BASIC ASSESSMENT REPORT (BAR) FOR 132 KV POWER LINE BETWEEN SORATA SWITCHING STATION AND WITSIESHOEK SUBSTATION – DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

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Contractor	To be appointed			
CELO (Contractor Environmental Liaison Officer)	To be appointed			
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ABOUT THIS DOCUMENT

This Environmental Management Programme (EMPr) is to facilitate the process whereby the best environmental practices and procedures are adopted by Eskom, its' Contractors and Sub- Contractors for the planning of, the construction, operation and decommissioning of the Witsieshoek-Sorata Power Line.

The EMPr is an evolving document that should be revised periodically to accommodate changes including modifications or inclusion of additional mitigation measures that either address, impacts that had not been foreseen by the Environmental Impact Assessment (EIA) process or those measures that have been implemented but found to be ineffective.

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ACRONYMS

CECO: Contractor Environmental Control Officer

CELO: Contractor Environmental Liaison Officer

CM: Contract Manager

DWA: Department of Water Affairs

DEA: Department of Environmental Affairs

EAP: Environmental Assessment Practitioner

ECO: Environmental Control Officer

EIA: Environmental Impact Assessment

EIR: Environmental Impact Assessment Report

EMPr: Environmental Management Programme

GPS: Global Positioning System

I&AP: Interested and affected party, refers to all those individuals and organizations that may have an interest in the detail and outcome of the EIA

MSDS: Materials Safety Data Sheets

MW: Mega Watt (=1,000,000 Watts), unit of measurement of power output (e.g. from power stations)

NCR: Non-Conformance Report

PPE: Personal Protective Equipment

RoA: Record of Authorisation

SHE Safety Health and Environment

ToRs: Terms of Reference

WHO: World Health Organisation

LIST OF UNITS

kV: Kilo volt (=1000 volts), unit of measure of electric potential, but also a common measure of the capacity of a power line

masl: metres above sea level (a standard measure of land altitude)

DEFINITIONS

Alternative: A possible course of action, in place of another, that would meet the same purpose and need defined by the development proposal. Alternatives considered in the EIA process can include location and/or routing alternatives, layout alternatives, process and/or design alternatives, scheduling alternatives or input alternatives.

Auditing: A systematic, documented, periodic and objective evaluation of how well the environmental management plan is performing with the aim of helping to safeguard the environment by: facilitating management control which would include meeting regulatory requirements.

Corrective (or remedial) Action: Response required addressing an environmental problem that is in conflict with the requirements of the EMPr. The need for corrective action may be determined through monitoring, audits or management review.

Environmental Impact Assessment (EIA): An EIA refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of a proposed development. The EIA includes an evaluation of alternatives; recommendations for appropriate management actions for minimising or avoiding negative impacts and for enhancing positive impacts; as well as proposed monitoring measures.

Environmental Impact Report: A report describing the process of examining the environment effects of a development proposal, the expected impacts and the proposed mitigating measures.

Environmental Policy Statement: Statement of intent and principles in relation to overall environmental performance, providing a framework for the setting of objectives and targets.

Impact: A description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time and space.

Mitigation Measures: These are the management measures that are to mitigate negative impacts or enhance positive impacts associated with a proposed project.

Non-conformance: Where activities relating to the construction, operation or decommissioning of the power lines do not conform to the guidelines set out in this EMPr. A Non-conformance report must be completed setting out corrective actions, responsibilities and timeframes.

1. INTRODUCTION

An Environmental Management Programme (EMPr) can be defined as "an environmental management tool used to ensure that any reasonably avoided impacts of the construction, operation and decommissioning of a project are prevented". It is a dynamic document subject to revision and amendment and it specifically ensures that environmental concerns are integrated into the design, construction, operation and maintenance phases of the project. The EMPr is required for Environmental Impact Assessments (EIA) conducted as part of EIA Regulation 32 of GN No. R385 of 23 April 2006.

The EMPr is prepared as part of the EIA for the Witsieshoek-Sorata Power Line Project. The EMPr then has to be understood within the context of the Basic Assessment Report (BAR) for this project and it is recommended that all key players involved in the implementation of this plan have access to and review the BAR.

It is intended that this document will be reviewed and updated or amended during the life cycle of the power line, but in particular at the following milestones:

- On completion of the design phase of the line and substations expansion
- At construction tender stage
- At regular intervals during construction
- On completion of construction
- At handover to Eskom for maintenance
- On decommissioning of the Witsieshoek-Sorata power line infrastructure

THE EMPr PROVIDES THE FOLLOWING

- Identify the specific activity or potential impact that requires management;
- Determine the mitigation measures to be implemented;
- Identify the performance indicator;
- Identify who would be responsible for the implementation; and
- Identify who would be responsible for monitoring.

2. PROJECT BACKGROUND

The proposed project is located in the Maluti-a-Phofung Local Municipality area in the eastern Free State, encompassing the area between Phuthaditjhaba, Kestell and Harrismith. The proposed power line will be characterized by a 31 m servitude, 1000 m buffer zone including the servitude and monopole structures will be used for the power line. The project is expected to involve the construction of 132kV power line between existing Sorata Switching Station, near Diyatalawa on Farm Wellington 853, and existing Witsieshoek near Bluegum Bosch in QwaQwa, Phuthaditjhaba on Farm Bluegum Bosch 189. The proposed lines will be between 20 and 30 kilometres in length (depending on the final corridor selected). Three power line corridor options have been identified (Figure 1).

