2024

THE OPERATION, MAINTENANCE AND UPGRADE OF THE GERUS EARTH ELECTRODE LINE, STATION AND ASSOCIATED INFRASTRUCTURES IN OTJOZONDJUPA REGION.

THE DOCUMENT IS PREPARED BY NAMPOWER'S SHEW SECTION.

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1 LIST OF TERMS, ACRONYMS AND ABBREVIATIONS

APD	Anti-Perching Devices
BFD	Bird Flight Diverters
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	Human immunodeficiency virus/ acquired immunodeficiency syndrome
MEFT	Ministry of Environment, Forest and Tourism
NHC	National Heritage Council
REDs	Regional Electricity Distributors
SAPP	Southern African Power Pool
SHE	Safety, Health and Environment
SHEW	Safety, Health, Environment and Wellness
KV	Kilovolt

2 INTRODUCTION

In 2010, NamPower completed the construction of the 350kV High Voltage Direct Current (HVDC) line also known as Caprivi link interconnector) from Gerus station North West of Otjiwarongo to Zambezi station near Katima Mulilo. The purpose of the 350 kV HVDC line, is to facilitate the transmission of electricity in the SADC region in order to provide better interconnection between import and export zones and strengthen the north eastern grid. The 350 kV HVDC line consists of a transmission line between Gerus and Zambezi Station and supporting infrastructures. The supporting infrastructure include: Earth Electrode Stations (including the earth electrode line), Repeater Stations; and Converter Stations (at each station).

The earth electrode stations and associated infrastructures were not part of the ECC obtained for the construction and operation of the 350 kV HVDC line. The ECC for the earth electrode stations and line were obtained in 2014 and subsequently renewed in 2017. The ECCs have since expired and renewal is required.

3 PROJECT DESCRIPTION

The purpose of the earth electrode line and stations is to provide a current path when the 350 kV HVDC line is operated in earth return mode. The 350 kV HVDC line may be operated under certain conditions in “earth return” return due to significant savings in power losses. This is in comparison to the metallic return mode, where the second conductor on the HVDC line is used as a return path and the ground connection is done at one converter station (usually Gerus). The electrode line thus connects the converter station to the grounding electrode. The operating voltage of the electrode line under normal conditions is less than 1kV.

The Gerus earth electrode station consists of boreholes to graphite deposits in the earth. Each borehole consists of a 100m borehole with a central galvanized steel pipe with flat copper bars tied to it. The borehole is then filled with conductive material. Each steel pipe is connected to the main electrode line to Gerus Converter Station. The electrodes are installed by immersing conducting metal rods into the ground. The Gerus electrode system is located on 24 ha NamPower land 38.3km southwest of Otjiwarongo on the Farm Patagonia no. 137. The Gerus-Electrode Line runs south-westwards from the Gerus Substation towards the end of the line west of Otjiwarongo.

Currently, only two of the nine electrodes have been installed. The remaining seven are part of the planned full installation project that is yet to be undertaken. Once the station is fully developed, it will consist of the following:

- All the nine boreholes/ sub electrodes
- A fenced off switching station
- Fibre on the existing line will be terminated into the control room
- A small containerised control room
- Auxiliary supply (possibly using rooftop solar)
- A gravel access road between the electrode station and the C33 road.
- A cable connection between the switching station and the nine earth electrode stations

This EMP include management measures for the three phases namely: operational, maintenance and upgrade of the Gerus electrode station and line. Figure 1 below shows the location of the earth electrode and line.

