

2023

**THE ENVIRONMENTAL MANAGEMENT PLAN FOR THE  
CONSTRUCTION AND OPERATION OF THE 220KV TRANSMISSION  
LINE FROM OTJIKOTO-MASIVI AND MAINTENANCE OF AN  
EXISTING 132KV OTJIKOTO – RUNDU TRANSMISSION POWERLINE  
FROM OSHIKOTO REGION TO KAVANGO EAST REGION**



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SHEW SECTION. JUNE 2023**

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## 1 LIST OF TERMS, ACRONYMS AND ABBREVIATIONS

EAP	Environmental Assessment Practitioner
ECC	Environmental Clearance Certificate
EIA	Environmental Impact Assessment
EMA	Environmental Management Act no 7 of 2007
EMP	Environmental Management Plan]
GIS	Geographical Information System
HIV/AIDS syndrome	Human immunodeficiency virus/ acquired immunodeficiency
MEFT	Ministry of Environment, Forest, and Tourism
NHC	National Heritage Council
SHE	Safety, Health, and Environment
SHEW	Safety, Health, Environment and Wellness
kV	Kilovolt

## 2 INTRODUCTION

NamPower has transmission and distribution networks across all regions countrywide. It is important to state that the proposed 220kV powerline will run mostly alongside the existing 132kV line from Tsumeb to Rundu which runs alongside the B8 main road from Mururani to Masivi. The proposed Otjikoto-Masivi line is a 220kV single circuit overhead transmission line connecting the Otjikoto substation near Tsumeb and the Masivi substation under construction near Rundu. The proposed line will span 267km from Oshikoto region to Kavango West region, approximately 10km along B1 outside of Tsumeb to about 10km before Rundu. In addition to the existing 132kV Transmission line, the 220kV transmission line is required to strengthen the supply network in the Kavango West and East regions due to increased load demands in the area.

### 2.1 Project description

The 220 kV transmission line from Otjikoto – Masivi will transmit power through an overhead line system from Otjikoto substation outside Tsumeb Town to Masivi substation located near the town of Rundu. The 132 kV Otjikoto – Rundu existing transmission line is 275km in length, have Self-Supporting Type 232 Towers and was constructed in 1992. See the locality map shown in Figure 1.

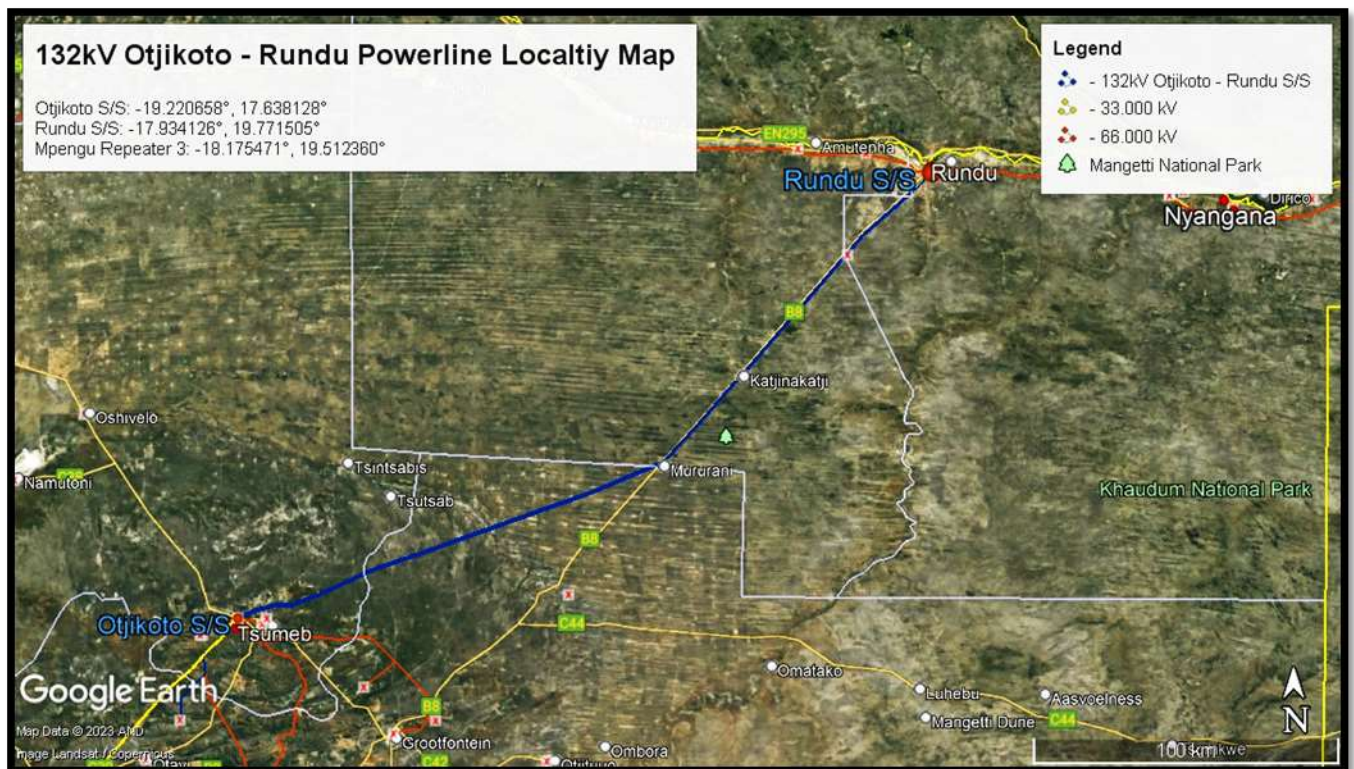
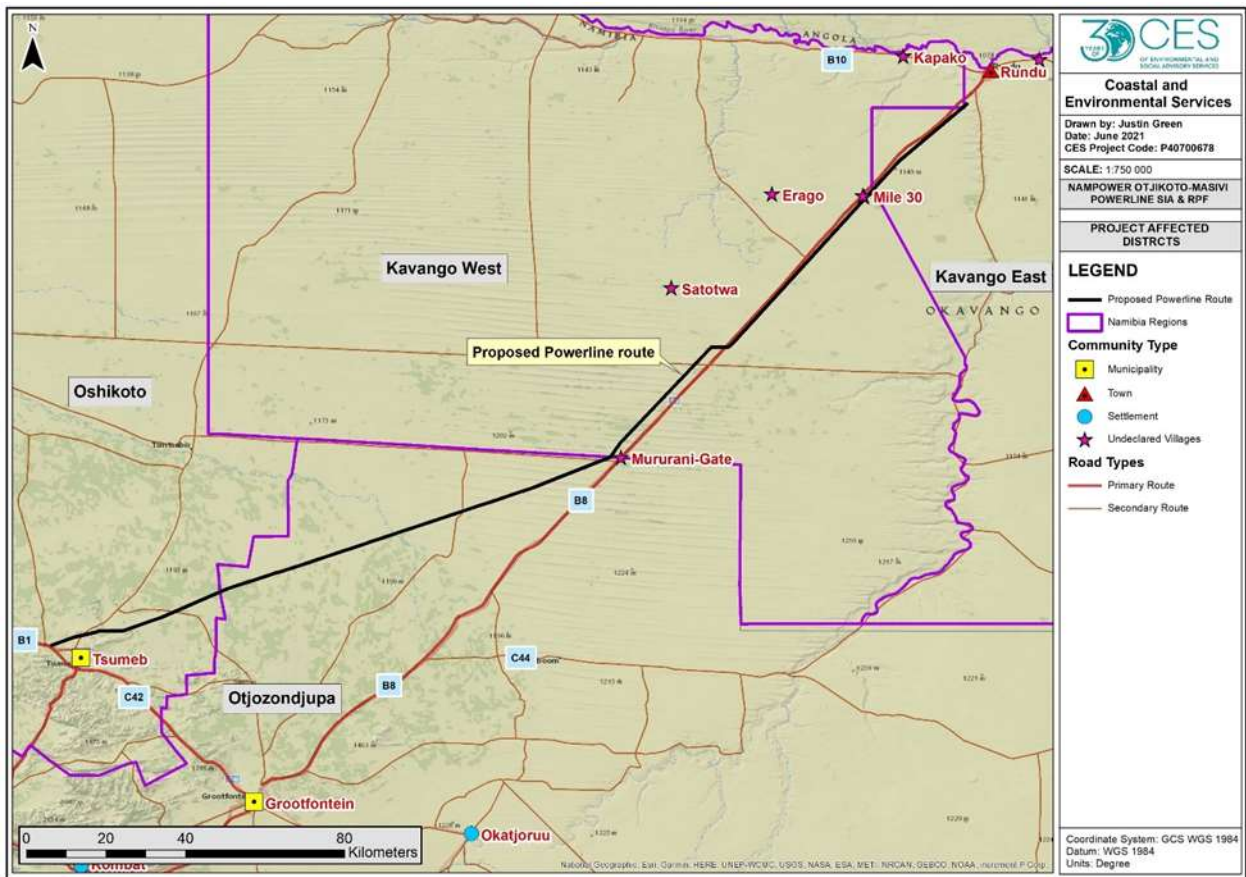