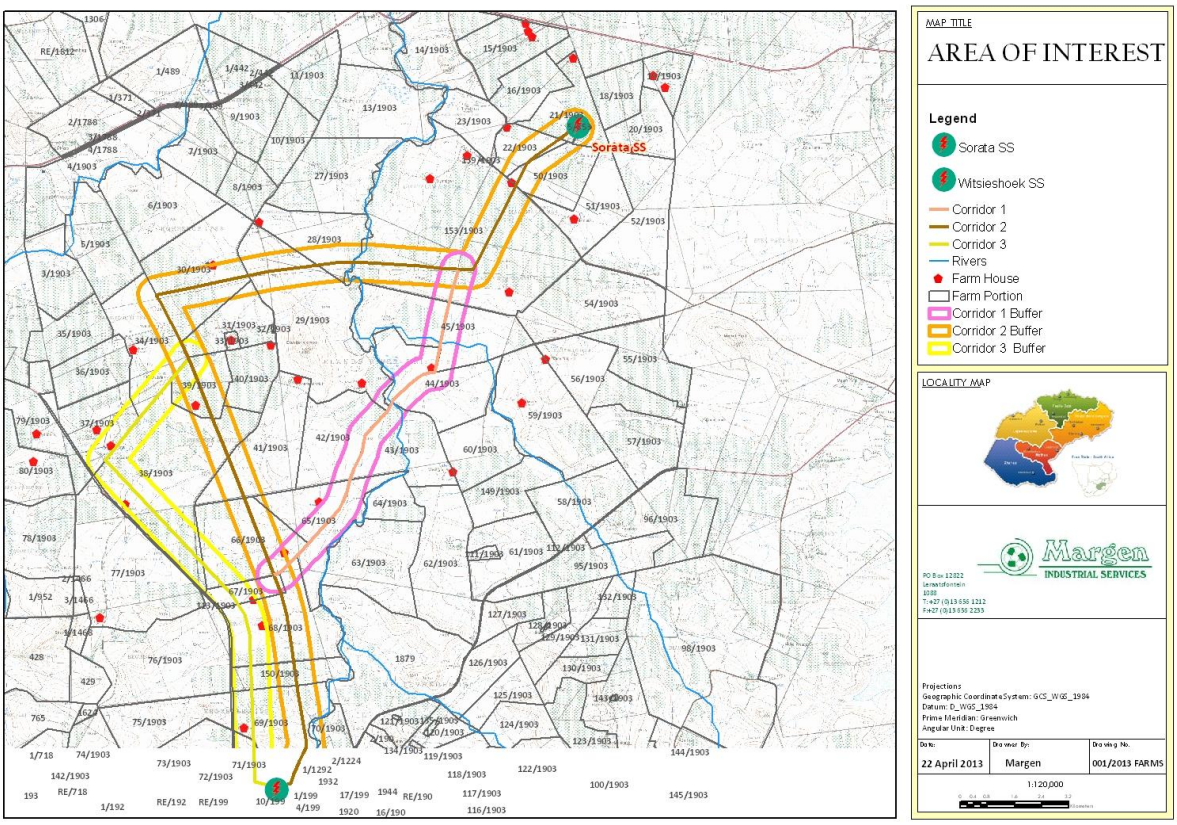

Figure 1: Project Area

2.1. PROJECT DESCRIPTION

The project comprises:

The proposed new Eskom Distribution 132kV powerline will come from the existing Sorata Switching Station to Witsieshoek Substation which is approximately ±30 kilometres.

Steel Monopole structures will be used

3. HOW TO USE THIS DOCUMENT

This section sets out the basic steps in using this document; it will allow the reader the opportunity to understand the prerequisite requirements that should be adopted as governing rules and the contents of the document.

Firstly, it should be understood that the onus is on Eskom as the project proponent and as the landowner to ensure the correct and timely implementation of the EMPr at all prescribed project phases. The administrative structure outlined herein spells out the key players to be involved in the implementation of the EMPr and their specific roles and responsibilities. Eskom personnel will be responsible for effecting some of the activities whilst others will be outsourced to external parties such as Contractor and/ or Sub- contractors.

This document comprises of three key chapters namely:

Legislative Framework: presents a summary of pieces of legislative developed for the preservation and protection of various natural resources and more specifically, those that are applicable to the proposed project and its activities. These provide the basis for the enforcement of the EMPr especially with regard to health, safety and environmental project related issues.

EIA Process and Key Environmental Issues: provides the necessary background information required for the understanding of the origination of the EMPr, by way of providing a summary of the EIA process followed, the outcomes in terms of the identified pertinent environmental issues / impacts of which are accordingly addressed in the EMPr.

Environmental Management Programme: outlines the measures and procedures that are to address the identified project related environmental impacts. The plan itself comprises of three sections namely:

- **Part 1: Roles and Responsibilities**, which outlines the duties of key persons involved in the management, supervision, implementation and auditing of the EMPr implementation process.
- **Part 2: Requisites for EMPr Implementation** specifies the requisite actions required for the successful implementation of the EMPr.
- **Part 3: EMPr Impact Tables** outlines the management action in terms of the measures and procedures required for the enhancement, mitigation, prevention or avoidance of determined environmental impacts.

4. LEGISLATIVE FRAMEWORK

4.1. CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA ACT, ACT NO. 108 OF 1996

States that every one has a right to an environment that is not harmful to their health and wellbeing and as such Eskom should conduct its business in a manner that does not result in environmental pollution and ecological degradation, that contributes to the conservation of cultural heritage and national economic and social development.

4.2. CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

South Africa is party to the Convenstion of Biological Diversity which therefore binds all parties to comply with its stipulations. The Convention aims for the conservation and rehabilitation of biological resources ascribed as important conservation species. In addition, rehabilitation and restoration of degraded ecosytems through the development and implementation of plans or other management strategies is also prescribed. States party to this Convention are also required to develop and maintain legislation and / or regulations for the conservation and protection of threatened species or populations.

4.3. BIODIVERSITY ACT, ACT NO. 10 OF 2004

The Act serves to enforce the conditions of the Convention on Biological Diversity on a national scale by providing a framework for the conservation and management of biodiversity, through a number of strategies including the establishment of regulatory bodies (South African Biodiversity Institute (SANBI)), the development and implementation of various tools (biodiversity management plans and agreements). The Act also calls for the listing of threatened and / or protected ecosystems, species threatened or in need of national protection and of alien and invasive species to be controlled.

Eskom should therefore align the proposed power lines in a manner that avoids threatened or protected ecosystems and should not use any plants categorised as either a weed or an invasive plant in undertaking rehabilitative work. Protected species found within the servitude and individual tower positions are to be rescued and relocated to another location before the bush clearing exercise can commence.

4.4. AIR QUALITY ACT, NO. 20 OF 2004

Provides for the prevention of atmospheric pollution through a number of measures including the establishment of administrative institutions and bodies with powers to develop legislation, regulations, standards for the control, monitoring and abatement of noxious or offensive gases, smoke, vehicular smoke, dust, controlled fuels and other emitters. As such control measures to address such polluters have to be incorporated into the EMPr and are to be implemented according during the appropriate project phases.

4.5. CONSERVATION OF AGRICULTURAL RESOURCES ACT, NO. 43 OF 1983

The Act aims for the conservation of soil, water sources and vegetation through a number of control measures including the development of regulations for soil conservation, control of weeds and bush encroachment. The Act also prescribes a list of measures for combating the spread of weeds and invader plants. Therefore in undertaking rehabilitative work Eskom or its Contractors or Sub-contractors should not use plants that are categorised as either a weed or an invasive plant.

4.6. FENCING ACT, NO. 31 OF 1963 (AS AMENDED BY ACT 108 OF 1991)

The Act regulates matters with regard to boundary fences of farms and makes provisions for the erection, alteration, maintenance, damage and repair of. It also spells rights of owners or lease holders where the land is subject to certain servitudes and outlines procedures for settling of disputes due to wilful actions including leaving gates opened and unauthorised entry to private land. As, Eskom will have a servitude that will cross through a number of properties, the applicable provisions of the Act have been incorporated accordingly in the EMPr tables.

4.7. HEALTH ACT, NO. 63 OF 1977

Promotes good health by providing the framework for rendering health services, through defining powers and duties of health personnel and the establishment of regulations pertaining to notifiable medical conditions, communicable diseases, conditions dangerous to health, food and milk, certain farming operations, water for human use and consumption. The regulations that are applicable to activities to be undertaken by Eskom are those governing the generation of nuisances and those relating to rubbish, night – soil, sewage, waste and reclaimed products.

4.8. OCCUPATIONAL HEALTH AND SAFETY AMENDMENT ACT, NO 181 OF 1998

The Act makes provision for the health and safety of persons at work and persons that are not employees against any hazards that may arise out of or in connection with the work related activities. The act has provisions regarding the maintenance and operation of plant and machinery, working

conditions to the use of protective clothing and equipment. The Act therefore informs the EMPr on measures and procedures to be incorporated regarding the safety and health of the persons on site.

4.9. NATIONAL ENVIRONMENTAL MANAGEMENT ACT, NO 107 OF 1998

This Act provides the legislative framework through which strategic environmental management goals and objectives are to be implemented. It is the basis through which the Environmental Impact Assessment and the Environmental Management Programme were developed and it also provides the mandate for the enforcement of the implementation of the EMPr.