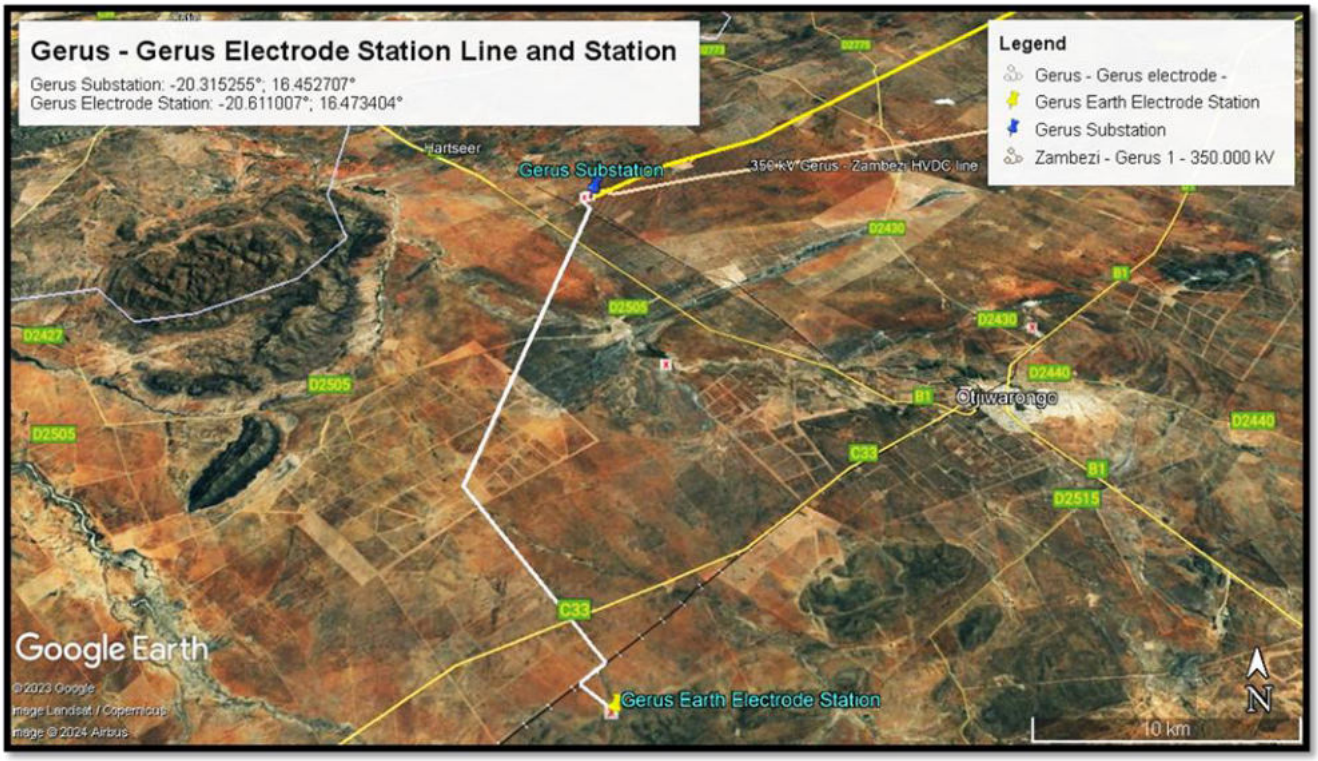

Figure 1: Locality map showing the Gerus - Gerus Electrode line

3.1 General area description

The line Gerus-Electrode Line falls within the vegetation type known as the Thornbush Savannah (Tree and Shrub Savannah) or Thornbush Shrubland (Cunningham, 2022). The main ephemeral rivers draining the general area flow towards the northwest e.g. Omatjene River (Mendelsohn et al. 2002). The important species along this route are *Vachelia erioloba, Albizia anthelmintica; Boscia albitrunca and Ziziphus mucronata.*

The route passes through 1 “hotspot” area which is viewed as “high” sensitivity (See Figure 2). The Gerus-Electrode Line section is 38.3km in length of which 0.5% of the route is viewed as “high” sensitivity i.e. unique habitats and 99.5% of the route is viewed as “low” sensitivity (Cunningham, 2022).

Figure 2. *Albizia anthelmintica* (worm cure Albizia) one of the Protected trees F, LC – occurring along the line route.

Figure 3. A ground farm dam, albeit artificial, is viewed as "high" sensitivity i.e. potentially high biodiversity and thus important habitat.

The general Gerus-Electrode Line 300kV transmission line route, have certain anthropomorphic influences mainly associated with roads and tracks, railway line, transmission line and associated access route and infrastructures, farm infrastructures, etc. The impact of line inspections and general maintenance activities would be site specific and have a relatively small environmental "footprint".

