

**ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED  
SUBDIVISION AND DEVELOPMENT OF PORTION 139 OF RUNDU  
TOWNLANDS NO. 1329, RUNDU TOWN, KAVANGO EAST REGION-NAMIBIA**



**Prepared By:**

**Prepared For:**



**ACEMAC Construction cc**

**APP-001424**

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<b>PROJECT TITLE:</b>	Environmental Management Plan for the Proposed Subdivision and Development of Portion 139 Of Rundu Townlands No. 1329, Rundu Town, Kavango East Region-Namibia
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## Contents

1.	CHAPTER ONE: BACKGROUND.....	2
1.1.	INTRODUCTION .....	2
1.2.	PROJECT LOCATION .....	2
1.3.	PROJECT DESCRIPTION .....	4
2.	CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK.....	6
2.1.	INTRODUCTION .....	6
3.	CHAPTER THREE: ENVIRONMENTAL MANAGEMENT PLAN (EMP).....	15
3.1.	EMP ADMINISTRATION.....	15
3.2.	OPERATIONAL PHASE .....	23
3.3.	ENVIRONMENTAL MONITORING PLAN .....	27
4.	CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS .....	28
4.1.	CONCLUSION .....	28
4.2.	RECOMMENDATIONS .....	28

## List of Tables

<b>Figure 1: Portion 139 Rundu</b>	<b>3</b>
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## List of Figures

Table 1: Proposed Site Coordinates	2
Table 2: Applying Policies, legal and Administrative regulations	7
Table 3: Roles and Responsibilities in EMP Implementation	16
Table 4: Construction Phase	17
Table 5: Impacts associated with the Operation Phase	24

## Definitions

TERMS	DEFINITION
BID	Background Information Document
EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
EMP	Environmental Management Plan
GHG	Greenhouse Gasses
ISO	International Organization for Standardization
I&APs	Interested and Affected Parties
MET: DEA	Ministry of Environment and Tourism's Directorate of Environmental Affairs
NHC	National Heritage Council
NEMA	Namibia Environmental Management Act
PRP	Pit Rehabilitation Plan
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

## **EXECUTIVE SUMMARY**

EnviroPlan Consulting cc has been engaged by ACEMAC Construction cc to conduct the Environmental Impact Assessment (EIA) and develop an Environmental Management Plan (EMP) for the proposed Subdivision and Development of Portion 139 Of Rundu Townlands No. 1329, Rundu Town, Kavango East Region-Namibia and to apply for an Environmental Clearance Certificate for the proposed project.

The township development project has triggered the application for an environmental clearance certificate as the following listed activity will be triggered by:

### **LAND USE AND DEVELOPMENT ACTIVITIES**

- 5.1d the rezoning of land from; zoned open space to any other land use

### **INFRASTRUCTURE**

- 10.2 The route determination of roads and design of associated physical infrastructure where -  
(a) it is (along/near) a public road;

### **Environmental Impacts**

- Low potential environmental impact.
- Relative or moderate social impact (positive)

### **Social Impacts**

The project is set to improve the socio-economic environment of Rundu Town through a major boost in business through integrations, employment and tourism on the long term.

# 1. CHAPTER ONE: BACKGROUND

## 1.1. INTRODUCTION

**ACEMAC Construction cc**, is the prospective owner of the portion 139 of the Rundu townlands No. 1329, measuring 15 hectares. As per the requirements of the Township and Division of Land Ordinance 1963 and the Environmental Management Act No. 7 of 2007, ACEMAC cc appointed EnviroPlan Consultants to undertake an Environmental Scoping Assessment (ESA), formulate an Environmental Management Plan (EMP) and apply for an Environmental Clearance Certificate (ECC) to the Ministry of Environment, Forestry and Tourism (MEFT): Directorate of Environmental Affairs (DEA).

In this respect, this document form part of the application to be made to the DEA's office for an Environmental Clearance certificate for the proposed township establishment on portion 139 of Rundu Townlands that shall allow the development of affordable 170 residential stands, 1 business stand, 5 Public Open Spaces, 1 institutional stand and opening of streets, according the guidelines on the statutes of the Environmental Management Act No.7 of 2007 and the environmental impacts regulations (GN 30 in GG 4878 of 6 February 2012).).

## 1.2. PROJECT LOCATION

The portion 139 is situated approximately 6km from Rundu Town along the Rundu-Nkurenkuru road opposite Sauyemwa Township. The exact coordinates of the location are:

The proposed development is approximately 15 ha. in extent and is vacant areas that is mostly dominated by grass, bushes, shrubs the farm is currently zoned "Undetermined". Several Informal roads and footpaths visible in the area. Notable in the surrounding are disused buildings, the map below (Fig 1) gives an Arial view of the project site and exact project location coordinates are as follows:

**Table 1: Proposed Site Coordinates**

A	Lat 17° 55' 35.56"	Long 19° 43' 17.34"
B	Lat 17° 56' 1.25"	Long 19° 43' 5.51"
C	Lat 17° 56' 3.57"	Long 19° 43' 15.82"
D	Lat 17° 55' 47.17"	Long 19° 43' 29.09"