4.10. NATIONAL HERITAGE RESOURCES ACT, NO 25 OF 1999.

This Act provides for the protection of heritage resources, which according to the Act is a place, or an object of cultural significance, which includes a place or object of aesthetic, architectural, historical, scientific, social, spiritual, linguistic and technological value. A permit is required for the disturbance, removal or destruction of any heritage site, archaeological site or paleontological site, burial ground, grave, or any public monument or memorial that may be encountered during the construction phase. All excavation related activities are to cease if any artefacts exposed during this exercise, in addition an Archaeologist must be called to site for inspection and possible rescue. Under no circumstances is any artefact to de destroyed or removed without the consent of the South African Heritage Resource Agency.

4.11. NATIONAL WATER ACT, NO 36 OF 1998.

The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways. The Act also calls for Eskom to adopt actions that will prevent and remedy the effects of pollution generated by its operations and those that will address emergency incidences. Activities that might be relevant to the construction of power lines are according to this Act, works to riverbanks, temporary crossings, impoundments, abstractions and discharges of pollutants including soil.

4.12. DWAF MINIMUM REQUIREMENTS FOR THE HANDLING, CLASSIFICATION AND DISPOSAL OF HAZARDOUS WASTE 1998

- Duty of Care Principle
- Polluter Pays Principle
- Precautionary Principle

4.13. NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, NO 59 OF 2008

The aim of the Act is to consolidate waste management in South Africa. It requires the establishment of a national waste management strategy with norms and standards for waste management. The strategy will also include provincial norms and standards for the classification of waste, waste service delivery and tariffs for the services. The Act requires Eskom to classify the waste that will be generated from the different phases of this project. It also requires Eskom to set up methods for reduction, re-use, recycling and recovery of the waste. Specific requirements need to be followed for the storage, collection and transportation of waste and the use of authorised methods for the treatment, processing and disposal of the waste. Some of the activities that will require a waste

[3] Republic of South Africa, National Environmental Management Act (107 of 1998). Department of Environmental Affairs and Tourism.

management license include facilities for the storage, transfer, recycling, recovery, treatment and disposal of waste on land.

5. PROJECT IMPLEMENTATION PROCESS

The overall project will be implemented through a series of 19 major activities, namely:

i. **Environmental Impact Assessment**: this EMPr is submitted together with the EIR/BAR and will be refined through development of specific EMPr once an RoA is issued by the DEA.

ii. **Negotiations for the servitude:** Eskom will initiate a negotiation process with various landowners situated within the project area to discuss issues pertaining to servitude acquisition. Agreements on matters such as costs of required land, placement of the tower line with respective properties, matters relating access, maintenance are arrived at between the Negotiator and respective landowners. All land and land rights acquired for the purpose of this project are to be registered at the Deeds Office as either title deeds for land or servitudes for rights of access.

iii. **Land survey to determine exact placement of the line towers:** Once Eskom has successfully secured agreements to register the servitude with the respective landowners the Surveyors will prepare a preliminary route alignment profile. The Design engineers will use this profile to finalise the power line specifications. Thereafter the profiles will be issued to the Environmental Assessment Practitioner (EAP) for the purpose of carrying out the Walk Through exercise.

iv. **"Walk-Through" Survey:** The "walk-through" is a pre-requisite activity for the design and negotiation process, whereby specialists are appointed to undertake detailed surveys of each of the proposed power line routes and tower positions. The Specialist typically comprises of a botanist, archaeologist, avifauna and a social impact assessment specialists. The two primary objectives for the investigations will be to identify sensitive area in the respective fields of specialisation and to recommend local deviations to avoid these areas. These surveys are normally undertaken in the summer and winter seasons to ascertain occurrence of red data species.

v. **Design work to produce the profiles for construction:** The information generated from the walk through exercise will be issued to the design engineers who will in turn use it to prepare the final profile of the power lines.

vi. **Erection of campsites for the Contractors' workforce:** The appointed Contractor will have to negotiate with respective landowners in order to acquire land for the establishment of the campsite. The campsite will be used for duration of the construction phase and thereafter it has to be cleaned and rehabilitated and the land evacuated. Once the land has been secured it is recommended that an environmental scan of the site is carried out by an ECO or qualified person before the actual work to prepare the site is undertaken.

vii. **Negotiations for access roads to the servitude:** Eskom and the respective landowners will agree on the access road including the access points to be used by Eskom to gain entry to the servitude through the landowner's properties.

viii. **Servitude gate installation to facilitate access to the servitude:** Gates will be installed at the agreed upon points of entry at each property.

ix. **Bush clearing: to facilitate access, construction and the safe operation of the line:** A strip of vegetation cover has to be removed to facilitate access, construction and the safe operation of the line. However, it is not necessary for the entire servitude to be cleared off the vegetation cover. The following will be required before bush clearing can start:

- Heritage Permits from South African Heritage Resources Agency (SAHRA)

- Biodiversity Licence to Remove or Destroy Protected Trees from the Department of Agriculture, Forestry and Fisheries; and
- Biodiversity Permits from provincial departments of Water Affairs
- A Water Use Licence Application (WULA) from the Department of Water Affairs (DWA)

x. **Establishment of access roads on the servitude.**

xi. **Transportation of equipment, materials and personnel.**

xii. **Installation of foundations for the towers:** Soil types and trial pits at each foundation point will be carried to determine foundation requirements. Thereafter the foundations will be excavated to the required depth and steel reinforcement and concrete used to reinforce and stabilise them. A Water Use Licence Application (WULA) from the Department of Water Affairs (DWA) will be required prior to installation of foundations.

xiii. **Tower assembly and erection:** The towers are brought to site in sections and assembled before they are erected into position using cranes.

xiv. **Conductor stringing and regulation:** The conductor cables are pulled up and strung from one tower to the next though the use of a pulley. Sag and tensions are checked for in order to ensure that the minimum ground clearance heights are achieved.

xv. **Final inspection of the line**: Once the construction of power lines is completed it will be tested to ensure it functions correctly.

xvi. **Rehabilitation of disturbed areas:** Excess material and equipment are to be removed from the project area and the campsite. The disturbed environment has to be returned to a condition close to its original state. Ideally, all restoration work should be carried out as an on-going process during the construction phase.

xvii. **Signing off Landowners:** Eskom's internal procedures prescribe that landowners sign off a release forms confirming that the land was rehabilitated accordingly. There is a one-year guarantee on contractors' work during which all rehabilitation work must be completed.

xviii. **Handing and taking over of the servitude:** The Eskom Transmission head offices will after the satisfaction that line is operating correctly and all rehabilitation works implemented correctly will hand over the line to regional division for operation and maintenance.

xix. **Operation and maintenance of the line:** Ongoing maintenance will be performed periodically throughout the operational life span of power line. This typically includes annual visits to inspect the line and at least one visit for servitude maintenance per year.

A schedule of the main construction related activities is presented in Appendix 1. It also provides an indication of the typical construction team size for each activity, and likely duration at each tower position. This will assist landowners in their expectations of the construction activities and planning for activities on site.