4 OBJECTIVES AND SCOPE OF THIS ENVIRONMENTAL MANAGEMENT PLAN (EMP)

The operation of the transmission line and station can have a negative impact on the receiving environment. However, the impacts are limited to the station boundaries and line servitude. It is thus important that good management measures are implemented to ensure that environmental damage is minimized. This Environmental Management Plan (EMP) seeks to manage and keep to a minimum the negative impacts associated with the transmission line and station and at the same time, enhance the positive and beneficial impacts.

The scope of this EMP include all activities associated with the operation of the transmission

line and substation. It is necessary to highlight that the EMP is a living document that should be periodically reviewed and updated. It should 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 operational phase activities are carried out in a manner that takes cognizance of environmental protection and is in line with National legislation.

This EMP has the following objectives:

- To outline mitigation measures to be implemented during the operation phase, in order to manage and minimize the extent of environmental impacts.
- Minimize negative impacts and enhance positive impacts associated with the operations.
- To ensure that the operational activities do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- To identify key personnel who will be responsible for the implementation of the measures, outline functions and responsibilities.
- To propose mechanisms for monitoring compliance and preventing long term or permanent environmental degradation.
- To ensure that the concerns and complaints of Interested and Affected Parties (I&APs) with regards to the operational activities are addressed effectively and timely.
- Ensure compliance to legislative requirements.

5 POLICY AND LEGISLATIVE FRAMEWORK

Table 1: The legislative requirements which are applicable to the operational and maintenance activities include but not limited to:

Legislation:	Section (s) applicable:	Implications:

Environmental Management Act no 7 of 2007	Section 3
	
	Section 27
	
	Section 33 onwards
	
	And all other applicable sections.
		• All activities performed should be in line with the following principles:
		  ○ Interested and affected parties should have an opportunity to participate in decision making
		  ○ Listed activities should be subject to an EIA
		  ○ Polluter should pay for rehabilitation
		  ○ Pollution should be minimized
		• Environmental assessments should be carried out for listed activities. The proposed activity can be classified under the following range of activities:
		  ○ Generation of electricity
		  ○ Transmission of electricity
		• These sections details the process to be followed in order to obtain a clearance certificate.
		• 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.

EMA Regulations GN 28-30 (GG 4878) (February 2012)	• Listed activity: • 5.1 • 6 – 9; 13; 15; 21 -24 • Any other applicable	• This activity can be considered as electricity generation and transmission. • 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.

	sections	
No. 156 Labor 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 with.
Labor Act no 11 of 2007	• Section 3 • Section 4 • Section 9 • Section 39 – 42 • All other applicable sections	• Children under the age of 16 may not be employed • Forced labor may not be used. • Basic conditions of employment as stipulated by the law must be met. • The employer shall ensure the health and safety of all employees and non-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	• Section 33	• 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.
Public and Environmental Health Act no 1 of 2015	• Section 52 • Section 53 • All other sections applicable to different activities.	• 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. • Waste must only be disposed of at a waste disposal site, including an incinerator approved by the local authority concerned.

Water Resources Management Act no 24 of 2013	• Section 89 • All other sections applicable to different activities.	• 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 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	• Section 27 • All other sections applicable to different activities.	• 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; • To provide for the division of such substances into groups in relation to the degree of danger; • To provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances; and • To provide for matters connected therewith.
Fertilizers, farm feeds, agricultural remedies and stock remedies Act no 36 of 1947	• Definitions • Section 7 • Section 10 • All other sections applicable to different	• Arborocides application is defined as an agricultural remedy under this Act • Only registered pesticide may be used. • May only buy herbicides in a container that complies with the prescribed requirements and is sealed and labelled. • Only allowed to use herbicides in the prescribed manner. • Land owners must be notified about applications, and the following information