Figure 1: Locality map showing the 132kV Otjikoto - Rundu transmission line.



**Figure 2:** Otjikoto-Masivi 220kv transmission line route.

## 2.2 General area description

The 132kV and 220kV transmission line routes pass through 2 vegetation types – Mountain Savannah and Karstveld or Karstveld and Tree Savannah and Woodlands (Northern Kalahari or North-eastern Kalahari Woodland). The main ephemeral rivers draining the general area flow westwards e.g. Omuramba Owambo (Tsumeb area) north-eastwards e.g. Omuramba Omatako (Mururani Gate area) eastwards e.g. Okavango River (Rundu area).

The general transmission line route servitudes, have numerous anthropomorphic influences mainly associated with commercial farming, traditional farming practices (e.g. mahangu fields) and others such as; railway, tracks, roads, associated access routes and infrastructures. The impact of most common line activities such as construction, operational inspections and general maintenance activities would be site specific and have a relatively small environmental “footprint” and is not expected to have a major impact on the environment.

There are some environmental and socio-economic sensitive areas associated with this line route and they include: agricultural areas including mahangu fields and drainage lines (Omuramba). The “high” sensitivity area should be avoided during construction and when applying herbicides and should rather be cleared using the tradition manual hand clearing techniques.

### **3 OBJECTIVES AND SCOPE OF THIS ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

The construction and operation of the transmission’s lines can have a negative impact on the receiving environment. However, the impacts are limited to the line’s servitudes. It is thus important that good management measures are implemented to ensure that environmental damage is minimised. This Environmental Management Plan (EMP) seeks to manage and keep to a minimum the negative impacts and at the same time, enhance the positive impacts.

The scope of this EMP include all activities associated with the construction of the 220kV transmission line and operation of the 132kV transmission line It is necessary to highlight that the EMP is a living document that should be periodically reviewed and updated. It must also be noted that the EMP should be read in conjunction with laws and regulations outlined in section 5, Table 1 and all other applicable laws.

The aim of this EMP is to detail the management actions required to implement the mitigation measures identified thereby ensuring that any construction phase and operational phase activity is carried out in a manner that takes cognisance of environmental protection and is in line with legal.

This EMP has the following objectives:

- To outline mitigation measures to be implemented during the operation phase, to manage and minimize the extent of environmental impacts.
- Minimize negative impacts and enhance positive impacts associated with the operations.
- To ensure that the construction and operational activities do not result in undue or reasonably avoidable adverse environmental impacts and ensure that any potential



	<p>Section 33 onwards</p> <p>And all other applicable sections.</p>	<ul style="list-style-type: none"> <li>○ Generation of electricity</li> <li>○ Transmission of electricity</li> <li>• These sections details the process to be followed in order to obtain a clearance certificate.</li> <li>• All existing listed activities must obtain a clearance certificate within one year of the law coming into effect. Therefore, all existing activities which can be considered a listed activity should apply for clearance.</li> </ul>
EMA Regulations GN 28-30 (GG 4878) (February 2012)	<ul style="list-style-type: none"> <li>• Listed activity:</li> <li>• 5.1</li> <li>• 6 – 9; 13; 15; 21 -24</li> <li>• Any other applicable sections</li> </ul>	<ul style="list-style-type: none"> <li>• This activity can be considered as electricity generation and transmission.</li> <li>• These sections details the process to be followed in terms of producing an Environmental Assessment and this process should be adhered to during the generation of information for this document.</li> </ul>
No. 156 Labour Act, 1992: Regulations relating to the health and safety of employees at work .	All applicable regulations	All regulations applicable to different activities must be complied to.
Labour Act no 11 of 2007	<ul style="list-style-type: none"> <li>• Section 3</li> <li>• Section 4</li> <li>• Section 9</li> <li>• Section 39 – 42</li> <li>• All other applicable</li> </ul>	<ul style="list-style-type: none"> <li>• Children under the age of 16 may not be employed.</li> <li>• Forced labour may not be used.</li> <li>• Basic conditions of employment as stipulated by the law must be met.</li> <li>• The employer shall ensure the health and safety of all employees and non-</li> </ul>



	sections	employees on site. Employees must fulfil their duties in order to ensure their own health and safety and that of other employees and persons. Employees may leave the work site if reasonable measures to protect their health are not taken.
Electricity Act no 4 of 2007	<ul style="list-style-type: none"> <li>• Section 33</li> </ul>	<ul style="list-style-type: none"> <li>• Installations used for the provision of electricity should be operated with due compliance with the requirements of laws relating to health, safety and environmental standards. Therefore – any company involved within the Electricity Supply Industry must adhere to the laws covering the previously stated aspects or stand to lose their licenses to operate.</li> </ul>
Water Act no 54 of 1956	<ul style="list-style-type: none"> <li>• Section 21 and 132</li> <li>• Section 23</li> <li>• All other sections applicable to different activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Conditions in terms of the disposal and management of effluent are to be adhered to.</li> <li>• Any person causing pollution to a water source shall be guilty of an offence.</li> </ul>
Public and Environmental Health Act no 1 of 2015	<ul style="list-style-type: none"> <li>• Section 52</li> <li>• Section 53</li> <li>• All other sections applicable to different activities.</li> </ul>	<ul style="list-style-type: none"> <li>• A person generating waste must ensure that the waste generated is kept and stored under conditions that causes no harm to human health or damage to the environment.</li> <li>• Waste must only be disposed of at a waste disposal site, including an incinerator approved by the local authority concerned.</li> </ul>
Water Resources Management Act no 24 of 2013	<ul style="list-style-type: none"> <li>• Section 89</li> <li>• All other sections applicable to different activities.</li> </ul>	<ul style="list-style-type: none"> <li>• The owner or occupier or other person in control of land where an incident that causes or is likely to cause a water resource to be polluted must take all reasonable measures to contain</li> </ul>