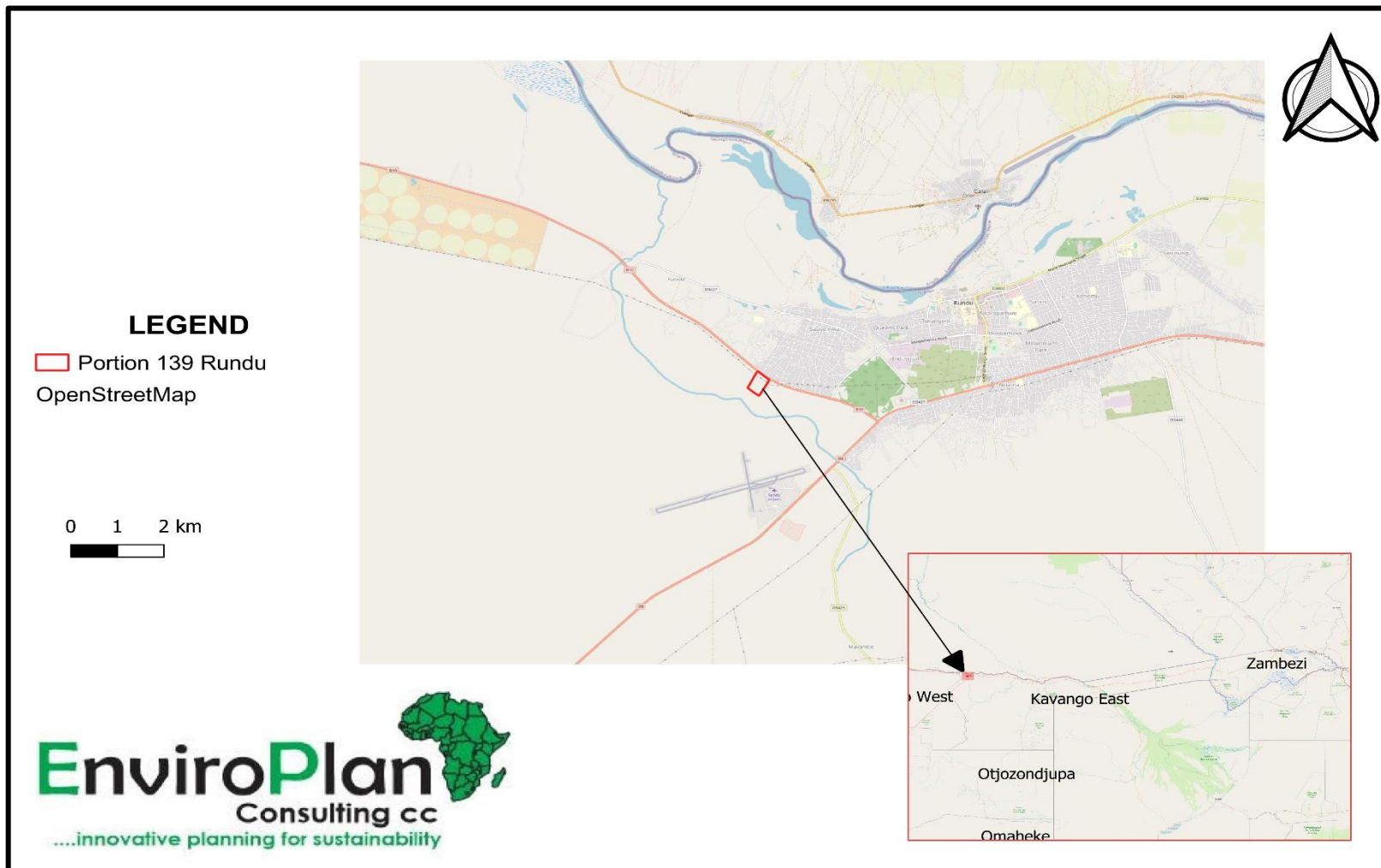


Figure 1: Portion 139 Rundu

### **1.3. PROJECT DESCRIPTION**

#### **Development Proposal & Layout**

The proposed project site is at portion 139, a portion located in Rundu Town and Townlands No. 1329. The land is zoned “undetermined”. It is argued that the portion is better developed for township as it is easily accessible to the existing, adjacent Sauyemwa suburb and can be easily connected to the existing service infrastructure (water, electricity, sewer and roads).

The township development on the site can be regarded as a special one due to the fact that the town of Rundu is in dire need of both residential and business purposes. This is critical for the growth of the town and the growing population. Going forward with that and considering that this portion is not being utilized, the developmental would optimize the use of land, which is currently unused, and facilitate the provision of affordable land for residential and business development.

The intention is to use the land primarily for a self-sustaining township development on the emphasis of low-cost residential development. The portion 139 has a potential to accommodate approximately 178 single residential erven, 1 business stand (small to medium mall), 1 municipal stand, 1 institutional stand and 5 open ervens for public open space and opening of streets. Local streets should represent not more than an area of 15% of the total site.

#### **Infrastructure and Services**

The proponent at the developers’ costs shall liaise with the municipality of Rundu for the provision of municipal services such as electricity, water reticulation, sewerage reticulation and domestic waste management. The services can easily be easily connected to the proposed project site. Since the site is adjacent to the existing Sauyemwa suburbs, water, sewer and electricity services are near and can be connected directly from Sauyemwa.

#### **Roads and Storm Water**

Access to the respective portion is through the Rundu-Nkurenkuru highway road. Since the access road is existing, only the inside access roads need to be constructed, which will have a minimum environmental impact. Internal roads of a minimum width of 12m to 15m shall be constructed. The roads would be constructed in line with municipal engineering standards and specifications and all traffic signs and road markings provided.

Storm water would be taken off from surface run-off and drain towards the bottom of the site/township. Adequate and proper drainage should be constructed that avoid instances of waterlogging and flooding of the township. It would be attempted to maintain the natural flow of storm water flow with minimum disruptions.