6. KEY ENVIRONMENTAL ISSUES

6.1. AVIFAUNA

Major risks to avifauna are collision during flight and electrification when perching on transmission line infrastructure. Vultures including the White-backed and Cape Vulture are both species that may frequent the area. Recommendations include:

- To avoid sensitive areas by remaining close to road reserves already impacted areas with a low ecological integrity, such as industrial/residential areas;
- All disturbances to natural areas must be limited and activities must remain in demarcated areas;
- Before and during construction an ecological audit is recommended to establish the presence of nests and breeding pairs;
- It is recommended that the earth wire on the power line is marked with Bird Flight Diverters, alternating black and white, ten metres apart, on each earth wire. In sensitive areas the spacing should be reduced to five metres;
- Standard bird guards should be fitted to the top of the towers above the conductors in order to minimise the impact of faecal streamers shorting on the tower structure. chance that birds, especially vultures, will attempt to perch on the insulators; and
- To conduct construction and maintenance activities during the non-breeding seasons of birds present.

6.2. BIODIVERSITY

A flora and fauna survey was conducted on each of the three corridor options, to predict the possible impacts of a proposed power line between existing Witsieshek Substation and Sorata Switching Station and to recommend a corridor with the least impacts.

Potential risks are threats to Red Data, rare or protected species of vegetation and fauna.

The habitat area of the proposed power lines is mostly degraded, and of a relatively poor quality. Large grassland areas were cleared for agricultural activities. These areas are also infested with various species of exotic trees (pine, cedar, black wattle and blue gum).The remaining natural grassland areas where the proposed power lines will pass through are a relatively small area, and even if the construction of the transmission lines results in habitat loss, it will be localised. If Eskom requires clearing an 8m wide strip for stringing proposes this area can be rehabilitated if it is not needed for a access road. Therefore the overall significance of the impact during the pre construction and construction phases will be low. The only mitigation measures in this case are to collect and relocate those species (mainly burrowing species) that cannot flee by themselves.

It is anticipated, therefore, that bush clearing and vegetation disturbance should be at a minimum over the larger part of the power line route. Construction vehicles will drive directly over grassland without blading (grading) access routes. Tree clearing shall be at a minimum. As a result, disturbance to fauna should be at a minimum, and should encourage early re-habitation soon after construction is concluded.

6.3. WETLANDS AND RIVERS

The region contains numerous small streams, depression pans and farm dams. It has a relatively high rainfall regime and during the summer rain season, these fill up quickly. The sandy soils and undulating landscape facilitate seepage and subsurface waterflow, which very often allow for

continued water seepage and movement into these water bodies long after the end of the rainy season and even into the dry, winter months in some cases where the catchment areas are large.

Compliance to at least a 50m setback for all identified aquatic features within the delineated waterbodies should be implemented. The wetland buffer zone and development setback should be established in the identified mapped area, where no construction vehicles should dredge and/or work within 50m of wetland edges for all identified water features. If possible, the undertaking of construction should take place during the dry season when development activities are near the rivers and associated wetlands.

There is little need to disturb any of the wetlands along the proposed route, even though the power lines will pass over some of them. Construction traffic and access roads should be diverted around all the wetlands, towers placed outside a buffer area around the wetland, and pilot cables (for stringing) may be pulled across by hand.

6.4. HERITAGE

The physical survey of 3 proposed corridors (i.e. Corridor 1, Corridor 2 & Corridor 3) yielded a total of 33 sites of which 4 are considered not to be historical or heritage sites. There is the potential for Early Stone Age (ESA) sites along much of the proposed power line route. A walk through survey will assist in identifying sites to be avoided by towers and access roads, but some of the sites may only be uncovered during the excavation of foundations and there will need to be a qualified archaeologist on hand.

It is the intention to avoid all buildings, but this will need to be analysed in more detail after the negotiation phase. Additionally, the contractor will need to ensure avoidance of all heritage sites during the construction phase.

6.5. SOCIAL ENVIRONMENT

The proposed power lines are located in an area of mixed land use ranging from extensive farming (grazing) and intensive irrigation. The power line development will bring long-term benefit to the area through increased electricity supply capacity and reliability, and there are some opportunities for benefit by the local communities from supplying goods and services during the construction phase. However, the main focus of this EMPr is the management and control of the potential negative social impacts mainly associated with the construction phase, but also the long-term operation and maintenance period. Key issues include:

Issue	Construction	Operation/ Maintenance
1. Uncontrolled access to private land, and associated security risks, theft, invasion of privacy, etc.	X	X
2. Damage to property, loss of property (e.g. livestock) and difficulty in resolution of responsibility (the “blame game”) – *this is a risk to the landowner, Eskom <u>and</u> the contractor.*	X	X

Issue	Construction	Operation/ Maintenance
3. Uncontrolled interaction between contractors and local communities. Increase in sex trade, spread of STDs, disruption and even breakdown of social fabric.	X	
4. Encroachment of settlements (mainly informal) into the servitude between the award of the RoA and the start of construction. Also later encroachment after construction.	X	X
5. Location of gates and access arrangements after construction.	X	X
6. Fire management, waste management and illegal water use by the construction crews.	X	
7. Influx of job seekers who are not employed by the contractor (and are therefore uncontrolled).	X	
8. Inadequate compensation for registration of servitude across property.		
9. Incomplete site rehabilitation after construction.	X	
10. Road safety and construction traffic. Traffic disruption due to construction activities.	X	

6.6. VISUAL

The proposed power line route is seen to offer the lowest combined visual impact of all the options considered, even though the new lines will pass close to a number of homesteads. Much of the environmental management of the visual impact will have been done by the selected routing of the lines during the EIA stage, though some local adjustments may occur during the servitude negotiation and design phases. Any adjustments during the negotiation phase will be done directly with landowners.

Hence, the primary requirement for this EMP will be a focus on rehabilitation of the construction areas, temporary access roads, re-grassing, litter management, etc.

6.7. FLOOD RISK

There are two river crossings in the power line route, one is the Elands River and Namahadi River. The river valleys of both are fairly narrow and will be easily spanned by the power lines. Construction access across the tributary is more feasible, but should be avoided where possible.

A 1:100 flood line determination has been undertaken to indicate flood risk. A Water Use License Application (WULA) will be submitted to guide construction and operation of this power linewhere impact to the river banks of either watercourse will occur.

7. THE ENVIRONMENTAL MANAGEMENT PLAN

The overall broad structure of the Environmental Management Programme comprises of three sections herewith detailed below.

7.1. PART 1: ADMINISTRATIVE STRUCTURE (ROLES AND RESPONSIBILITIES)

The administrative structure provides an outline of the key personnel to be involved in the implementation of the EMPr and their respective responsibilities. This section is an important component of the EMPr as it defines matters that will ensure that there is accountability. Although, Eskom will not be involved with the day to day operations, as the project proponent, it has the overall responsibility for the development and implementation of the EMPr and is therefore accountable for ensuring that any conditions stipulated by the Department of Environmental Affairs (DEA) are satisfied.

7.1.1. DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA)

The Department of Environmental Affairs (DEA) as the legally mandated environmental authority in the country has a crucial role in the assessment and enforcement of this EMPr. The roles of the authority are categorised as follows:

- **Review the draft EMPr:** The department will review the draft EMPr to assess its' adequacy. DEA can either approve the EMPr with or without conditions, or request resubmission of the EMPr thereby asking the Environmental Assessment Practitioner (EAP) to address certain issues and in the worst case scenario can reject the submission all together.
- **Monitor Environmental Performance:** DEA will request from Eskom periodic monitoring and audit reports to assess the level of environmental performance on site, issues regarding compliance and none compliance and matters relating to conditions of the ROA, permitting / licensing conditions by other departments.
- **Site Audits:** The authorities may perform random controls to check compliance. In case of persistent non-compliance, Eskom will be required to provide an action plan with corrective measures and have it approved by the authorities.