	activities.	must be supplied: o Purpose of administration o Registered name and number of the product • Precautions to be taken before, during and after each administration.
The Nature Conservation Ordinance (1975) as amended through the Nature Conservation Amendment Act of 1996.	• Chapter 11: Game Parks, Nature Reserves, Conservancies and Wildlife Councils	• 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**.**
National Heritage Act No 27 of 2004	• Section: 46, 48, 55 • All other sections applicable to different activities.	• 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 • A chance find procedure should be followed in case of discovery of a heritage resource.
Soil Conservation Act no 76 of 1969	• Section 4 • Section 13 • Section 21 • And other applicable sections	• Institutions may be ordered by the relevant Minister to construct soil conservation works when and where necessary. • 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. • It is illegal to damage, destroy / fail to maintain any soil conservation works; fire belts; works constructed in terms of a fire protection scheme.
Forest Act no 12 of 2001	• Section 66 • Section 41	• Vegetation may not be removed within 100 m of a river, stream or water course

	• And other applicable sections	• 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.

6 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 operational phase:

Table 2: The roles and responsibilities for operational and maintenance activities:

Responsible person	Responsibilities
The Area Superintendent	• Is responsible for the enforcement of the EMP • To ensure that environmental requirements are adequately covered in any external service provider contracts. • 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. • To ensure that corrective actions are implemented for non-compliances. • To ensure that appropriate records and information regarding compliance with environmental requirements are maintained. • To ensure that the line and substation remain in compliance with the requirements of this EMP, through regular communication and monitoring. • To ensure that all incidents, accidents and complaints are reported. To also ensure that incidents, accidents and

	incidents are investigated to prevent re-occurrence.
Project Manager	• Is responsible for the enforcement of the EMP. • To ensure that SHE requirements are included in the tender documents sent to the contractors. • Must ensure that the contractor remains in compliance with the requirements of this EMP. • To ensure that all incidents, accidents and complaints are reported. To also ensure that incidents, accidents and incidents are investigated to prevent re-occurrence.
NamPower SHEW	• To ensure that all requirements with regards to this EMP are fulfilled. • Communicate NamPower SHEW requirement to the contractors and NamPower employees. • Provides SHEW inductions to NamPower and contractor employees. • Implement monitoring, conduct inspections and audits in consultation with the Project Manager/Area Superintendent. • Document and communicate monitoring, audit and inspection findings to project manager and area superintendent. • 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.
Contractor	• Is responsible for the implementation of the EMP • To appoint as SHE officer responsible for the implementation of this EMP. • To ensure that all tasks undertaken under the scope of work, are in accordance both with NamPower's SHEW requirements, NamPower Contractor Management

	Procedure, this EMP, as well as the legal requirements. • Ensure that employees are trained and awareness built relating to environmental and social management. • To ensure that all incidents, accidents and complaints are reported to the project manager. The contractor to ensure that incidents, accidents and complaints are investigated to prevent re-occurrence. • Ensuring that all employees receive a SHEW induction before the start of the project. • Ensuring that the work being done does not create a nuisance to any anyone working, residing or living on adjacent properties or within the immediate surroundings of the site.

7 DESCRIPTION OF OPERATIONAL ACTIVITIES TO BE UNDERTAKEN AND ASSOCIATED IMPACTS

The operational activities for the line include but not limited to the ones listed in Table 3. Their associated socio-economic and environmental impacts as also listed.

Table 3: Description of the activities related to the operational, maintenance and upgrade activities.

Activity	Description	Associated potential impacts
General functioning of the station and transmission line.	• Physical presence and functional characteristics of the station and associated line.	• Bird mortalities through collisions with powerline. • Visual impact.
Maintenance of the station and line	• The maintenance of the station and line entails: • General equipment/component maintenance and	• Soil and water contamination • Waste generation • Loss of biodiversity • Social issues related to the