### **Water Reticulation**

The internal water reticulation network should be connected through the existing municipal network in Sauyemwa suburb. The design of the network should be done in consultation with the municipal engineering department.

### **Sanitation**

The area shall be connected to a Public Sewerage System Network (PSSN) of the Rundu town.

### **Electricity Distribution Network**

There is an existing electricity line passing through the project site therefore electricity connection is not a problem. The property developer is in process to investigate the connection options to that existing NORED grid. However, the capacity is sufficient to serve the proposed development.

### **Waste collection**

Small household bins of 120l shall be provided at every house, others will be strategically positioned across the township such that people will not move 200m without accessing a public bin. The bins have to be collected twice a week. The client should negotiate with Rundu Municipality for a contract on waste collection.

## **2. CHAPTER TWO: POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK**

### **2.1. INTRODUCTION**

An important part of the EIA is identifying and reviewing the administrative, policy and legislative situation concerning the proposed activity, to inform the proponent about the requirements to be fulfilled in undertaking the construction and land servicing activities. This section looks at the legislative framework within which the proposed development will be serviced and operate under, this will also inform the aspects that this Environmental Management Plan will cover.

The focus is on the compliance with the legislation during the planning, construction and operational phases. All relevant legislations, policies and international statutes applying to the project are highlighted in table 2. below as specified in the Environmental Management Act, 2007 (Act No.7 of 2007) and the regulations for Environmental Impact Assessment as set out in the Schedule of Government Notice No. 30 (2012).

**Table 2: Applying Policies, legal and Administrative regulations**

<b>Legislation/Policy/Guiding document</b>	<b>Provision</b>	<b>Project implication</b>
<b>The Constitution of the Republic of Namibia (1990)</b>	<p>The articles 91(c) and 95(i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalizing policies to accomplish the sustainable objectives which include:</p> <ul style="list-style-type: none"> <li>- Guarding against overutilization of biological natural resources,</li> <li>- Limiting over-exploitation of non-renewable resources,</li> <li>- Ensuring ecosystem functionality,</li> <li>- Maintain biological diversity.</li> </ul>	<p>Through implementation of the environmental management plan the proposed development will be in conformant to the constitution in terms of environmental management and sustainability.</p>
<b>Vision 2030 and National Development Plans</b>	<p>Namibia’s overall Development ambitions are articulated in the Nations Vision 2030. At the operational level, five-yearly national development plans (NDP’s) are prepared in extensive consultations led by the National Planning Commission in the Office of the President. Currently the Government has so far launched a 5<sup>th</sup> NDP that pursues three overarching goals for the Namibian nation: high and sustained economic growth; increased income equality; and employment creation.</p>	<p>The proposed project will increase availability of serviced erven in Rundu as well as creating employment in construction, which will be in fulfilment to the NDP and Vision 2030.</p>

<p><b>Environmental Assessment Policy of Namibia 1994</b></p>	<p>The Environmental Assessment Policy of Namibia requires that all projects, policies, Programmes, and plans that have detrimental effect on the environment must be accompanied by an EIA. The policy provides a definition to the term “Environment” broadly interpreted to include biophysical, social, economic, cultural, historical and political components and provides reference to the inclusion of alternatives in all projects, policies, programmes and plans.</p>	<p>The development establishment will only commence after being awarded an environmental clearance certificate, thus by abiding to the requirements of the Environmental Assessment Policy of Namibia. The EIA and EMP will cater for the sustainable management of bio-physical environment.</p>
<p><b>Environmental Management Act No. 07 of 2007</b></p>	<p>The Act aims at</p> <ul style="list-style-type: none"> <li>✓ Promoting the sustainable management of the environment and the use of natural resources by establishing principles for decision-making on matters affecting the environment;</li> <li>✓ To provide for a process of assessment and control of projects which may have significant effects on the environment;</li> <li>✓ To provide for incidental matters.</li> </ul> <p>The Act gives legislative effect to the Environmental Impact Assessment Policy. Moreover, the act also provides procedure for adequate public participation during the environmental assessment process.</p>	<p>This document is compiled in a nature that project implementation is in line with the objectives of the EMA Act. Guiding procedures were also drawn from the act to facilitate for the carrying out of the EIA and drafting the EMP for the proposed development.</p>

<p><b>Townships and Division of Land Amendment Act, 1992 (Act 28 of 1992)</b></p>	<p>“(l) Whenever any area of land constitutes, by reason of its situation, a portion of an approved township, or adjoins an approved township, the Executive Committee may, by proclamation notice in the Gazette and after consultation with the Board, extend the boundaries of that township to include such area”. (Minister of Regional and Local Government) A new township needs to be created for approval by the Namibian Planning Advisory Board and the Township Board.</p>	<p>Through conducting this EIA and preparation of The townships board already approved this project, however the construction and operation will need to be regulated accordingly.</p>
<p><b>Public Health Act (No. 36 of 1919)</b></p>	<p>Under this act, in section 119: “No person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”</p>	<p>The project proponent will ensure that all legal requirements of the project in relation to protection of the health of their employees and surrounding residents is protected. -Personal protective equipment shall be provided for employees in construction. -The development shall follow requirements and specification in relation to water supply and sewerage handling so as not to threaten public health of future residents on this piece of land.</p>
<p><b>Soil Conservation Act 76 of 1969</b></p>	<p>The objectives of this Act are to: ✓ Make provisions for the combating and prevention of soil erosion,</p>	<p>The project will have a rather localized impact on soils and on the soil through construction and access roads construction hence soil protection</p>