7.1.2. PROJECT MANAGER

Eskom must appoint a Project Manager who will represent the Clients' interests in the implementation of the entire project and this person will bear the ultimate responsibility for managing the site operations including overseeing and monitoring environmental performance. The Project Manager will ensure the implementation of this EMPr through the supervision of the Environmental Control Officer (ECO, see below).

7.1.3. THE ESKOM ENVIRONMENTAL CONTROL OFFICER

The Environmental Control Officer (ECO) will be the representative for Eskom on site and will have direct responsibility of monitoring and ensuring that the requirements of the EMPr are carried out accordingly. This individual is therefore required to have the appropriate training and experience. Ideally, the ECO should be appointed one month before the start of construction in order to familiarise themselves with the job requirements including reviewing the EIA and EMPr for the project, preparing training material, compilation of site observations and audits record sheets. The

ECO will establish audit procedures, determine the frequency of audits, undertake the audits and maintain records of audits. The ECO must remain employed until all rehabilitation measures as required are completed and the site is handed over to Eskom by the contractor for operation.

The ECO is therefore the link between Eskom's' Project Manager and the Contractor / Subcontractor. He/ She will on a periodic basis provide feedback on progress to the Project Manager and will issue directives regarding non – compliance to the respective parties, via the agreed upon channels as stated in the contract between Eskom and the party in question. In addition, the ECO may also have to work in close liaison with any CECO that may be hired directly by the principal contractor.

The duties of the ECO will include but will not be limited to the following:

- Provide induction training of all personnel about the EMPr and its implementation.
- Conduct regular inspections in order to monitoring the performance of the Contractor (and Sub-contractors) and ensuring compliance with the EMPr and associated method statements.
- To document current site activities and the monitoring including matters relating to non-conformance. All documents should be signed by relevant parties to make them authentic and should be kept on site and available for monitoring purposes. In summary the following documents are to be kept on site:
    - Site daily dairy.
    - Complaints register.
    - Records of all remediation/rehabilitation activities.
    - Copies of bi-weekly reports to the Transmission Engineering Environmental Advisor for auditing purposes.
    - Copy of the Environmental Management Programme.
    - Minutes of site meetings including discussions on environmental issues.
- Provide feedback on progress to the Project Manager of an agreed upon timeframes.
- Hold regular site meetings with relevant Contractor representatives to discuss safety, health and environment matters.
- In collaboration with the CELO to maintain and monitor the stakeholder liaison register, keeping a record of complaints, responses to complaints, response times etc. All matters with landowners and other third parties will be addressed directly by an Eskom representative, typically the ECO.
- Validating the regular site reports prepared by the Contractor;
- Checking the Contractor's record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken;
- Checking the public complaints register in which all complaints are recorded, as well as action taken;
- Issuing of site instructions to the Contractor for corrective actions required;
- Conducting regular audits to ensure that the system for implementing the EMPr is operating effectively.

7.1.4. CONTRACTOR

Eskom following a tender process will appoint a principal Contractor for the construction of the transmission power lines. Ideally in order to facilitate commitment to environmental performance certain prerequisites are required; for example the request for proposals should require that tenderers to show their approach and budget breakdown for the implementation of the EMPr and in addition, the contract to the appointed Contractor should include clauses that will bind the Contractor to this objective and should also include the EMPr document.

The Contractor will be responsible for the day-to-day operations and therefore directly involved in the implementation of the measures and procedures in the EMPr. The Contractor will assign key people with positions of authority to supervise various aspects of the implementation activities that will be responsible for signing off tasks that have been completed and monitoring progress.

It is increasingly common for developments of this nature for the principal Contractor to engage a full time environmental officer who will be expected to work closely with these supervisory staff and Eskom's ECO.

7.1.5. CONTRACTOR ENVIRONMENTAL LIAISON OFFICER (CELO)

The Contractor Environmental Liaison Officer (CELO) is the Contractor's environmental representative on site. This individual has to ensure that the EMPr and the legal requirements are met by the contractor. The individual will conduct this by monitoring and auditing the EMPr implementation process on behalf of the Contractor.

In addition to reporting on progress, as part of the continued public consultation process, the CELO will also be responsible for liaising with various stakeholders on matters relating to the project and the environment. This process will be undertaken to afford stakeholders an opportunity to define and shape the project by way of the issues raised and where there is merit, their input should be taken into account and incorporated, as they have local knowledge, understand the social norms and dynamics. This may only lead to improvements including that of relations between Eskom, the Contractor and stakeholders.

The identification of relevant stakeholders can in part be determined from the database compiled by the Environmental Assessment Practitioner (EAP) during the EIA process. However some of the key stakeholders of which can be contacted on a periodic basis include:

- **Permitting and Licensing Authorities:** This may include both central and local government institutions with legislative mandates governing some activities likely to impact on various components of the environment or the use of some natural resources. The often have mandates to issue approvals, permits or licenses.
- **Service providers**: It is important that other service providers particularly those with infrastructure within the project area are kept abreast about the project and where necessary establish collaborations to ensure that the transmission lines do not result in the destruction of existing infrastructure or obstruct the construction of other infrastructure that is already planned and in the pipeline.
- **Local Stakeholders**: This includes persons within the project area and those who are most likely to be affected given their proximity. The important stakeholders may include tribal authorities, farmers associations, landowners and local communities. Communication with these parties can be conducted in the form of regular meetings, newsletters or notices.

7.2. PART 2: PRE- REQUISITES FOR EMPR IMPLEMENTATION

7.2.1. Tender and Contractual Requirements

Tender Process: Eskom to incorporate the EMPr into the Tender Bid Documents to allow for the bidding contractors to submit a proposal that incorporates a method statement for the implementation of the EMPr and costing for the exercise.

Contractual Obligations: Contracts by Eskom to either the Contractor or Sub – Contractors has to contain contractual obligations that obliges these parties to implement the EMPr and which also spells out possible ramifications for non-adherence.

Appendix 8 is an example of a pro-forma for Eskom and the Contractor's Project Managers to sign for the purpose of ensuring the implementation of the EMPr.

7.2.2. Induction and Training

As stated above the ECO will be responsible for conducting the environmental induction-training course so as to equip the site employees with an understanding of Eskom's policies regarding safety, health and environmental issues. This includes the overall objective of the EMPr and of their roles and responsibilities. Ideally this activity should be undertaken in the initial stages such that good practices are adopted from the onset.

Environmental training must include:

- A site induction
- Emergency response training
- Familiarisation with site environmental controls, and
- Specific environmental training for relevant employees e.g. requirements for installing erosion and sedimentation controls, conducting daily checks to maintain controls, cleaning up spills.
- Bring to attention of employee areas of environmental sensitivity and procedure with regard to these areas, for example, clearly demarcate, etc.

7.2.3. Monitoring and Auditing

An ECO will be responsible for conducting regular inspections and undertaking periodic audits and depending on observations made, the ECO may request the Contractor to address certain areas, suggest alternative measures or procedures to address certain problematic areas, request feedback on areas of non-conformance.