	replacement. • Construction or repairing of access roads.	introduction of new workers in the area, e.g. HIV/AIDS spreading
Construction	• Construction include the following activities: • Construction or refurbishment of buildings (digging and setting of foundations, digging of cable trenches and other activities). • Installation or extension of boundary fences • Drilling and installation of the remaining electrodes. • Personnel conduct in surrounding communities. • Construction of an access road.	• Noise emissions • Dust emissions • Introduction of new people in the area leading to the spread of diseases such as HIV/AIDS • Soil and water contamination • Waste generation • Employment of casual workers • Loss of biodiversity • Loss of productive land
Periodic inspections, monitoring, maintenance of the line	• Replacement, cleaning and maintenance of station and line components.	• Soil and ground water contamination as a result of oil spills • Soil contamination as a result of improper waste handling and disposal. • Loss of biodiversity if existing access roads are not put to use. • Veld fires.
Hazardous Substances	• Storage of hazardous material.	• Possible oil spills and soil contamination due to transformer blow out
Installation of Optic Fiber networks	• Design, Supply, Delivery, Installation and Commissioning of Optic Fiber networks for communication purposes.	• Loss of biodiversity if existing access roads are not put to use or there will be a need to do bush clearing. • Soil contamination as a result of improper waste handling and disposal.
Vegetation management within the servitude	• Selective herbicide application, mechanical and manual bush clearing	• Loss of biodiversity due to clearing operation. • Soil and groundwater contamination. • Water pollution

		• Loss of sensitive habitat. • Loss of archaeological resources. • Possible employment opportunities if bush clearing is outsourced.
Safety, Health and Environmental monitoring	• Periodic environmental monitoring and audits to assess compliance to management procedures, and EMP requirements.	• Soil and ground water contamination as a result of oil spills • Soil contamination as a result of improper waste handling and disposal. • Loss of biodiversity if existing access roads are not put to use. • Veld fires.

8 MANAGEMENT AND MITIGATION MEASURES

In order to ensure that the potential impacts are eliminated and/or minimised, it is necessary to ensure that the various activities related to the operation and maintenance of the power lines and station 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

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
Safety Health and Environmental (SHE) Awareness	• All employees should undergo SHE induction before work commences onsite. • All employees are to be made aware of their individual roles and responsibilities in achieving compliance with the EMP. • All employees must receive environmental awareness training. • SHE toolbox talks to be conducted and records to kept onsite.	• Area superintendent • Project manager • SHEW • Contractor • All employees
Safety Management	• Develop and implement an occupational health and safety system that comprises key elements such as risk assessment and safe working procedure. • All work activities to be done under the supervision of a competent person. • Adherence to NamPower SHE procedures, policies and legal requirements. • SHE file to be submitted in case of projects in accordance with NamPower SHE requirements.	• Area superintendent • Project manager • Contractor
Fire Management	• Eliminate the presence of potential sources of ignition. • Fire extinguishers to be readily available onsite.	• Area superintendent • Project manager

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• Regular servicing of fire extinguishers. • Firefighting training to be provided to employees. • Maintain fire breaks.	• Contractor
Air Quality	• Dust generation from all activities must be minimised. • Excavation, handling and transportation of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present. • Speed limit to be enforced to control dust emissions. • Dust suppression measures shall be implemented when necessary. • Vehicle, machinery and equipment shall be maintained in good working order in order to minimise exhaust fume emissions. • Vehicle, machinery and equipment must be serviced by competent personnel and records must be kept onsite	• Area superintendent • Project manager • Contractor
Resources Efficiency	• Minimise water wastage and record water usage. • Avoid wasteful use of materials.	• Area superintendent • Project manager