	<p>✓ Promote the conservation, protection and improvement of the soil, vegetation, sources and resources of the Republic.</p>	<p>measures will be employed and preservation of trees as much as possible.</p>
<p><b>Nature Conservation Ordinance 1996</b></p>	<p>To consolidate and amend the laws relating to the conservation of nature; the establishment of game Parks and nature reserves; the control of problem animals; and to provide for matters incidental thereto.</p>	<p>The proposed project implementation is not located in any known or demarcated conservation area, national park or unique environments. The project site was selected with this ordinance in mind to ensure that Namibian nature is conserved.</p>
<p><b>Protected Areas and Wildlife Management Bill</b></p>	<p>This bill, when it comes into force, will replace the Nature Conservation Ordinance 4 of 1975. The bill recognizes that biological diversity must be maintained, and where necessary, rehabilitated and that essential ecological processes and life support systems be maintained. It protects all indigenous species and control the exploitation of all plants and wildlife.</p>	<p>The project has ensured that their activities do not fall within the boundaries of any protected area and that the project will not affect heavily endangered vegetation and animals on its site.</p>
<p><b>Forest Act, 2001 (Act No. 12 of 2001)</b></p>	<p>The Act gives provision for the protection of various plant species through the Ministry of Agriculture, Water and Forestry (MAWF), Directorate of Forestry).</p>	<p>-During the clearing of land for the establishment the cutting down or harvesting of plant species will be done upon approval from the Directorate of Forestry. The proponent will also have to ensure that there is no indiscriminate cutting down of trees.</p>

		-The proposed site is sparsely vegetated with white thorn tree species, which are not threatened or protected.
<b>National Biodiversity Strategy and Action Plan (NBSAP2)</b>	The action plan was operationalised in a bid to make aware the critical importance of biodiversity conservation in Namibia putting together management of matters to do with ecosystems protection, biosafety, biosystematics protection on both terrestrial and aquatic systems.	ACEMAC construction has been advised by the EIA Team and recognises the need for ecosystems protection to manage the changing climatic environment. Through this project, there will be reforestation and fostering of green development, which will be promoting the protection and conservation of the biophysical environment, and with this EIA, it will be ensure that almost 40% of grown tree species on site will not be removed but rather will be part of the development, to promote Greed development.
<b>National Policy on Climate Change for Namibia, 2010</b>	In harmony with the findings of the IPCC over time and the Earth Summits being held annually the policy seeks to outline a coherent, transparent and inclusive framework on climate risk management in accordance with Namibia’s national development agenda, legal framework, and in recognition of environmental constraints and vulnerability. Furthermore, the policy pursues the strengthening of national capacities to reduce climate change risk and build resilience for any climate change shocks.	The proposed project will ensure that there will be limited release of greenhouse gasses such as methane, carbon dioxide, nitrous oxides. Methods such as wet surface operations to reduce dust emissions will be utilised to remove aerosols emitted into the near-surface atmosphere.

<p><b>Wetland Policy, 2004</b></p>	<p>The policy provides a platform for the conservation and wise use of wetlands, thus promoting inter-generational equity regarding wetland resource utilization. Furthermore, it facilitates the Nation's efforts to meet its commitments as a signatory to the International Convention on Wetlands (Ramsar) and other Multinational Environmental Agreements (MEA's).</p>	<p>In compliance to this policy the development will ensure a standard environmental planning such that it does not affect any wetlands within its locale through recognition of wetlands to promote the conservation and wise utilization of wetlands resources.</p>
<p><b>Water Resources Management Act, 2013 (Act No. 11 of 2013)</b></p>	<p>This Act provides for the management, protection, development, use and conservation of water resources and the regulation and monitoring of water services and to provide for incidental matters. (Department of Water Affairs).</p>	<p>Water usage during construction will be supplied by Rundu Town Council.</p>
<p><b>National Heritage Act 27 of 2004</b></p>	<p>Heritage resources to be conserved in development. (National Heritage)</p>	<p>During the project implementation as soon as objects of cultural and heritage interests are observed such as graves, artefacts and any other object believed to be older than 50 years, all measures will be taken to protect these objects until the National Heritage Council of Namibia have been informed, and approval to proceed with the operations granted accordingly by the Council.</p>
<p><b>National Monuments Act of Namibia (No. 28 of 1969) as amended until 1979</b></p>	<p>"No person shall destroy, damage, excavate, alter, remove from its original site or export from Namibia: (a) any meteorite or fossil; or</p>	<p>The proposed site of development is not within any known monument site both movable or immovable as specified in the Act, however in</p>



	<p>(b) any drawing or painting on stone or a petroglyph known or commonly believed to have been executed by any people who inhabited or visited Namibia before the year 1900 AD; or</p> <p>(c) any implement, ornament or structure known or commonly believed to have been used as a mace, used or erected by people referred to in paragraph (b); or</p> <p>(d) the anthropological or archaeological contents of graves, caves, rock shelters, middens, shell mounds or other sites used by such people; or</p> <p>(e) any other archaeological or palaeontological finds, material or object; except under the authority of and in accordance with a permit issued under this section.</p>	<p>such an instance that any material or sites or archeologic importance are identified, it will be the responsibility of the developer to take the required route and notify the relevant commission.</p>
<p><b>Pollution Control and Waste Management Bill</b></p>	<p>This bill has not come into force. Amongst other the bill aims to “prevent and regulate the discharge of pollutants to the air, water and land” Of particular reference to the Project is: Section 21 “(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse.”</p> <p>Section 55 “(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or</p>	<p>To control air, water and land pollution as agitated by the Act the project proponent will ensure that erven will have approved drainage on site and that sanitation facilities do not threaten public health, adding on an integrated pollution management strategy following the EMP and will be operationalised on site.</p>