		and minimize the effects of the incident; and to clean up polluted areas and remedy the effects of the incident.
Hazardous Substances Ordinance 14 of 1974	<ul style="list-style-type: none"> <li>• Section 27</li> <li>• All other sections applicable to different activities.</li> </ul>	<ul style="list-style-type: none"> <li>• To provide for the control of substances which may cause injury or ill-health to or death of human beings, by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances;</li> <li>• To provide for the division of such substances into groups in relation to the degree of danger;</li> <li>• To provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances; and</li> <li>• To provide for matters connected therewith.</li> </ul>
Fertilizers, farm feeds, agricultural remedies and stock remedies Act no 36 of 1947	<ul style="list-style-type: none"> <li>• Definitions</li> <li>• Section 7</li> <li>• Section 10</li> <li>• All other sections applicable to different</li> </ul>	<ul style="list-style-type: none"> <li>• Arborocide application is defined as an agricultural remedy under this Act.</li> <li>• Only registered pesticide may be used.</li> <li>• May only buy herbicides in a container that complies with the prescribed requirements and is sealed and labelled.</li> <li>• Only allowed to use herbicides in the prescribed manner.</li> <li>• Land owners must be notified about applications, and the following information must be supplied:</li> </ul>

	activities.	<ul style="list-style-type: none"> <li>○ Purpose of administration</li> <li>○ Registered name and number of the product</li> <li>● Precautions to be taken before, during and after each administration.</li> </ul>
The Nature Conservation Ordinance (1975) as amended through the Nature Conservation Amendment Act of 1996.	<ul style="list-style-type: none"> <li>● Chapter 11: Game Parks, Nature Reserves, Conservancies and Wildlife Councils</li> </ul>	<ul style="list-style-type: none"> <li>● Permits are required to enter the National Park. Permits are also required for the removal of any protected plant or tree. It also stipulates that no damage may be done to any object of geological, ethnological, archaeological, historical or other scientific interest without the appropriate permits.</li> </ul>
National Heritage Act No 27 of 2004	<ul style="list-style-type: none"> <li>● Section: 46, 48, 55</li> <li>● All other sections applicable to different activities.</li> </ul>	<ul style="list-style-type: none"> <li>● All heritage resources are to be identified and either protected or removed/mitigated with a permit from the National Monuments Council, before any development may take place.</li> <li>● A chance find procedure should be followed in case of discovery of a heritage resource.</li> </ul>
Soil Conservation Act no 76 of 1969	<ul style="list-style-type: none"> <li>● Section 4</li> <li>● Section 13</li> <li>● Section 21</li> <li>● And other applicable sections</li> </ul>	<ul style="list-style-type: none"> <li>● Institutions may be ordered by the relevant Minister to construct soil conservation works when and where necessary.</li> <li>● Fire protection schemes may be implemented to regulate the prohibition of veld burning as well as the prevention, control and extinguishing of veld and forest fires.</li> <li>● It is illegal to damage, destroy / fail to maintain any soil conservation works; fire</li> </ul>

		belts; works constructed in terms of a fire protection scheme.
Forest Act no 12 of 2001	<ul style="list-style-type: none"> <li>• Section 132</li> <li>• Section 41</li> <li>• And other applicable sections</li> </ul>	<ul style="list-style-type: none"> <li>• Vegetation may not be removed within 100 m of a river, stream or water course</li> <li>• A person shall be liable for damage caused by any fire which arises as a result of activities carried out on site without having taken reasonable measures to prevent a fire.</li> </ul>

## 5 ROLES AND RESPONSIBILITIES

It is the responsibility of NamPower and/or contractor to ensure that all the environmental management actions are carried out effectively and timeously. It is important to note that the successful implementation of the EMP is, however dependent on clearly defined roles and responsibilities by several stakeholders. Below are the key employees that are responsible for the management of environmental and social issues during the construction and operational phases:

**Table 2: The roles and responsibilities for construction and operational activities:**

Responsible person	Responsibilities
The Area Superintendent	<ul style="list-style-type: none"> <li>• Is responsible for the enforcement of the EMP.</li> <li>• To ensure that environmental requirements are adequately covered in any external service provider contracts.</li> <li>• To ensure that SHE requirements are included in the tender documents sent to the contractors. A copy of this EMP should also form part of the tender documents.</li> <li>• To ensure that corrective actions are implemented for non-compliances.</li> <li>• To ensure that appropriate records and information regarding compliance with environmental requirements are maintained.</li> <li>• To ensure that the line and substation remain in compliance</li> </ul>

	<p>with the requirements of this EMP, through regular communication and monitoring.</p> <ul style="list-style-type: none"> <li>• To ensure that all incidents, accidents and complaints are reported. To also ensure that incidents and accidents are investigated to prevent re-occurrence.</li> <li>• Ensuring that the work being done does not create a nuisance to any being working, residing or living on adjacent properties or within the immediate surroundings of the site.</li> </ul>
Project Manager	<ul style="list-style-type: none"> <li>• Is responsible for the enforcement of the EMP.</li> <li>• To ensure that SHE requirements are included in the tender documents sent to the contractors.</li> <li>• Must ensure that the contractor remains in compliance with the requirements of this EMP.</li> <li>• Ensuring that the work being done does not create a nuisance to any being working, residing or living on adjacent properties or within the immediate surroundings of the site.</li> <li>• To ensure that all incidents, accidents and complaints are reported. To also ensure that incidents and accidents are investigated to prevent re-occurrence.</li> </ul>
NamPower SHEW	<ul style="list-style-type: none"> <li>• To ensure that all requirements with regards to this EMP are enforced by contractors/NamPower's employees.</li> <li>• Communicate NamPower SHEW requirement to the contractors and NamPower employees.</li> <li>• Provides SHEW inductions to NamPower and contractor employees.</li> <li>• Implement monitoring, conduct inspections and audits in consultation with the Project Manager/Area Superintendent.</li> <li>• Document and communicate monitoring, audit and inspection findings to project manager and area</li> </ul>

	<p>superintendent.</p> <ul style="list-style-type: none"> <li>• Communicate the final inspection report to the Project manager on contractor compliance to the EMP before the project close-off and final payment is made to the contractor.</li> </ul>
Contractor	<ul style="list-style-type: none"> <li>• Is responsible for the enforcement of the EMP</li> <li>• To appoint a SHE officer responsible for the implementation of this EMP.</li> <li>• To ensure that all tasks undertaken under the scope of work, are in accordance both with NamPower's SHEW policies and procedures as well as to the requirements of this EMP.</li> <li>• Ensure that employees are regularly trained, and awareness built relating to environmental and social management.</li> <li>• To ensure that all incidents, accidents, and complaints are reported to the project manager. The contractor to ensure that incidents and accidents are investigated to prevent re-occurrence.</li> <li>• Ensuring that all employees receive a SHEW induction before the start of the project.</li> <li>• Ensuring that the work being done does not create a nuisance to any being working, residing, or living on adjacent properties or within the immediate surroundings of the site.</li> </ul>

## 6 DESCRIPTION OF OPERATIONAL ACTIVITIES TO BE UNDERTAKEN AND ASSOCIATED IMPACTS

The table below outlines the summary of the construction and operational activities and associated socio-economic and environmental impacts.