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• Source goods and services locally were possible	• Contractor
Waste Management	• Minimise the generation of waste by applying the waste hierarchy. • Station and line servitude to be kept free of waste. • No burning, burying or dumping of any waste materials shall be permitted onsite. All waste must be disposed at an approved and licensed disposal site. • Labelled waste bins with lids must be provided at substations/campsites (in case of a project) for all waste streams and ensure that waste is disposed at nearest approved waste disposal site. • Ensure that waste segregation is done at source. • Hazardous waste shall be disposed of at a registered hazardous waste disposal site. • Safe disposal certificates for hazardous waste must be kept in the SHE file. • Concrete waste or any other waste must not be dumped on site.	• Area superintendent • Project manager • Contractor
Wastewater management	• Water containing environmental pollutants shall be collected and removed from site.	• Project manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• No waste water runoff or uncontrolled discharges from the site/working areas shall be permitted. • Mobile toilets or septic tanks should be used in remote areas.	• Area superintendent
Hazardous Substances	• The use, handling, storage and disposal of the hazardous chemical must be in accordance with the MSDS. • Containers must be clearly marked to indicate contents and quantities. • 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. • All transformers to be contained in bunded areas. • Diesel and other liquid fuel, oil and hydraulic fluid must be stored in appropriate storage tanks or in bowsers with secondary containment. • Inspect and maintain hazardous storage areas and bund walls to avoid overflows. • Ensure that drip trays are available, to be use in case of leaking equipment/vehicle. • Spill kit and absorbents must be available for spill clean-up.	• Area superintendent • Project manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• Hazardous substance storage areas must display safety symbolic signs. • All spills must be reported, cleaned and remediated to in compliance with SHEW requirements.	
Social Impact	• NamPower/ Contractor must sign land permission form and agreement with land owners 14 days prior to commencement of work onsite. • Communication must be made to stakeholders before commencement of any project. This communication must include project details, duration of the project, details about the contractor etc. • Employees should limit their contact with permanent residents of the area. • Employees should be properly educated about the impact of HIV / AIDS. • The use of intoxicating liquor or drugs of any kind by the employees is strictly prohibited. • Ensure that all queries and complaints are documented, investigated and dealt with. • A register shall be kept of all complaints from stakeholders, this should also include the actions taken to rectify the complaints. • Leave the farm gates the way you found them, if open leave them open and if	• Area Superintendent • Project Manager • All NamPower employees • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	found closed ensure that they are closed.	
Archaeology	• Should a heritage site or archaeological site be uncovered or discovered during the operation phase, a “change find” procedure in appendix 8 should be applied. • Any chance finds must be reported to NamPower environmental section. • In an event of discovery of human remains or other artefacts the work shall cease. A professional archaeologist is to be consulted and carry out investigation. • Any damage which may occur shall be reported immediately and the relevant experts contacted to provide remediation advice	• Area superintendent • Project Manager • SHEW • Contractor
Fauna and Flora	• Ensure that the site is kept clean and free of rubbish that could potentially attract animals and pests • No harvesting or damaging of plants is allowed. • Poaching or capturing of any animal (wild or domestic) is prohibited. • Bird nests may not be disturbed unless interfering with the normal operation of the line/station.	• Area superintendent • Project Manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	• No domestic animals may be kept onsite as they can introduce diseases or interbreed with the animals occurring naturally in the area. • Vehicles driving along the lines should engage four wheel drive to prevent spinning and consequent impacts on soil surface. • Do not destroy, damage, collect any protected flora species that may be encountered unless interfering with the normal operation of the line/station. • Minimize disturbances to the sensitive areas. • Only remove/prune flora directly affecting the transmission line; • Identify potential bird collision prone areas (i.e. habitats). • Bird flight diverters (BFD's) must be installed in collision prone areas. • Monitor all bird mortalities encountered under the transmission line. • All wildlife and electrical infrastructure interactions such as (animal/bird deaths) must be reported to the SHEW section.	
Water Resources	• Care must be taken to ensure that pollution of water does not occur. • Naturally occurring water resources may not be used for any personal hygiene. • Water may only be taken from a private or government property based on an	• Area superintendent • Project Manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
	agreement between the NamPower, contractor and custodian of the water source.	
Erosion	• Implement and maintain erosion control measures where required along the access route. • Rehabilitate eroded areas	• Area superintendent • Project Manager • Contractor
Campsite Establishment	• Adequate ablution facilities must be provided onsite in relation to the number of employees. • Septic tanks/ or similar polluted water containment methods must be used in remote area. • Ablution facilities must not be located within 100m of any river, stream channel, pan, dam or borehole. • Non-employees are not allowed to reside at the campsite. • Fire extinguishers, first aid kits, assembly point, and emergency numbers must be available onsite. • Waste must be managed in accordance with waste management requirements outlined in this EMP.	• Area superintendent • Project Manager • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
Manual and Mechanical Vegetation Removal	• Obtain a permit from the Ministry of Environment, Forestry and Tourism to remove protected trees as per the Forest Act No. 12 of 2001. • 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. • Avoid mechanical bush clearing in sensitive areas. • Measures must be put in place to preserve the topsoil structure • The disturbed soil must be levelled. • 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. • Where clearing is done near a river, the contractor/NamPower must ensure that no felled bushes/branches/shrubs are left behind in the riverbed. • No burning of bush cleared materials is allowed onsite. • Manual and mechanical vegetation removal should be done in accordance with NamPower Procedures. • 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.	• Area superintendent • Project Manager • SHEW • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
Herbicide Use	• Prevent the application of selected herbicide(s) in sensitive areas – e.g. “high and medium” sensitivity areas. Sensitive areas are known/expected to have higher biodiversity (See annexure 1). Sensitive areas are known/expected to have higher biodiversity. • Avoid the spraying of protected tree [Forestry Ordinance No. 37 of 1952) not directly affecting the power lines during the line clearing operation. • Eradicate all invasive alien species potentially associated with the line/station. This would indicate overall environmental commitment. • Avoid spraying herbicide during windy days/periods. See the general product requirements for herbicide used. This could affect non-target areas and species. • Only recommended herbicides should be used. • Ensure that the Herbicide application should be done in accordance with manufacturer’s instructions. • Implement strict control over the storage, protective measures & application of the selected herbicide(s) throughout. • Always consult and adhere to the MSDS requirements for the herbicide • Herbicide must be handled in accordance with the requirements outlined in the NamPower Procedures.	• Area superintendent • Project Manager • SHEW • Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	RESPONSIBLE PERSON
Site Rehabilitation (progressive and post rehabilitation)	• Progressive rehabilitation when project work is in progress. Post project rehabilitation must also be done. All materials, equipment and waste must be removed from site upon the completion of the project. • An audit prior to the contractor leaving site must be conducted. • SHEW to sign site close off or take over certificate once remedial corrective actions have been implemented.	• Area superintendent • Project Manager • SHEW • Contractor