According to its mandate, DEA may in addition visit the project area to assess progress with regards to the implementation of the EMPr implementation and to determine whether it has been undertaken according to planned arrangements. The DEA may also request an independent audit for cross checking and verification purposes.

7.2.4. Documentation and Reporting

The following **Key Performance Indicators** must be reported on by the ECO:

- Complaints received from affected parties and actions taken;
- Environmental incidents, such as oil spills, etc. and actions taken;
- Incidents possibly leading to litigation and legal contraventions; and

- Environmental damage that needs specialised rehabilitation measures to be taken.

Monthly environmental compliance reports are to be submitted to the Project Manager (appointed per project) with all information relating to environmental matters. This should be used to highlight issues such as achievements, areas of non- compliance, obstacles encountered, changes to the EMPr etc.

7.2.5. Non-conformance Reporting Procedures

Complaints and non-conformances involving landowners and community must be reported to Eskom and copied to the DEA according to the following procedure:

Eskom should maintain the Complaints Register; this should be kept at an accessible location. The complainant has the right to request assistance from the security staff to complete the register. The complainant can also forward a copy of Complaint Registration to Eskom at:

Attention: The Information Officer

Eskom Holdings Ltd.

Distribution Services

PO Box 356

Bloemfontein

9300

Tel: 051 404 2287

- The Complaint Registration Form will then be forwarded to the ECO. The ECO will forward completed Complaint Registration Forms to the relevant line function manager for appropriate action.
- The ECO will write to the complainant to –
    - Acknowledge receipt of the Complaint Registration Form within 5 working days; and
    - Advise the complainant of a target completion date.
    - Advise the complainant of the outcome in writing.
- Documentation, including investigation outcomes, will be placed on the confidential file held by the Project Manager.

7.2.6. EMPr Review and Update

The EMPr will be reviewed periodically as new information is made available, this includes

- New construction sites and sites under rehabilitation
- Changes in the activity
- New environmental issues
- Latest landowner liaison
- Inspections, audits and visits by authorities
- Major incidents

The extent and detail of the review of an EMPr will need to be determined on a case-by-case basis. All the stakeholders identified could potentially participate in the review of the EMPr.

7.3. PART 3: EMPR TABLES

The tables are designed to address the environmental issues as identified by the EIA process and Walkthrough exercise whilst also incorporating the issues that come out of the activities undertaken in the respective project phases. Therefore prior to presenting the tables, this section provides a brief outline of the project phases taken into consideration for the EMPr.

7.3.1. Pre- Construction Phase

It is assumed that the pre- construction phase will incorporate all those activities required for the preparation of the construction phase. Activities include the selection and establishment of the construction site, vegetation clearing at the campsite and storage facilities area.

7.3.2. Construction Phase

Most impacts to the environment are expected to occur in the Construction phase and as such much focus is given to the activities undertaken during this phase, associated environmental issues and proposed environmental controls which form key components of the EMPr, however in addition the roles, responsibilities and lines of communication have to be clearly spelled out.

The following is a summary of key actions for this phase of the project:

- Construction camp location to be finalised and approved by ECO.
- Communicate summary of construction programme and list of responsible persons (with contact details) to the affected landowners and interested community. The EIA stakeholder database will provide an effective basis for this.
- Training and informing all persons with all persons active in the construction process is a vital aspect in the implementation of the EMPr. Initiate environmental information sessions with all personnel and the Eskom ECO is to ensure all personnel sign off attendance of such sessions.
- Procedures for recording and documenting environmental incidents, decisions, an agreement with landowners, etc. is to be established by the ECO and agreed with the principle Contractor.
- Regular reviews of the content and implementation of the EMPr are to be undertaken by the ECO. Update the EMPr and supporting documentation as required.
- Rehabilitation is to run in parallel with construction activities and not left to the very end of construction. The ECO should oversee the integration of rehabilitation activities where reasonably possible.
- The Eskom should undertake monthly audits of the EMPr implementation.
- Project Manager to undertake final inspections with ECO and Principal Contractor.
- ECO to finalise update of EMPr documentation and handover to responsible officer for the Operations Phase.

7.3.3. Operational Phase

The operations phase will be important for ensuring the stabilisation of the construction sites and the success of the rehabilitation works, as well as the long-term stability of the environment around the infrastructure during the operation of the lines as well as maintenance of power lines and servitudes.

The key actions are summarised as follows:

- Establish responsible persons for this phase and communicate these (with contact details) to landowners and interested parties.
- Initiate environmental information sessions with all personnel and the Eskom ECO are to ensure all personnel sign off attendance of such sessions.
- Establish monitoring and reporting procedures for critical environmental aspects as prescribed by the latest version of the EMPr. (Such aspects may include erosion and road maintenance, bird collisions, rehabilitation of grasslands, removal of invader species, etc.). Report to relevant authorities where appropriate.
- Oversee maintenance and any rehabilitation works.
- Update EMPr as required.

7.3.4. Decommissioning Phase

The procedures for decommissioning are not well tested for power supply infrastructure in South Africa. However, it is reasonably assumed that the process will be similar to the reverse of the construction process, and the same procedures are therefore recommended. These should be reviewed prior to decommissioning.

7.4. EMPr Table

The EMPr table has been set up according to the different phase of the project. This is mainly:

- Pre-Construction
- Construction
- Operations and Decommissioning

PRE-CONSTRUCTION	CONSTRUCTION	OPERATION & DECOMMISSIONING
Grievance procedure	Vegetation clearing	Grievance procedure
Compensation claim assessment	Use of ablution facilities and kitchen facilities	Compensation claim assessment
Compensation procedure	Use of vehicles for material, equipment and personnel transportation	Compensation procedure
Vegetation clearing	Fuel Storage facilities	Use of vehicles for material, equipment and personnel transportation
Appoint contractor, labourers, etc.	Maintenance of Roads	Maintenance of Roads
Conduct Environmental Induction and Training	Set up batching plant Power line Crossing	Access Roads
Relocation of People	Road Crossing	Fire Control
Set up living quarters, site office, assembly area and workshops	River/ Wetland Crossing	Solid waste management
Vegetation Clearing	Gate installation	Liquid waste management
Use of ablution facilities and kitchen facilities	Access Roads	Rehabilitation of Servitudes
Use of vehicles for material, equipment and personnel transportation	Borrow pits for Construction (Roads/ Building) Material from Quarries	
Fuel Storage facilities	Tower construction	
Set up batching plant	Stringing Operation	
	Noise	
	Fire Control	
	Cultural Heritage & Archaeological Resources	
	Avifauna	
	Solid waste management	
	Liquid waste management	
	Liquid waste management at camp	
	Hazardous waste management	
	Rehabilitation of Servitudes	
	Landowner relations	