**Table 3: The operational activities include but not limited to:**

Activity	Description	Associated potential impacts
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<p><b>Construction activities of the 220KV Transmission line.</b></p>	<ul style="list-style-type: none"> <li>• Setting out the line</li> <li>• Bush clearing</li> <li>• Excavation</li> <li>• Concrete casting</li> <li>• Mechanical installation of the towers.</li> <li>• Stringing of the conductor and OPGW.</li> <li>• Final inspection</li> <li>• Testing and commissioning of the line.</li> <li>• Inspection and monitoring.</li> <li>• Compensation to affected landowners.</li> </ul>	<ul style="list-style-type: none"> <li>• Dust, visual and noise.</li> <li>• Waste</li> <li>• Habitat and vegetation disturbance.</li> <li>• Potential soil erosion</li> <li>• Loss of biodiversity</li> <li>• Conflicts with landowners</li> <li>• Social issues within local communities.</li> <li>• Local employment</li> <li>• Migration</li> <li>• Human rights</li> <li>• Cultural heritage</li> <li>• Economic growth</li> <li>• Skilled workers and capacity building.</li> </ul>
<p><b>General functioning of the transmission lines.</b></p>	<ul style="list-style-type: none"> <li>• Physical presence and functional characteristics of the line.</li> </ul>	<ul style="list-style-type: none"> <li>• Animal (including birds) mortalities through collisions and electrocution.</li> <li>• Death of avifauna, especially protected spp.</li> <li>• Visual impact.</li> <li>• Community impacts in a form fatalities or injuries caused by electrocution.</li> <li>• Meeting electricity demand (positive impact).</li> </ul>
<p><b>Maintenance of the line and station.</b></p>	<p>The maintenance of the line entail but not limited to:</p>	<ul style="list-style-type: none"> <li>• Soil and water contamination</li> <li>• Waste generation leading to filling up of landfill space.</li> </ul>

	<ul style="list-style-type: none"> <li>• Repairing of line components.</li> <li>• Maintenance of electrical equipment/ line's components.</li> </ul>	<ul style="list-style-type: none"> <li>• Destruction of vegetation; vertebrate fauna; avifauna especially protected spp. and sensitive habitats.</li> <li>• Social issues such as introduction of new workers in the area, e.g., HIV/AIDS spreading.</li> <li>• Loss of human life (through electrocution).</li> </ul>
<b>Refurbishment/Construction.</b>	<ul style="list-style-type: none"> <li>• Refurbishment of the line components.</li> <li>• Construction and/or repair of excess roads.</li> </ul>	<ul style="list-style-type: none"> <li>• Noise emissions</li> <li>• Air emissions</li> <li>• Introduction of new people in the area leading to the spread of diseases such as HIV/AIDS</li> <li>• Soil and water contamination</li> <li>• Waste generation leading to filling up of landfill space.</li> <li>• Employment of casual workers</li> <li>• Loss of biodiversity reduces habitat availability and food sources for many animals.</li> <li>• Loss of sensitive plants and habitats.</li> <li>• Loss or damage of heritage resources.</li> </ul>
<b>Periodic inspections and monitoring.</b>	Periodic inspections and monitoring of the line.	<ul style="list-style-type: none"> <li>• Soil and ground water contamination because of oil spills</li> <li>• Soil contamination because of improper</li> </ul>



		<p>waste handling and disposal.</p> <ul style="list-style-type: none"> <li>• Loss of biodiversity if existing access roads are not put to use.</li> </ul>
<b>Installation of Optic Fibre networks.</b>	<ul style="list-style-type: none"> <li>• Design, Supply, Delivery, Installation and Commissioning of Optic Fiber networks for communication purposes.</li> </ul>	<ul style="list-style-type: none"> <li>• Loss of biodiversity</li> <li>• Soil contamination because of improper waste handling and disposal.</li> <li>• Loss of sensitive plants and habitats.</li> </ul>
<b>Vegetation Management.</b>	<ul style="list-style-type: none"> <li>• Removal of trees, bushes, or grass to maintain access to the line servitude.</li> </ul>	<ul style="list-style-type: none"> <li>• Destruction of vegetation; vertebrate fauna; avifauna especially protected spp. and sensitive habitats.</li> <li>• Conflict with landowners</li> <li>• Loss of topsoil</li> <li>• Soil and water contamination</li> <li>• Loss or damage of heritage resources.</li> <li>• Soil erosion</li> <li>• Destruction of sensitive habitats</li> </ul>

## 7 MANAGEMENT AND MITIGATION MEASURES

To ensure that the potential impacts are eliminated and/or minimised, it is necessary to ensure that the various activities related to the construction and operation of the powerlines are adequately managed and monitored. Table 4 below outline mitigation measures as well as objectives to be achieved. A responsible person (s) have been assigned to each mitigation measure (s).