9 REPORTING, MONONITORING AND AUDITING

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

10 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 or 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.
- Follow – up inspections/audits shall be conducted to assess whether the corrective and preventative actions were implemented effectively.

The contractor shall notify NamPower of the following:

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

NamPower has the right to stop all contractor's activities if it is found that a gross violation of the EMP is taking place.

11 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. These

must include but not limited to:

- Copy of the Environmental Clearance Certificate
- A copy of an EMP
- Induction records
- Resource use records i.e. water and fuel consumption
- Audit and Inspection reports
- Other related documents

12 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. It is unlikely that the operation and maintenance of the transmission line and station will have significant environmental and social repercussions and it is therefore recommended that the ECC is issued.

13 REFERENCES

Cunningham, P. (2022). ECOLOGY AND VEGETATION ASSESSMENTS WITHIN VARIOUS NORTHERN NAMPOWER TRANSMISSION LINES – GERUS TO ELECTRODE LINE (Otjiwarongo area) [Rapid Ecology & Vegetation Assessments].

14 ANNEXURES

Annexure 1: Areas of importance and protected species

Table 1. Areas of importance, with protected species potentially affected, along the Gerus-Electrode Line.

[Direction: Gerus Substation south-westwards towards the end of the Electrode Line west of Otjiwarongo]

Hotspot areas	Distance (km)	Area	Important species	Common names	Status	Aliens	Other important features	Importance ranking
	0 to 21.8	Gerus SS	*Acacia erioloba* *Albizia anthelmintica* *Boscia albitrunca*	Camel thorn Worm cure Albizia Shepherd's tree	F, LC F, LC F, LC			Low
1	21.8 to 22.0	Gerus SS					Ground dam	High
	22.0 to 37.2	Gerus SS	*Ziziphus mucronata*	Buffalo thorn	F, LC			Low

Note: Distance may not be exact as was measured on odometer.
Importance ranking: High
End: Endemic
F: Forest Act No. 12 of 2001
NC: Nature Conservation Ordinance No.4of 1975