Table 1: EMPr Impact Table

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.1 Grievance procedure	• Establish grievance procedure • Provide contact details of the developer	• Effective grievance process allows problem areas to be addressed timeously, avoiding project delays • It is a good communication tool • Required for IFC compliance	NEMA	***Objective:*** Establish a procedure whereby the public can express concerns and be sure they are addressed. ***Mechanism:*** • Provide dedicated contact telephone number, fax, e-mail, address for receipt of complaints. • Provide a site register (main camps) for "walk in" queries & complaints • Ensure construction crews have a record book to receive queries & complaints from passers by. • Ensure a minimum 48hrs for acknowledgement of complaint and a commitment on when full response will be sent to the complainant.	Number of complaints received. *Note: few complaints may mean that the method of communication is not appropriate for the environment.*	Inspect complaints register	Project Manager, ECO	• Must be operational from first site clearing to final rehabilitation • Megawatt Park office grievance register to operate beyond final rehabilitation (min 6 months).
7.4.2 Compensation claim assessments	Fair assessment and compensation for loss of property (e.g. livestock) or damage.	Claim for damages in remote areas are sometimes difficult to prove without evidence of "before" and "after" the event. This can lead to extended disputes.	Eskom's Compensation Policy	***Objective:*** To aid the assessment of claims and minimise disputes. ***Mechanism:*** • Photo records of facilities before construction activities take place. • Record of movement of all construction crews and personnel. • Photos of all repairs and rehabilitation.	Photo record, with date and GPS reference *(and duration of construction activities if they have started)* for all parts of the environment including: • Roads • Boreholes • Fences and farm gates • Watercourses • All other 3rd party facilities.	• Compensation agreements • Assessment records Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.	• ECO • Project manager • Camp manager	• Operational from first field visits until final rehabilitation.

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.3 Compensation procedure	• Implement compensation policy • Ensure all land owners are compensated for damages as a result of construction processes	• Compensation to farmers, communities and affected parties may be due to destruction of property or loss of business. • Disputes may develop • Lack of evidence may complicate the assessment • Relationship with public in general may be affected • Project delays and even court cases may arise.	Eskom's Compensation Policy	***Objective:*** To minimise the loss of assets due to the implementation of the project. **Mechanism:** Implement compensation policy.	Record all claims and settlements.	• Compensation agreements • Assessment records • Compensate policy	• Project Manager • ECO	To be operational from the time of the first works on the ground until a minimum of 6 months after completion of the rehabilitation programme
	• Settling of all outstanding claims • Signing off all landowners	• Landowners happy • Servitude ready for handover to Grid		***Objective:*** Minimize claims and litigation from landowners ***Mechanism:*** • All damage to commercial crops shall be recorded immediately. • The ECO • The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. • All claims for compensation emanating from crop damage should be directed to the ECO for appraisal. • The Contractor shall be held liable for all unnecessary damage to the environment and	• Successful completion of the contract with all landowners signing the release form six months after completion of the project • All claims investigated and dealt with in one month • No litigation due to unsettled claims	Site visit	ECO Eskom Envir. Advisor / Negotiator	After completion

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				crops. • A register shall be kept of all complaints from Landowners. • All claims shall be handled immediately to ensure timeous rectification / payment.				
7.4.4 Appoint contractor, labourers, etc.	Employment	Temporary job creation		***Objective:*** Where appropriate and possible, preference must be given to the local communities in the awarding of contracts and other job opportunities. Establish the responsible individuals required as key personnel for the different aspects of the EMPr ***Mechanism:*** • It will be a specific condition in the contractor's contracts that local labour be used wherever possible. • All reasonable attempts will be made to appoint people from the local communities as temporary labourers for non-specialised tasks.	Number of local people employed	Inspection of employment records	Construction Contractor and ECO	Weekly

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.5 Conduct Environmental Induction and Training	• Employees, contractors and project team • First Aid plan and fire safety procedure • Emergency preparedness plan • Accident procedure • Site awareness	• Poor health and safety procedure • Non-conformance with audits	• Eskom's SHE plan • IFC guidelines • OHSA • HA • AQA	***Objective:*** To equip the site employees with Eskom's policy regarding health, safety and environment. To also conduct environmental induction training on the EMPr requirements. ***Mechanism:*** • The EMPr will be included in all contracts and signed by every contractor and sub-contractors • All the employees will be trained on emergency preparedness • Adopt good practices for safety, health and environmental issues	• Signed EMPr pro-forma • Signed list of all employees that attended the induction • Defined Health & Safety plan	Conduct audits on EMPr implementation	• ECO • Project Manager •	Before commencement of the project
7.4.6 Relocation of People	Resettlement of people and their property	• Displacement of people. • Loss of property.	• Eskom's Resettlement policy • International Finance Corporation (IFC) Guidelines	***Objective:*** To manage the relocation by way of providing appropriate compensation and grievance procedures. ***Mechanism:*** • Residents should be sufficiently compensated and assisted with the relocation process. • Independent valuation of property loss and disruption/relocation costs. • A formal grievance procedure should be implemented and communicated to affected parties.	• Number of people relocated • Number of grievances • Independent evaluator's report	Inspection of resettlement agreements	• Independent Evaluator • Eskom's Negotiator • Project Manager • ECO	Before commencement of the project
7.4.7 Set up living quarters, site office, assembly area and workshops	• Bush clearing and levelling, • Install Concrete floor • Install Waste Collection Area, • Cast concrete slabs for buildings & concrete bundled area for servicing vehicles	• Camp site located in sensitive areas • Indiscriminate environmental degradation • Damage to protected / endangered vegetation • Damage to topsoil / waste	NEMA BDA CARA LRA SDA CTB	***Objective*:** To minimise environmental degradation and social disruptions. ***Mechanism:*** • Environmental Scan to be conducted on the identified site. • Additional specialist studies may be identified by ECO. • Preparation of plan showing site alternatives and environmental sensitivities. • Topsoil must be conserved and stockpiled for	Environmental Management Programme for the Scan.	• Report on all NCRs identified • Perform Spot Audits regularly • Conduct final audit before site handover to the asset owner	• Site / Operations Manager • ECO	• Before ground works start to establish new camp • Specialist studies may be season sensitive, therefore

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	• Appointment of contractors labourers	concrete • Compacting of ground		rehabilitation • Minimise scarring of the soil surface and land features • Minimise disturbance and loss of topsoil • Rehabilitate all disturbed areas • Minimise damage to vegetation • Minimise possibility of erosion due to removal of vegetation • Disturbed areas must be rehabilitated immediately to prevent soil erosion • Site establishment shall take place in an orderly manner and all amenities shall be installed at Camp sites before the main workforce move onto site. • The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction. • The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to Eskom.	Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.			allow adequate planning
				• Location of construction camp will be negotiated with the affected landowner prior to occupation. • Camp site will be fenced off and kept locked at all times Compacted ground shall be rehabilitated by ripping to a minimum depth of 600mm	Record of landowner agreements and special conditions.			
7.4.8 Vegetation Clearing	• Clearing of vegetation, especially protected species	• Unnecessary destruction of sensitive species, habitats and ecosystems • Soil erosion	BDA NHRA ROD	***Objective:*** • To minimise the loss of biodiversity through restricting the removal of vegetation to the footprint of the development. • Keep servitude as natural looking as possible • Minimise interference by vegetation to flow of electricity • Minimise possibility of erosion due to removal of vegetation • Eradication of alien invader and densifier species	• Site layout plan showing demarcations of areas to be cleared, fire breaks, trees and shrubs not to be removed. • Amount of stumps of vegetation on river and stream embankments • Visible herbicide damage to the vegetation along the	• Site Inspection	• ECO • Eskom Envir. Advisor	Prior to construction