**Table 4: Proposed mitigation measures for the general Construction and operational activities.**

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
<b>Safety Health and Environmental (SHE) Awareness</b>	<ul style="list-style-type: none"> <li>• Inform affected stakeholders prior to the start of the construction of the 220kV transmission line and prior to de-bushing or vegetation management under the existing 132kV transmission line.</li> <li>• All employees should undergo SHE induction before work commences onsite.</li> <li>• All employees are to be made aware of their individual roles and responsibilities in achieving compliance with the EMP.</li> <li>• SHE toolbox talks to be conducted and records to kept onsite.</li> <li>• Signage must be placed on and around the site.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project manager</li> <li>• SHEW</li> <li>• Contractor</li> </ul>
<b>Safety Management</b>	<ul style="list-style-type: none"> <li>• Develop and implement an occupational health and safety system that comprises key elements such as risk assessment and safe working procedure.</li> <li>• NamPower SHEW requirements must be complied with.</li> <li>• All work activities to be done under the supervision of a competent person.</li> <li>• Appropriate warning signs must be placed on the facilities.</li> <li>• SHE file to be submitted in case of projects in accordance with NamPower SHE requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project manager</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>Contractor must conduct risk assessment, identify the risks and appropriate health and safety management measures, and ensure (and demonstrate) that all employees involved in working at heights have a medical fitness certificates and have been trained in how to work at height safely.</li> </ul>	
<b>Traffic Management</b>	<ul style="list-style-type: none"> <li>The Contractor must provide, erect and maintain such traffic signs, road markings, barriers and traffic control signals and such other measures as may be necessary for ensuring traffic and pedestrian safety around construction sites, particularly in settled and farming areas.</li> <li>The Contractor shall take all reasonable precautions to prevent or reduce any disturbance or inconvenience to the owners, tenants or occupiers of adjacent properties, and to the public in general.</li> <li>The Contractor shall not commence any work that affects the public roads and highways until all traffic safety measures necessitated by the work are fully operational</li> </ul>	<ul style="list-style-type: none"> <li>Area superintendent</li> <li>Project manager</li> </ul> <p>Contractor</p>
<b>Fire Management</b>	<ul style="list-style-type: none"> <li>Eliminate the presence of potential sources of ignition and provide appropriate equipment to minimize fire risk.</li> <li>Fire extinguishers to be readily available in vehicle or onsite in case of camping.</li> </ul>	<ul style="list-style-type: none"> <li>Area superintendent</li> <li>Project manager</li> </ul> <p>Contractor</p>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>• Regular servicing of fire extinguishers.</li> <li>• Firefighting training to be provided to employees.</li> <li>• Maintain fire breaks.</li> </ul>	
<b>Air Quality</b>	<ul style="list-style-type: none"> <li>• Dust generation from all activities must be minimised.</li> <li>• Excavation, handling, and transportation of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present.</li> <li>• Speed limit to be enforced to control dust emissions.</li> <li>• Dust suppression measures shall be implemented when necessary.</li> <li>• Vehicle, machinery and equipment shall be maintained in good working order in order to minimise exhaust fume emissions.</li> <li>• Vehicle, machinery and equipment must be serviced by competent personnel and records must be kept onsite</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project manager</li> <li>• Contractor</li> </ul>
<b>Resources Efficiency</b>	<ul style="list-style-type: none"> <li>• Minimise water wastage and record water usage.</li> <li>• Avoid wasteful use of materials.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project manager</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>• Source goods and services locally were possible</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> </ul>
<b>Waste Management</b>	<ul style="list-style-type: none"> <li>• Minimise the generation of waste by applying the waste hierarchy.</li> <li>• Line servitude to be kept free of waste.</li> <li>• No burning, burying or dumping of any waste materials shall be permitted onsite.</li> <li>• Labelled waste bins with lids must be provided at campsites (in case of a project) for all waste streams and ensure that waste is disposed at nearest approved waste disposal site.</li> <li>• Ensure that waste segregation is done at source.</li> <li>• Waste must be disposed at a licensed waste facility.</li> <li>• Hazardous waste shall be disposed of at a registered hazardous waste disposal site.</li> <li>• Safe disposal certificates for hazardous waste must be kept in the SHE file.</li> <li>• Concrete waste must not be dumped on site.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project manager</li> <li>• Contractor</li> </ul>
<b>Wastewater</b>	<ul style="list-style-type: none"> <li>• Water containing environmental pollutants shall be collected and removed</li> </ul>	<ul style="list-style-type: none"> <li>• Project manager</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
<b>management</b>	<p>from site.</p> <ul style="list-style-type: none"> <li>• No waste water runoff or uncontrolled discharges from the site/working areas shall be permitted.</li> <li>• Mobile toilets or septic tanks should be used in remote areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor</li> <li>• Area superintendent</li> </ul>
<b>Hazardous Substances</b>	<ul style="list-style-type: none"> <li>• The use, handling, storage and disposal of the hazardous chemical must be in accordance with the MSDS.</li> <li>• Containers must be clearly marked to indicate contents and quantities.</li> <li>• Hazardous substances storage areas must be bunded. A bund should be able to contain 110% of the volume of the largest container stored within it.</li> <li>• Diesel and other liquid fuel must be stored in appropriate storage tanks or in bowsers with secondary containment.</li> <li>• Inspect and maintain hazardous storage areas to avoid overflows.</li> <li>• Ensure that drip trays are available, to be use in case of leaking equipment.</li> <li>• Spill kit and absorbents must be available onsite at campsite.</li> <li>• Hazardous substance storage areas must display safety symbolic signs.</li> <li>• All spills must be reported, cleaned and remediated to in compliance with</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project manager</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	SHEW requirements.	
<b>Social-economic Impact</b>	<ul style="list-style-type: none"> <li>• NamPower must engage effectively with the affected stakeholders and share information with regard to the line route and line construction process, and compensation processes to alleviate confusion and concerns.</li> <li>• NamPower/ Contractor must sign land permission form and agreement with landowners 14 days prior to commencement of work onsite.</li> <li>• Employees should limit their contact with permanent residents of the area.</li> <li>• NamPower must engage the contractor, traditional and local authorities to prioritise job opportunities to the local community.</li> <li>• Maximise employment of local people</li> <li>• Contractors must sign Entering Form with Private Landowners that clarifies sites that can be used for various construction activities and the contractors' responsibilities.</li> <li>• NamPower must engage in compensation negotiations with affected parties in good faith.</li> <li>• Employees should be properly educated about the impact of HIV / AIDS and pregnancies.</li> <li>• The use of intoxicating liquor or drugs of any kind by the employees is strictly</li> </ul>	<ul style="list-style-type: none"> <li>• Area Superintendent</li> <li>• Project Manager</li> <li>• All NamPower employees</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<p>prohibited.</p> <ul style="list-style-type: none"> <li>• Ensure that all queries and complaints are documented, investigated, and dealt with.</li> <li>• A register shall be kept of all complaints from stakeholders, this should also the actions taken to rectify the complaints.</li> <li>• Affected landowners are to be compensated as per the compensation policy.</li> </ul>	
<b>Archaeology</b>	<ul style="list-style-type: none"> <li>• Based on this assessment, it is concluded that the proposed Otjikoto – Masivi powerline route does not present any apparent threat to archaeological, historical, and palaeontological remains protected under the National Heritage Act (27 of 2004). However, it is recommended that the project proponent should adopt the Chance Finds Procedure set out in Appendix 1, so that if buried archaeological remains which are not visible to surface survey may be handled in accordance with the provisions of Part V Section 46 of the National Heritage Act (27 of 2004).</li> <li>• Should a heritage site or archaeological site be uncovered or discovered during the operation phase, a “change find” procedure in appendix 5 should be applied.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• SHEW</li> <li>• Contractor</li> </ul>



ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>• Any chance finds must be reported to NamPower environmental section.</li> </ul>	
<b>Bird Diverters</b>	<ul style="list-style-type: none"> <li>• NamPower should ensure that bird flight diverters are installed in the following areas - approximate GPS coordinates: <ul style="list-style-type: none"> <li>- <b>Tsumeb area - 19 11 48S; 17 41 37E to 19 10 19S; 17 49 57E</b></li> <li>- <b>Dam &amp; Pan area - 19 02 55S; 18 19 17E to 19 02 52S; 18 09 43E</b></li> <li>- <b>Murrumba Owambo area (2 x sites) - 18 59 43S; 18 18 56E to 18 59 24S; 18 20 07E and 18 58 36S; 18 22 22E to 18 57 10S; 18 26 53E</b></li> <li>- <b>Borrow pit area - 18 54 36S; 18 34 31E to 18 54 31S; 18 34 59E.</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• Contractor</li> </ul>
<b>Bird monitoring</b>	<ul style="list-style-type: none"> <li>• Monitor all bird mortalities.</li> <li>• Every line inspection should be treated as a bird monitoring survey as well.</li> <li>• It should be determined if dead birds encountered beneath the line were affected by the herbicides or viewed as collision/electrocution mortalities.</li> <li>• Focus on protected bird species along the route.</li> <li>• Sample any open surface water after herbicide application.</li> <li>• Very few open water sources are located along the route and although it is</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<p>recommended that herbicides not be used in “high” sensitivity areas, monitoring this would be viewed as a good practice.</p> <ul style="list-style-type: none"> <li>• Take water samples from any surface water encountered and have these analysed to determine if herbicide used has entered these sources.</li> <li>• This would indicate if aquatic species and/or species drinking from the water are likely to be affected.</li> </ul>	
<b>Electrocution</b>	<ul style="list-style-type: none"> <li>• NamPower and contractors to ensure that anti-climbing and anti-vandalism features are incorporated into the design and construction of the towers.</li> <li>• NamPower and contractors to ensure that the towers are properly earthed so that they will not electrocute anybody who touches them.</li> <li>• NamPower to engage in ongoing community awareness campaigns around the electrical hazards associated with the towers and lines amongst the affected communities.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• Contractor</li> </ul>
<b>Electromagnetic Interference</b>	<ul style="list-style-type: none"> <li>• Continuing to engage with neighbouring communities to ensure that they do not encroach into the powerline servitude and are aware of the hazards of doing so.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
<b>Fauna and Flora</b>	<ul style="list-style-type: none"> <li>• Ensure that the site is kept clean and free of waste.</li> <li>• Ensure that the line structures are maintained such that the conductors do not hang low to avoid potential human life and animal life losses.</li> <li>• No harvesting or damaging of plants is allowed.</li> <li>• Poaching or capturing of any animal (wild or domestic) is prohibited.</li> <li>• Bird nests may not be disturbed unless interfering with the normal operation of the line/station.</li> <li>• No domestic animals may be kept onsite (in case of camping) as they can introduce diseases or interbreed with the animals occurring naturally in the area.</li> <li>• Vehicles driving along the lines should engage four wheel drive to prevent spinning and consequent impacts on soil surface.</li> <li>• Do not destroy, damage, collect any protected flora species that may be encountered servitude operations unless interfering with the normal operation of the line.</li> <li>• Avoid disturbing the rocky/mountainous areas. Rocky areas potentially have</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<p>high plant and high vertebrate fauna diversity.</p> <ul style="list-style-type: none"> <li>• Only remove/prune flora directly affecting the transmission line;</li> <li>• Avoid disturbing the rocky, pans and ephemeral drainage lines and other sensitive areas. sections.</li> <li>• Identify potential bird collision prone areas (i.e. habitats).</li> <li>• Install bird flight diverters (BFD's) and anti-perching devices (APD's) to the identified collision potential areas.</li> <li>• All wildlife and electrical infrastructure interactions such as (animal/bird deaths) must be reported to the SHEW section.</li> </ul>	
<b>Water Resources</b>	<ul style="list-style-type: none"> <li>• Care must be taken to ensure that pollution of water does not occur.</li> <li>• Naturally occurring water resources may not be used for any personal hygiene.</li> <li>• Water may only be taken from a private or government property based on an agreement between the NamPower, contractor and custodian of the water source.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• Contractor</li> </ul>
<b>Erosion</b>	<ul style="list-style-type: none"> <li>• Implement and maintain erosion control measures along the access route in erosion prone areas.</li> <li>• Rehabilitate eroded areas</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
		<ul style="list-style-type: none"> <li>• Contractor</li> </ul>
<b>Maintain servitude</b>	<ul style="list-style-type: none"> <li>• Ensure that the all the applicable permits have been acquired for access route clearing.</li> <li>• Eradicate all invasive alien plant species encountered along the route.</li> <li>• Only remove trees that pose a direct threat to the transmission line.</li> <li>• Only prune branches that pose a direct threat to the transmission line.</li> <li>• Only remove trees that pose a direct threat to the transmission poles.</li> <li>• Avoid raptor/vulture nesting trees.</li> <li>• Herbicide use should be limited to around transmission poles only.</li> <li>• Avoid using herbicides in sensitive habitats.</li> <li>• Use only FSC approved herbicides.</li> <li>• Use herbicides strictly in accordance with each product's MSDS and the NamPower Herbicide and Pesticide Management Procedure.</li> <li>• Prevent the cleaning of herbicide knapsacks in field.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project manager</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>• Eradicate all invasive alien plant species encountered along the route.</li> <li>• Monitor the impacts of herbicide use around pylons.</li> <li>• Ensure that the all the applicable permits have been acquired for access route clearing.</li> </ul>	
<p><b>Campsite Establishment</b>   <b>(should there be a need for camping, mostly during projects)</b></p>	<ul style="list-style-type: none"> <li>• Avoid sensitive habitats.</li> <li>• Avoid raptor/vulture nesting trees.</li> <li>• Prevent the collection of veld foods (e.g. mushrooms) and unique plants (e.g. various Aloe spp.) or any form of illegal activities.</li> <li>• Prevent the removal and/or damaging of protected flora potentially occurring in the general area - e.g. various Aloe spp., etc.</li> <li>• Prevent the collection of firewood.</li> <li>• Avoid introducing ornamental plants, especially potential invasive alien species, as part of the landscaping of the substation/camp sites, etc., but rather use localised indigenous species, should landscaping be attempted, which would also require less maintenance (e.g. water).</li> <li>• Remove all invasive alien species on site – e.g. Opuntia spp., etc. (See Tables</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<p>3 and 4). This would not only indicate environmental commitment, but actively contribute to a better landscape.</p> <ul style="list-style-type: none"> <li>• Ensure that adequate fire fighting equipment (e.g. fire beaters; extinguishers, etc.) is available at camp sites and clear kitchen areas to avoid accidental fires.</li> <li>• Rehabilitate all areas disturbed by the construction activities – i.e. camp sites, etc.</li> <li>• Adequate ablution facilities must be provided onsite in relation to the number of employees.</li> <li>• Ablution facilities must not be located within 100m of any river, stream channel, pan, dam or borehole.</li> <li>• Non-employees are not allowed to reside at the campsite.</li> <li>• Fire extinguishers, first aid kits, assembly point, and emergency numbers must be available onsite.</li> <li>• Waste must be managed in accordance with waste management requirements outlined in this EMP.</li> </ul>	
<p><b>Manual and Mechanical Vegetation Removal</b></p>	<ul style="list-style-type: none"> <li>• Obtain a permit from the Ministry of Environment, Forestry and Tourism to remove protected trees as per the Forest Act No. 12 of 2001.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>• Measures must be put in place to avoid erosion especially at rivers, stream channel crossings, and at places where existing erosion scars and dongas are encountered to avoid any further erosion.</li> <li>• Avoid mechanical bush clearing in sensitive areas.</li> <li>• Measures must be put in place to preserve the topsoil structure.</li> <li>• The disturbed soil must be levelled.</li> <li>• Do not remove wood cut on site as this would affect the recycling of nutrients locally as well as lead to a potential industry in firewood targeting the better quality tree species.</li> <li>• Where clearing is done near a river, the contractor/NamPower must ensure that no felled bushes/branches/shrubs are left behind in the riverbed.</li> <li>• No burning of bush cleared materials is allowed onsite.</li> <li>• Manual and mechanical vegetation removal should be done in accordance with NamPower Procedures.</li> <li>• Avoid the cutting down of protected tree species [Forestry Ordinance No. 37 of 1952) not directly affecting the power lines during the line clearing operation.</li> <li>• Use existing tracks as far as possible.</li> <li>• Cross drainage lines at right angles.</li> <li>• Avoid tracks within drainage lines.</li> </ul>	<ul style="list-style-type: none"> <li>• SHEW</li> <li>• Contractor</li> </ul>



ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>• Avoid unnecessary offroad driving.</li> <li>• Maintain track discipline.</li> <li>• Implement erosion control measures.</li> <li>• Rehabilitate all new tracks.</li> <li>• Ensure that the all the applicable permits have been acquired for access route clearing.</li> </ul>	
<b>Herbicide Use</b>	<ul style="list-style-type: none"> <li>• Prevent the application of selected herbicide(s) in sensitive areas – e.g. “high” &amp; “medium” sensitivity areas (See annexure 1). Sensitive areas are known/expected to have higher biodiversity.</li> <li>• Avoid the spraying of protected tree [Forestry Ordinance No. 37 of 1952) not directly affecting the power lines during the line clearing operation.</li> <li>• Eradicate all invasive alien species potentially associated with the line/station. This would indicate overall environmental commitment.</li> <li>• Avoid spraying herbicide during windy days/periods (See the general product requirements for herbicide used) as this could affect non-target areas and species.</li> <li>• Avoid spraying, removing and/or approaching trees with vulture (and other larger raptors) nests along the route (if they are not affecting the line).</li> <li>• Implement strict control over the storage, protective measures &amp; application of the selected herbicide(s) throughout.</li> <li>• Always consult and adhere to the MSDS requirements for the herbicide</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• SHEW</li> <li>• Contractor</li> </ul>