Annexure 2: Herbicide application guideline

Management requirement
Recommended herbicide for the control of woody plants: Access 240 SL or any similar product with picloram or tricoplyr as active ingredients should be used
Recommended Application method: Foliar application – spray or paint-on-stump –is recommended as this is target specific. Access mixed with water and Actipron (wetting agent).
Technique: 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.
Use: Active growing season – i.e. September to April (best in early growing season – September to November – before main rains) has best results.
Concentration Foliar application = 350ml/100l water + Actipron Super 500ml/100l spray mix. Cut stump application = 2l/100l water + Actipron Super 2l/100l spray mix.
Application repeatability ▪ Year 1: Apply herbicide (early growing season) ▪ Year 2: Follow-up to target any regrowth and coppicing (early growing season) ▪ Thereafter: As required – i.e. dependent on coppicing potential of various species. This could be determined during routine line inspections.

Annexure 3: Monitoring checklist for bush clearing and herbicide application

Activity: Bush clearing **Site:**	**Compliance**	
	Yes	No
Manual clearing conducted		
Mechanical clearing conducted		
Protected tree species on 12m boundary only trimmed		
Protected tree species not affecting line left *in situ*		
Raptor and vulture nesting sites left undisturbed		
Overall access improved		
Activity: Chemical application		
Active ingredient used = Triclopyr		
Application method used = spray		
Application technique used = spray leaves/cut stumps		
Application season = Sep to April (Sep to Nov = best)		
Application conditions = no wind		
Application procedures = protective equipment used as the MSDS		
Application knowledge = certified users only		
Storage = safe/secure		
Storage = chemical register maintained		
Storage = equipment clean/functional		
Concentration: Foliar application = 350ml/100l water + Actipron Super 500ml/100l spray mix		
Concentration: Cut stump application = 2l/100l water + Actipron Super 2l/100l spray mix		
Repeatability: Year 1		
Repeatability: Year 2		
Repeatability: Year 3		

Sensitive “hotspot” areas avoided		
Water – open surface water encountered		
Water – open surface water samples taken		
Collateral damage observed (i.e. non target areas/species affected)		
Any complaints from landowners		

Annexure 4: Protection of Ecology & Vegetation

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 vehicle damage to plants		
Erosion		
Evidence of erosion along route		
Evidence of recovery at rehabilitated sites		
Invasive alien plants		
Evidence of invasive alien plants along route		
Bird mortalities		
Record all dead birds encountered below the line		

Annexure 5: Landowner permission form

Landowner Permission Form

Landowner name:	Contact number:
Representative name:	
Farm/village name:	
Contractor/NP Employee:	
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 onthe property.

Section A: Before activities commence

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

Use of water resources		Camping	
Powerline erection		Bush clearing	
Powerline refurbishment		Herbicide application	
Trimming of vegetation		Access road usage	
Use of other infrastructure(please specify)		Rehabilitation	

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

_____

_____

_____

_____

Dates when access is needed:

From: _____ **To:** _____

Signatures (prior to entry)

_____ _____

Landowner/ Representative Contractor/NamPower representative

_____ _____

Date Date

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

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

Issues still to be resolved upon completion of activities:

Signatures (upon completion)

Landowner/Representative	Contractor/NamPower representative
Date	Date

Annexure 6: pre-application consent form for herbicide application

PRE-APPLICATION CONSENT FORM	
Name of Landowner / Representative:	
Contact Details:	
Name of Farm:	
Name of Contractor/NamPower Employee:	
Name and Details of Contact Person:	
Herbicide to be used:	
Period of Application:	
NamPower District Supervisor:	
Contact Details:	
NamPower site to be Treated:	
Comments from Landowner/Representative:	
Signed:	
Landowner/ Representative:	NamPower Representative:
Date:	Date:

Annexure 7: Post application review form for herbicide/pesticide applications

POST-APPLICATION REVIEW FORM	
Name of Landowner / Representative:	
Contact Details:	
Name of Farm/Village:	
Name of Contractor:	
Name and Details of Contact Person:	
Herbicide to be used:	
Period of Application:	
NamPower District Supervisor:	
Contact Details:	
NamPower site to be treated:	
Outstanding Issues:	
Signed:	
Landowner/ Representative:	NamPower Representative:
Date:	Date:

Annexure 8: 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