	creates a significant risk of harm to human health or the environment.”	
<b>Convention on Biological Diversity (CBD)</b>	Namibia is a signatory of the Convention on Biological Diversity and thus is obliged to conserve its biodiversity.	The project will preserve tree species on as part of their plans for greed and sustainable development.
<b>United Nations Convention to combat Desertification</b>	Namibia is bound to prevent excessive land degradation that may threaten livelihoods.	It will be the responsibility of the developer and future land owners at to conserve vegetation on and around the area, to avoid encroachment of the desert environs in the area.

### **3. CHAPTER THREE: ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

The proposed township establishment will have environmental impacts as indicated in the Environmental Scoping Report. This section is aimed at outlining the Environmental Management Plan (EMP) for impacts associated with the proposed township establishment project. The EMP stipulates the management of environmental programs in a systematic, planned and documented manner. The EMP below includes the organizational structure, planning and monitoring for environmental protection at the proposed farm area development and other areas of its influence. The aim is to ensure that the proponent maintains adequate control over the project operations to:

- To prevent negative impacts where possible;
- Reduce or minimise the extent of impact during project life cycle;
- Prevent long term environmental degradation.

#### **3.1. EMP ADMINISTRATION**

There is a strong need to clearly outline the roles and responsibilities of all stakeholders to ensure that the EMP is fully implemented. There is also a need for the proponent to appoint an overall responsible person (project manager) to ensure the successful implementation of the EMP as highlighted below:

**Table 3: Roles and Responsibilities in EMP Implementation**

<b>ROLE</b>	<b>ENVIRONMENTAL RESPONSIBILITIES</b>
ACEMAC Construction cc	Responsible to enforce EMP implementation to contractors
Environmental Control Officer	<p>Implement, review and update the EMP.</p> <ul style="list-style-type: none"> <li>• Ensure all reporting and monitoring required under EMP is undertaken, documented and distributed as needed</li> <li>• Conduct environmental site training (tool box talks) and inductions with the support of an environmental consultant.</li> <li>• Conducts environmental audit at work site with the support of environmental consultant.</li> <li>• Close out all non-conformances.</li> <li>• Ensure materials being used on site are environmentally friendly and safe.</li> </ul>
The Department of Environmental Affairs	<p>Approve the EMP and any amendments to the EMP.</p> <ul style="list-style-type: none"> <li>• Approve reports of environmental issues and non-conformances as issued.</li> <li>• Review and approve environmental reports submitted as part of EMP implementation</li> </ul>
Site Engineers	<p>Control and monitor actions required by the EMP.</p> <ul style="list-style-type: none"> <li>• Report all environmental issues to the ECO.</li> <li>• Ensure documented procedures are followed and records kept on site.</li> <li>• Ensure any complaints are passed onto the management within 24 hours of receiving the complaint.</li> </ul>
Workers/Employees/Visitors	<p>Follow requirements as directed by site engineers.</p> <ul style="list-style-type: none"> <li>• Report any potential environmental issues to site engineer/project manager, indicating spilt oil, excess waste, excessive dust generation, dirty water running off the site and other possible non-conformances</li> </ul>

**Table 4: Construction Phase**

Impact	Description	Effects	Class	Time frame	Responsibility	Action
<b>Construction Phase-Negative Impacts</b>						
<b>Noise pollution</b>	Noise will be generated through: -Access roads construction -Construction of Streets -Construction of drainage services and water reticulation systems. -Construction of buildings -Moving vehicles.	- The health of working personnel could be disturbed. - Passers-by could be disturbed by the noise. - General annoyance -Driving away of local animals' species near the project site -Residents nearby will be affected	Environmental	6-8 months	-Environmental Control Officer -Site Manger	- A construction interval between 7:00 AM and 5:00 PM will be adhered to - Workers will be issued ear plugs to protect them from excessive noise. - Public will be notified through printed timetable stating planned operational activities. - Construction activities will be conducted during daytime. -Site notices will be erected on and around the site notifying visitors and nearby residents of different hazards on site. -It is however important to note that the nearest dwellings are across the Rundu-Nkurenkuru road, approximately 100m + from the construction area.
<b>Dust Generation</b>	Dust will accumulate because of the land preparation, onsite movements of vehicles and machines, wind blowing on loose material during construction and tipping.	- Can lead to respiratory illnesses especially to those working in the area. - General air pollution. -Nuisance to nearby residents	Environmental	6-8 months	-Environmental Control Officer -Project Manger	- Dust suppression will be done through watering dust sources surfaces. -Watering down dusty surfaces. -Ensure that protective equipment such as respirators are distributed to employees, and ensure their use. -Site notices to be erected on and around the site to inform visitors and surrounding residents.