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	<ul style="list-style-type: none"> <li>• Herbicide must be handled in accordance with the requirements outlined in NamPower Procedures.</li> </ul>	
<b>Site Rehabilitation (progressive and post rehabilitation)</b>	<ul style="list-style-type: none"> <li>• Progressive rehabilitation especially when there is project work is in progress.</li> <li>• Post projects rehabilitation must also be done.</li> <li>• All materials, equipment and waste must be removed from site.</li> <li>• A post construction audit prior to the contractor leaving site must be conducted.</li> <li>• SHEW to sign site close off or take over certificate once remedial corrective actions have been implemented.</li> </ul>	<ul style="list-style-type: none"> <li>• Area superintendent</li> <li>• Project Manager</li> <li>• SHEW</li> <li>• Contractor</li> </ul>

## **8 REPORTING, MONITORING AND AUDITING**

The environmental monitoring, inspections and audits must be conducted in line with legislation, supporting procedures and requirements of this plan. Monitoring, inspection, and audit reports detailing the monitoring, inspection and audit results shall be prepared by the SHEW section and communicated to the Area Manager, Superintendent or Project Manager.

## **9 NON-COMPLIANCE AND CONFLICT MANAGEMENT PROCEDURES**

The Area Superintendent, Project manager and Contractor shall ensure that the employees and external service providers comply with the requirements outlined in this EMP. In the event of non-compliance, the following recommended process shall be followed:

- Non – compliances will be identified during inspections or audits carried out by the SHEW Section and reported to the Area manager, Superintendent and Project Manager for corrective actions.
- Area Superintendent / Project Manager shall notify the responsible stakeholders about the non-compliance .
- Corrective and preventative actions must be implemented on an agreed timeframes.
- Area Superintendent / Project Manager to report back on how the non-conformances have been rectified.
- Follow – up inspections/audits shall be conducted to assess whether the corrective and preventative actions were implemented effectively.

The contractor/Area Superintendent / Project Manager shall notify NamPower of the following:

- Conflicts arising with any landowner / representative and other stakeholders.
- Any special conditions requested by a landowner / representative.

NamPower has the right to stop certain line activities if it is found that a gross violation of the EMP is taking place.

## **10 RECORD KEEPING**

Record keeping is important for the effective functioning and implementation of an EMP. EMP documentation must be kept in both the hard copy and electronic format for safe keeping and must be available during SHE audits.

## **11 CONCLUSION**

All management measures and legal requirements outlined in this EMP should be implemented in order to ensure environmental compliance by all parties undertaking the operational activities. This will ensure that potential negative impacts are identified, avoided or mitigated and positive impacts are enhanced.

## 12 ANNEXURES

### Annexure 1: Sensitive and important areas

Table 5. Areas of importance, with protected species potentially affected, between Tsumeb and Rundu along the 132Kv line.

[Direction: Section 1 = Tsumeb to Mururani gate; Section 2 = Rundu to Mururani gate]

Hotspot areas	Distance (km)	Area	Important species	Common names	Status	Aliens	Other important features	Importance ranking
	0 to 0.5	Otjikoto to Tsumeb-Ondangwa railway line				<i>Pennisetum setaceum</i> ; <i>Nicotiana glauca</i>		Low
	0.5 to 4.5	Tsumeb	None					High
	4.5 to 10.5	Tsintsabis Rd	<i>Peltophorum africanum</i> <i>Philonoptera nelsii</i> <i>Sclerocarya birrea</i> <i>Ziziphus mucronata</i>	African Wattle; Apple Leaf; Maroela Buffalo Thorn	F# F# F# F*	-		Low
	10.5 to 27.4	Tsumeb area	<i>Aloe littoralis</i> <i>Philonoptera nelsii</i> <i>Sclerocarya birrea</i> <i>Ziziphus mucronata</i>	Windhoek Aloe; Apple Leaf; Maroela Buffalo Thorn	NC F# F# F*	-	Rocky karst undulating landscape	Low
	27.4 to 34.3	Tsumeb area				-		Low

34.3 to 51.8	Tsumeb area [D3039 Rd]	<i>Spirostachys africana</i>	Tamboti	F#		Low
51.8 to 63.8	Tsumeb area [D3017 Rd]	<i>Berchemia discolor</i> <i>Peltophorum africanum</i> <i>Philonoptera nelsii</i> <i>Spirostachys africana</i>	Bird Plum; African Wattle; Apple Leaf; Tamboti	F* F# F# F#		Low
63.8 to 68.9	Tsumeb area [D3017 Rd]	<i>Spirostachys africana</i>	Tamboti	F#	-	Low
68.9 to 78.9	Tsumeb area				-	Low
78.9 to 84.5	Tsumeb area	<i>Spirostachys africana</i>	Tamboti	F#	-	Low
84.5 to 89.5	Tsumeb area					Low
89.5 to 102.5	Tsumeb area	<i>Spirostachys africana</i>	Tamboti	F#		Low
102.5 – 132.5	Mururani gate area	<i>Acacia erioloba</i> <i>Burkea africana</i> <i>Peltophorum africanum</i> <i>Philonoptera nelsii</i>	Camelthorn; Burkea; African Wattle; Apple Leaf	F# F# F# F#		Low
0 – 3.5	Rundu area					High
3.5 to 3.9	Rundu area					High
3.9 to 37.0	Rundu area	<i>Burkea africana</i> <i>Schinziophyton rautanenii</i> <i>Sclerocarya birrea</i> <i>Peltophorum africanum</i> <i>Pterocarpus angolensis</i> <i>Philonoptera nelsii</i>	Burkea; Mangeti; Marula; African Wattle; African Teak; Apple Leaf	F# F# F# F# F#		Low
37.0 to 37.4	Rundu area					High
37.4 to 62.8	Rundu area	<i>Burkea africana</i> <i>Schinziophyton rautanenii</i> <i>Sclerocarya birrea</i> <i>Peltophorum africanum</i>	Burkea; Mangeti; Marula; African Wattle; African Teak;	F# F# F# F#		Low
					Mahangu fields Omuramba	
					Mahangu fields	