<b>Loss of Biodiversity</b>	-Vegetative plants on site will be removed -Habitat destruction for both ground dwelling species and tree dwelling species. -Soil disturbance on and around the site.	-The clearing of vegetation will result in the breaking of the ecosystem processes in the area. -Loss of aesthetic value of the proposed project area. -The few small animals still habiting the place such as small rodents and birds will be forced away. -The ecosystem food chain on and around the area will be broken.	Environmental	Construction phase	-Environmental Control Officer -Site Manager	- The proposed project area had development before the area was proclaimed and there is massive urban area disturbances already, hence there is little vegetation to be affected by the development. - All the major trees will be preserved and the layout plan will fit into the environment without affecting the trees. - Ground disturbance will only be limited to boundary area to avoid affecting a large area. -Upon completion of construction activities more trees and lawn will be planted on and around the site to restore the site into a status that is environmentally friendly.
<b>Greenhouse gas emissions</b>	Green House Gasses (GHGs) emissions will be produced from the following activities: <ul style="list-style-type: none"> <li>• Fuels combustion for transport (construction vehicles and equipment)</li> <li>• Ground excavation releases phosphorus found underground and releases particulate matter into the atmosphere.</li> </ul>	-Global climate change - Air pollution	Environmental	Construction phase	-Environmental Control Officer -Project Manager -Department of Environmental Affairs.	-Adopt the use of ethanol blended fuels wherever necessary. -Design an operation system that cuts on fuel consumption. - Use of solar energy system during construction for lighting and other minor energy needs.
<b>Pollution from construction activities</b>	Construction is associated with a lot of raw material and activities that results in pollution	-Chemical pollution from oil spills resulting from the handling of various	Environmental	Construction phase	-Environmental Control Officer -Project Manger	-Ensure that all waste from construction activities is stored and contained in designated containers

		<p>machineries used during the construction phase</p> <ul style="list-style-type: none"> <li>-Construction rubble, empty packaging containers/bags and materials remnants.</li> <li>-Construction workers can also pollute the surrounding environs if they are not provided with adequate toilet facilities and a waste management system for domestic waste.</li> </ul>				<p>and transported to the Rundu waste disposal site.</p> <ul style="list-style-type: none"> <li>-Bulky waste such as building rubbles must be collected and disposed of at any of the various municipal satellite sites or for landfilling.</li> <li>-Adequate mobile toilets must be provided at the construction camps for the use of the workers.</li> <li>-A skip container will be put on site and regularly emptied to handle domestic waste.</li> </ul>
<p><b>Hydrocarbons release into the environment</b></p>	<p>There will be no storage of oils and fuel on site, however there is risk of spillage of hydrocarbons from vehicles and machinery operations, maintenance through leakages and spillages which may result in environmental contamination</p>	<ul style="list-style-type: none"> <li>-Washing away of contaminated soils by rains into nearby rivers</li> <li>-Pollution of soil and affecting small living organisms habituating the soil</li> <li>-Result in possible groundwater pollution.</li> <li>-Possible fire risk on and around the site</li> </ul>	Environmental	Construction Phase	<ul style="list-style-type: none"> <li>-Environmental Control Officer</li> <li>-Project Manager</li> <li>-Department of Environmental Affairs.</li> </ul>	<ul style="list-style-type: none"> <li>-Implement a maintenance programme to ensure all vehicles, machinery and equipment are and remain in proper working order</li> <li>-Vehicle maintenance should be Conducted in designated areas only, preferably off-site.</li> <li>- Spillages are to be removed from site by a specialist waste removal contractor such a rent a drum.</li> <li>-Waste oil, fuels and other chemicals from drip trays on stationery vehicles and machinery will be disposed of as hazardous waste at a licensed facility by a specialist hazardous waste handler.</li> <li>-Oil residue will be treated with oil absorbent material such as Drizit or bio-remediation and removed to an approved waste disposal site</li> </ul>

						<ul style="list-style-type: none"> <li>-Spill kits will be easily accessible and workers will be trained in the use thereof.</li> <li>-Staff and contractors will be trained in the handling and storage of oils, fuels, chemicals and other hazardous substances</li> <li>-No bins containing organic solvents such as paint and thinners shall be cleaned on site, unless containers for liquid waste disposal are provided on site.</li> </ul>
<b>Safety and Health risks</b>	Construction related Safety and Health hazards	-Injuries to workers such as Occupational dermatitis, slips and fall of humans and objects, musculoskeletal disorders, etc.	Health and safety	Construction phase	Project manager	<ul style="list-style-type: none"> <li>-Equip workers with Personal Protective Equipment (PPE), provide trainings on how to effectively use the PPE.</li> <li>-Provide platforms for briefings and meetings about possible safety and health hazards in the work place</li> <li>-Provide site signs warning and informing about different hazards on site.</li> </ul>
<b>Population Influx</b>	The project will bring in skilled and unskilled workforce into Rundu town from other places increasing population density in the area.	<ul style="list-style-type: none"> <li>-There is potential for cultural systems conflict between locals and new people in the area</li> <li>-Potential for rife prostitution and spread of HIV/AIDS and other STDs</li> <li>-Potential for scaring away of local wild animals, poaching and removal of</li> </ul>	Socio-economic	Construction phase	<ul style="list-style-type: none"> <li>-Environmental Control Officer</li> <li>-Project Manger</li> </ul>	<ul style="list-style-type: none"> <li>-Train and brief employees to respect local cultures and leaders.</li> <li>-Engage on massive sexual health training and awareness and providing contraceptives such as condoms, as well as provide means counselling for those that are affected by HIV/AIDS and other STDs.</li> <li>- Provide environmental trainings and continue a regular basis briefing the employees about nature conservation</li> </ul>



		protected indigenous vegetative species				(animal and plants), and discourage indiscriminate vegetation clearance.
<b>Land use change</b>	-The existing environment will drastically change from a dormant piece of land to a modernised urban development.	-The area will no longer be suitable for agriculture. -Sudden change in landscape appearances may be unfavourable to the conservatives.	-Social -Terrestrial environment	Permanent	-Environmental Control Officer -Project Manger	-The development should blend into the existing area through designing and colour coding. -Green designing will bring life to the site and blend with surrounding areas.
<b>Extraction of consumption resources</b>	-Construction raw materials such as sand and aggregate come from the extractive industry and it might have detrimental impacts on the environment.	-Sand abstractors may result in degradation from the source areas. -Unsustainable construction practices can cause damage to the ecological and social environment through noise, driving away animals and destruction of forest resources.	-Ecological -Social	Construction phase	-Environmental Control Officer -Site Engineer	-The project manager will only make sure that suppliers of raw materials from the extractive industry have an Environmental Clearance Certificate for their activities.
<b>Resources consumption</b>	The construction industry can be resource intensive, i.e. electrical and water resources.	-The project can result in a strain on available water resources and electricity.	-Socio-economic	Construction phase.	-Environmental Control Officer -Project Manger	-Water saving should be ensured by the site manager i.e. repairing leakages, opening taps only when water is required and recycling of water on site. -Electricity supply can be augmented by sustainable energy such as solar to power things such as boreholes and smaller appliances on site.
<b>Construction Phase-Positive Impacts</b>						
<b>Employment creation</b>	The construction exercise provides an opportunity of outsourcing work	- Improves disposable income to those employed and their immediate families.	Socio-economic	Project life time	-Project Manger	- Work with local leadership (councillor) on acquiring non-skilled labour from the residents.

<p><b>Business linkages</b></p>	<p>-Raw materials acquiring and contracting companies provide an opportunity for businesses.</p>	<p>-Local suppliers will be presented with an opportunity to empower their businesses. -Construction workers can be provided with accommodation, food and services from the local community increasing business activities.</p>	<p>-Socio-economic</p>	<p>Construction phase</p>	<p>-Project Manger</p>	<p>-The proponent will outsource most of its materials and services from Rundu Town.</p>
<p><b>Infrastructure development</b></p>	<p>The development presents a unique opportunity for infrastructure development in Rundu Town.</p>	<p>-Existing roads will be upgraded which will benefit the local community. -Development of the facilities will also pave way for future developers to grow interests in the area and result in ripple effects and quick growing of the area.</p>	<p>-Socio-economic</p>	<p>Construction phase</p>	<p>-Project manager</p>	<p>-Development such as road upgrading will not only be limited up until the project site, but it will be extended to service other residents as well.</p>

## **3.2. OPERATIONAL PHASE**

The operational phase is the most critical component of project implementation since it is more on a long term, however and it is normally associated with less impacts as compared to construction phase. This phase will comprise of the actual day to day running of the development. This phase is expected to last permanently, but with upgrading activities occasionally. There will be several impacts that will occur on a daily basis or other sequential routine. The phase forms the basis of an Environmental Management Plan that is detailed in Chapter and will be followed by the decommissioning phase. The major impacts identified by this study for the operational phase are as detailed in the previous chapter.

**Table 5: Impacts associated with the Operation Phase**

Aspect	Description	Effects	Class	Time Frame	Responsibility	Action
<b>Operation Phase-Positive Impacts</b>						
<b>Water usage</b>	-Water is an important resource that will be used by the residents for domestic purposes, the proposed project will be serviced with water by Rundu Town council's water reticulation system.	-Straining local water supply from the Rundu Town Council water reticulation system.	Environmental	Permanent	Building/Site manager	<ul style="list-style-type: none"> <li>- Apply a supply and demand model that will be determined by seasonal variations in water availability.</li> <li>-Water saving connections to be put in place.</li> <li>-Regular maintenance of water pipes to avoid leakages and wasteful use of water resources.</li> </ul>
<b>Energy usage</b>	-Human settlements consume a lot of electrical energy daily, such that energy requirements will need checking.	-Energy supply through the main grid will be strained	-Socio-economic	Permanent	-Building/Site manager	-The proponent has a plan of using solar energy to power the area, but initially electrical energy will be supplied by Rundu Municipality.
<b>Solid Waste</b>	- Domestic and industrial solid waste will be generated by the residents who will settle in this area. It is therefore very important to construct appropriate infrastructure to management thus waste types, etc.	<ul style="list-style-type: none"> <li>- Eyesore to the environment</li> <li>-Unwanted nutrient disposal into the soils,</li> <li>- Detrimental to livestock health</li> </ul>	Environmental Socio-economic	Permanent	-Site manager	<ul style="list-style-type: none"> <li>-Visual inspections monitoring</li> <li>-All waste will be managed by Rundu Town Council, the developer will ensure that domestic waste handling facilities such as dust bins and skip containers are available for all erven.</li> <li>-Waste separation will be provided for to allow for recycling of recyclable materials.</li> </ul>