		<i>Pterocarpus angolensis</i> <i>Philonoptera nelsii</i>	Apple Leaf	F#		
62.8 to 63.1	Rundu area				Mahangu fields	High
		<i>Burkea africana</i>	Burkea;	F#		
63.1 to 68.4	Rundu area	<i>Schinziophyton rautanenii</i> <i>Sclerocarya birrea</i> <i>Strychnos sp.</i>	Mangeti; Marula; Monkey Orange;	F# F# F*		Low
		<i>Peltophorum africanum</i> <i>Pterocarpus angolensis</i> <i>Philonoptera nelsii</i>	African Wattle; African Teak; Apple Leaf	F# F# F#		
68.4 to 68.6	Rundu area				Mahangu fields	High
		<i>Burkea africana</i>	Burkea;	F#		
68.6 to 75.2	Rundu area	<i>Schinziophyton rautanenii</i> <i>Sclerocarya birrea</i> <i>Strychnos sp.</i>	Mangeti; Marula; Monkey Orange;	F# F# F*		Low
		<i>Peltophorum africanum</i> <i>Pterocarpus angolensis</i> <i>Philonoptera nelsii</i>	African Wattle; African Teak; Apple Leaf	F# F# F#		
75.2 to 75.5	Rundu area				Mahangu fields	High
		<i>Burkea africana</i>	Burkea;	F#		
75.5 to 76.6	Rundu area	<i>Schinziophyton rautanenii</i> <i>Sclerocarya birrea</i> <i>Strychnos sp.</i>	Mangeti; Marula; Monkey Orange;	F# F# F*		Low
		<i>Peltophorum africanum</i> <i>Pterocarpus angolensis</i> <i>Philonoptera nelsii</i>	African Wattle; African Teak; Apple Leaf	F# F# F#		
76.6 to 77.0	Rundu area				Mahangu fields	High
		<i>Burkea africana</i>	Burkea;	F#		
		<i>Schinziophyton rautanenii</i> <i>Sclerocarya birrea</i> <i>Strychnos sp.</i>	Mangeti; Marula; Monkey Orange;	F# F# F*		
77.0 to 94.5	Rundu area	<i>Peltophorum africanum</i> <i>Pterocarpus angolensis</i> <i>Philonoptera nelsii</i>	African Wattle; African Teak; Apple Leaf	F# F# F#		Low
94.5 to 94.8					Mahangu fields	High
94.8 to 101.9	Rundu area	<i>Burkea africana</i> <i>Schinziophyton rautanenii</i> <i>Sclerocarya birrea</i> <i>Strychnos sp.</i>	Burkea; Mangeti; Marula; Monkey Orange;	F# F# F# F*		Low

		<i>Peltophorum africanum</i>	African Wattle;	F#		
		<i>Pterocarpus angolensis</i>	African Teak;	F#		
		<i>Philonoptera nelsii</i>	Apple Leaf	F#		
101.9 to 102.3	Rundu area				Mahangu fields	High
		<i>Burkea africana</i>	Burkea;	F#		
102.3 to 1114.1	Rundu area	<i>Schinziophyton rautanenii</i>	Mangeti;	F#		Low
		<i>Sclerocarya birrea</i>	Marula;	F#		
		<i>Strychnos sp.</i>	Monkey Orange;	F*		
		<i>Peltophorum africanum</i>	African Wattle;	F#		
		<i>Pterocarpus angolensis</i>	African Teak;	F#		
		<i>Philonoptera nelsii</i>	Apple Leaf	F#		
114.1 to 114.4	Mururani area				Mahangu fields	High
		<i>Burkea africana</i>	Burkea;	F#		
114.4 to 118.7	Mururani area	<i>Schinziophyton rautanenii</i>	Mangeti;	F#		Low
		<i>Sclerocarya birrea</i>	Marula;	F#		
		<i>Strychnos sp.</i>	Monkey Orange;	F*		
		<i>Peltophorum africanum</i>	African Wattle;	F#		
		<i>Pterocarpus angolensis</i>	African Teak;	F#		
		<i>Philonoptera nelsii</i>	Apple Leaf	F#		
118.7 to 119.6	Mururani area				Mahangu fields	High
		<i>Acacia erioloba</i>	Camelthorn;	F#		
		<i>Burkea africana</i>	Burkea;	F#		
119.6 to 138.1	Mururani area	<i>Schinziophyton rautanenii</i>	Mangeti;	F#		Low
		<i>Sclerocarya birrea</i>	Marula;	F#		
		<i>Strychnos sp.</i>	Monkey Orange;	F*		
		<i>Peltophorum africanum</i>	African Wattle;	F#		
		<i>Pterocarpus angolensis</i>	African Teak;	F#		
		<i>Philonoptera nelsii</i>	Apple Leaf	F#		



## Annexure 2: Herbicide application guideline

<b>Management requirement</b>
<i>Recommended herbicide:</i> Access 240 SL or any similar product with picloram or tricopyr as active ingredients should be used
<i>Recommended Application method:</i> Foliar application – spray or paint-on-stump –is recommended as this is target specific. Access mixed with water and Actipron (wetting agent).
<i>Technique:</i> The herbicide can be applied directly to the plant – stem or leaves – as a spray. Trees and shrubs with a stem diameter <10cm can be sprayed directly, but trees with a stem diameter >10cm should be felled before treatment of the cut surface for best results. Treatment should be done as soon as possible after felling and the entire cut surface and stump should be wetted. Coppice growth can also effectively be controlled.
<i>Use:</i> Active growing season – i.e. September to April (best in early growing season – September to November – before main rains) has best results.
<i>Concentration</i>  Foliar application = 350ml/100l water + Actipron Super 500ml/100l spray mix.  Cut stump application = 2l/100l water + Actipron Super 2l/100l spray mix.
<i>Application repeatability</i> <ul style="list-style-type: none"><li>▪ Year 1: Apply herbicide (early growing season)</li><li>▪ Year 2: Follow-up to target any regrowth and coppicing (early growing season)</li><li>▪ Thereafter: As required – i.e. dependent on coppicing potential of various species. This could be determined during routine line inspections.</li></ul>

**Annexure 3: Monitoring checklist to ensure that line inspections and general maintenance activities were conducted in accordance with guidelines – i.e. ecological best practices.**

Activity: Protection of Ecology & Vegetation	Compliance	
	Yes	No
Track discipline		
Evidence of new tracks		
Evidence of off-road driving		
Evidence of turnaround violations		
Evidence of oil spills		
Evidence of waste		
Evidence of litter		
Illegal collection/damage of flora		
Evidence of illegal plant collection		
Evidence of vehicle damage to plants		
Evidence of unauthorised people/vehicles		
Evidence of erosion along route		
Invasive alien plants		
Evidence of invasive alien plants along route - New		
Evidence of invasive alien plants along route - Existing		
New species		
Any new plants encountered – i.e. not previously observed		
Domestic stock/pets		
Domestic stock and/or pets encountered along route (Relevant to Protected Areas only)		
Bird mortalities		
Record all dead birds encountered below the line		

## Annexure 4: Landowner permission form



# **Landowner Permission Form**



Landowner name:	Contact number:
Representative name:	
Farm name:	
Contractor:	
Representative name:	Contact number:

### **General Notice**

This form is to be used prior to a contractor entering a landowner's property to commence any work related to the construction or maintenance of power-line structures and servitudes.

The form must be completed by either the landowner or his / her legal representative on the property.

### **Section A: Before activities commence**

#### **Activities to be undertaken on the property (completed by the contractor):**

Use of water resources  
Powerline erection  
Powerline refurbishment  
Trimming of vegetation  
Use of other infrastructure  
(please specify)


Camping  
Bush clearing  
Herbicide application  
Access road usage  
Rehabilitation


**Specific conditions to be met on the property (as stipulated by the landowner):**

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**Dates when access is needed:**

**From:** \_\_\_\_\_

**To:** \_\_\_\_\_

**Signatures (prior to entry)**

\_\_\_\_\_  
Landowner/Representative

\_\_\_\_\_  
Contractor representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

**Section B: Upon completion of work and prior to leaving the property**

**Remarks on compliance or misconduct (upon completion of activities):**

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**Issues still to be resolved upon completion of activities:**

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**Signatures (upon completion)**

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Landowner/Representative

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Contractor representative

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Date

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Date

## **Annexure 5: Chance find procedure**

Definition: 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 object must 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.

### **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 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