<b>Sewerage and effluent waste</b>	Domestic activities will result in ablution sewer water	-Health hazard	-Environmental -Health	Permanent	Site Manager	-All sewerage waste will be channelled into the Municipal sewer reticulation system.
<b>Population increase</b>	Influx of population into the area.	-Population increase may result in social evils such as prostitution and high crime rate. -Pressure on available social services. -Cultural integration may result in dilution of the local values and cultures. -Possibility for conflicts between new residents, visitors and the residents.	-Socio-economic	Permanent	-Project proponent -Police -Health services	-The proponent will push for the establishment of a police post in the area and space will be reserved for the police post. -Engaging actively in sexual health to avoid diseases spreading sexually.
<b>Increased storm water flow</b>	-The area is undeveloped hence most water quickly infiltrates as it reaches the ground, but due to the paving and hard surfaces storm water will increase	-Enhance the chances of flood occurrences -Chances of soil erosion and gully formation will be increased	Environmental	Permanent	-Site Engineer -Environmental Control Officer	-Standard storm water drainage will be part of the water reticulation designs indicating the storm water deposit areas.
<b>Infrastructure hazards</b>	-Infrastructure hazards are potential risks that building pose to its inhabitants, local environment or surrounding residents.	-There is potential for building collapse. -Firebreaks potential	-Socio-economic -Environmental	Permanent	-Site Engineer -Contractor -Project proponent -Buildings inspectorate -Ministry of Health and Social Services. -Ministry of Safety and security	-Sewerage infrastructure will be regularly monitored and inspected over time. -Standard buildings will be constructed and building inspection will be done by Regional Council officers. -Fire emergency evacuation plan will be put in place to avoid fatalities and injuries in case of an emergency.

Operational Phase-Positive Impacts						
<b>Development of the area</b>	-The project will further develop Rundu Town as a growing town.	-Ripple effects will result in construction of supporting infrastructure such as schools, hospitals, car services and supermarkets.	-Economic	Permanent	-Regional council	-The Development Should Be Regulated in Such a way that the local people are empowered and benefit from the development activities.
<b>Revenue generation</b>	The development is bound by to pay tax and rates to Rundu Town Council and the government	-The town council will benefit from revenue generation from the development -Business facilities will be paying tax to the government benefiting the country at large.	National	Permanent	-Project proponent -Inland Revenue department	-The project will benefit the locals, authorities and the government if all dues, rates and taxes are adhered to.
<b>Rehabilitation maintenance of the environment.</b>	Currently the project environment is already degraded	-After construction trees will be planted and a green zone created improving the aesthetic value of the environment to a better position than it was before.	Environmental	Permanent	-Building/site manager	-During operation phase tree planting will continue and maintenance of the green zone. -Regular watering of the lawns that will be planted.

### **3.3. ENVIRONMENTAL MONITORING PLAN**

Monitoring component is very important for identifying successfulness of mitigation measures formulated for the significant impacts identified. The monitoring works will identify impacts that have not been foreseen and give enough time to analyse the situation and formulate measures to minimise impact. Survey records and results must be maintained for these monitoring and inspections, highlighting any problems and the measures taken to address it.

Prior to site preparation and construction activities, the main contractor should present an environmental management plan (including, *inter alia*, location of construction camp and toilet facilities, location of material storage areas, solid waste management plan, dust control measures, activity schedule, etc.) for review and approval by the DEA, the environmental monitor and the project manager. The developer should present a landscape plan and the trees/vegetation earmarked for protection should be flagged and hoarded by the contractor.

The entity selected to carry out environmental monitoring of the construction works should then prepare an environmental monitoring programme based on the above, the requirements of the EIA, and conditions of the development permit. The major elements of the environmental impact monitoring programme to be implemented during the construction phase of the project are as follows:

- Site clearance to ensure that trees marked for protection are left untouched and that large areas of soil are not left exposed and uncovered for extended periods of time.
- Site drainage and surface runoff, especially during and shortly after major rainfall events, to ensure there is no flooding, ponding and runoff of surface water. Compliance of construction works with site management and landscape plans.
- Ensure transportation of earth materials is done by covered trucks and from approved sites.
- The contractor must immediately and completely clean up spills of materials in public areas.
- Solid waste disposal practices to ensure appropriate on-site management and final disposal at approved dump.
- Health and Safety should be prioritised at all times.

## 4. CHAPTER FOUR: CONCLUSION AND RECOMMENDATIONS

### 4.1. CONCLUSION

Arising from the analysis by the consultants, the proposed project is going to create permanent land cover/use change on the proposed project site. The vegetation environment that is going to be converted into a residential area and the document has thus provided adequate mitigation measures for the identified impacts for sustainable land development, because land must develop, but with land development there should not be environmental degradation, thus the EMP provides for the sustainable land development for the township development.

### 4.2. RECOMMENDATIONS

To alleviate any negative impacts that may emanate from the construction and operation phases of the land development and its affiliate development, relevant and cost-effective management and mitigation measures will be put in place.

The following recommendations are proposed:

#### a) Waste Management Recommendations

Solid and liquid waste shall be generated during the project lifespan and must be managed in such a way that it does not impact on the environment.

- The waste water reticulation system should be regularly monitored and maintained in good working conditions and odours managed to make the facility environmentally friendly.
- Provision of colour coded dust bins at all erven to ensure that recyclable material is recovered.

#### b) Environment Management Plan Recommendations

To ensure a healthy and safe environment in the proposed site and its environs, a plan for environmental management has to be instituted through monitoring. This involves the collection and analysis of relevant environmental data of the site including:

- Health & Security provision for workers
- Firefighting equipment that is strategically placed for easy access
- Devoted maintenance status of drainage facilities (drainage lines)
- Energy production and use
- Ensuring that only efficient taps are installed to conserve water.
- Quantification on amount of waste generated and its management to obtain information for continued improvement in handling and disposal
- Observation on socio-economic & demographic characteristics of the projects life cycle and identification of unexpected environmental impact
- Formulation of counter-measures to mitigate against the observed unexpected negative impacts and comparing them with actual impacts



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