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				that cause a fire hazard ***Mechanism:*** • Follow procedures for site identification (see above). • Adhere to site clearing limits set out in this EMPr • Extent & method of clearing to be mapped & agreed by ECO prior to construction • Locate and map all plants and natural features to be protected. • Clearing by blading (grading or bulldozing) should not be allowed unless deemed unavoidable by ECO. • Do not remove any tree or large shrub without permission from the ECO. • No vegetative matter may be removed for firewood. • No natural materials may be harvested for construction purposes, with the exception of those found within the site footprint. • Any exotics that are encountered are to be removed immediately, making use of mechanical methods • If a suspected Red Data Species is encountered, construction activities are to stop immediately. ECO/DEA authority needs to be contacted for identification and way forward. • Only 6m vegetation cleared along the centre of the servitude for access purposes	servitude one year after completion of the contract due to incorrect herbicide use • Litigation due to unauthorised removal of vegetation			

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				• Protected or endangered species of plants shall not be removed unless they are interfering with a structure. • Where such species have to be removed due to interference with a structure, the necessary permission and permits shall be obtained from Provincial Nature Conservation. • All protected species not to be removed must be clearly marked and such areas fenced off if required. No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks. Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard. **Contractor requirements:** • Contractor must be in possession of a valid herbicide applicators licence • Contractor to have necessary knowledge to identify protected species as well as species not interfering with operation of the line due to their height and growth rate • Contractor to be able to identify all declared weeds & alien species that can be totally eradicated	Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.			

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.9 Use of ablution facilities and kitchen facilities	Install drainage system for toilets, waste water, water supply Use veld for toilet	• Ground water pollution and impact on vegetation • Pollution of ground water and soil • Health risk spreading of diseases	NWA OHSA NEMA TRMSCAAC1 REV 3 CTB OHSA	***Objective:*** To ensure proper sanitation is achieved and minimise the spread of diseases ***Mechanism:*** • The Contractor shall install mobile chemical toilets on site • Staff shall be sensitised to the fact that they should use these toilets at all times • No use of the veld shall be allowed, as this always create problems with the landowners and lead to claims for problems with stock diseases • Toilet paper is also a source of littering in the veld, and the Contractor shall be forced to clean up any litter • The Contractor shall take all the necessary precautions against the spreading of disease, especially under livestock.	Number of complaints received from landowners regarding sanitation	• A record shall be kept of drugs administered and the dates when this was done. This should be available on site. • A record of all complaints should be available on request. ECO officer to keep records	ECO Eskom Envir. Advisor	As and when required
7.4.10 Use of vehicles for material, equipment and personnel transportation	• Trucks delivering material to store area • Servicing vehicles resulting in draining oil and removing filters & Emergency repairs due to breakages • Transport of personnel and material to site • Air pollution from exhaust fumes	• Oil, lubricants or fuel spills • Waste material containers packaging	NWA ECA NEMA HSA ROD AQA	***Objectives:*** • To prevent and minimise pollution to the environment. Prevent transgressing acts that governs pollution • The hierarchical approach to integrated waste management with the preferred option being reduction, reuse and recycling followed by treatment and disposal, must be adopted ***Mechanism:*** • Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop area. • During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are effected outside the workshop area.	• Oil spillages • A register shall be kept on all substances and be available for inspection at all times. • Areas shall be monitored for spills and any spills shall be recorded rehabilitated immediately	Monitor register	ECO Eskom Envir. Advisor	Daily Weekly

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				• Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. • All potentially hazardous and non-degradable waste shall be collected and removed to a registered waste site. • A certificate of disposal shall be obtained by the Contractor and kept on file • Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and re-mediated to the satisfaction of the ECO. • The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site,				
				• All hazardous substances shall be stored in suitable containers and storage areas shall be bunded. This includes all carbon substances like fuel and oil as well as herbicides and battery acid. • Any leaking containers shall be repaired or removed from site (See above actions for spills).				
7.4.11 Fuel Storage facilities	• Fuel storage facility • Fuel handling	Pollution from accidental spillage events, leakage, theft, etc.	NEMA HSA ROD	• Fuels include diesel, petrol, paraffin, and lubricating oils. • All fuels to be stored in secure areas (lockable sites) • Security control required at all times • Register of usage to be maintained at all times and monitored for loss (leakage, theft, etc.) • Fuel storage tanks to be contained in walled (bunded) sites with a minimum storage capacity of 1.2 times the volume of the tank. The base and walls of the site must be impervious and strong enough to prevent puncture. • Regular monitoring (daily) for spillage, theft or leakage. Visual inspection of all container areas. • Emergency procedures to be available at all sites for fuel containment and cleanup in the event of an accidental spillage.	• Design of containment areas • Security control • Emergency procedures • Record of inspection	Number of leakage incidents using a leakage detector and visual inspections	Workshop manager ECO Project manager	• Before establishment of workshop or fuel storage facility • Daily during operational phase

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.12 Landowner relations	Communication with landowner	Landowner refusing entry to his/her property	TRMPVACV2 REV1	**Objective**: Maintain good relations with Landowners **Mechanism:** • Access to farms must be properly regulated • No Eskom Holdings employee or contractor shall enter land over which Eskom Transmission holds a servitude without prior notification of the ECO. • Landowners shall as far as possible be notified prior to the intended visit. The Lands and Rights will assist in the notification of landowners. Where landowners cannot be reached, notification should be given via other appropriate security or community structures that exist in the area. The notification should include description of vehicles, the number of people and the time and intention of the visit	• No delays in the project due to Landowner interference • Number of claims or litigations from landowner • Signed landowners' final release forms	Complaints register	ECO Eskom Envir. Advisor	Daily Weekly

PRE CONSTRUCTION PHASE								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.13 Set up batching plant (concrete)	• Negotiate the site for batching plant. • Dust and Noise Management during site establishment	• Damage to top soil • Dust nuisance from the excavated and stockpiled material	TRMSCAAC1 REV 3 ROD	***Objective:*** • To ensure all agreements with Landowners are adhered to • Prevention of complaints from Landowners • Successful rehabilitation of disturbed areas • To avoid dust nuisance from excavated material and avoid noise nuisance from operating construction equipment ***Mechanism:*** The siting of batching plants shall be done in conjunction with the landowner and ecologist/botanist and archaeologist. • The batching plant area shall be operated in such a way as to prevent contaminated water runoff from the site and polluting nearby streams or water bodies. To this effect diversion berms can be installed to direct all wastewater to a catchment area. • Implement dust suppression measures e.g. regular watering • Concrete mixing to be carried out away from sensitive areas • The mixing of cement, concrete, chemicals and other materials must be done in designated areas on concrete aprons or protected linings, with the necessary provision made to contain spillage and overflows • The residues of these materials must be removed and the area rehabilitated once the work is complete • Develop and implement dust monitoring programme • Limit working hours of noisy equipment to daylight hours (06:00-18:00) • Fit silencers to equipments	• Complaints from Land Owners • All disturbed areas to be rehabilitated successfully, three months after construction • Use water bowsers to suppress the dust	Landowner to sign off after completion of project.	ECO Eskom Envir. Advisor	Daily Weekly after construction
					Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.			

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.14 **Vegetation Clearing**	• Clearing of vegetation, especially protected species	• Unnecessary destruction of sensitive species, habitats and ecosystems • Loss of natural root stock allowing invasion of weed and pioneer species. • Soil erosion	BDA NHRA ROD	***Objective:*** • To minimise the loss of biodiversity through restricting the removal of vegetation to the footprint of the development. • Keep servitude as natural looking as possible • Minimise interference by vegetation to flow of electricity • Minimise possibility of erosion due to removal of vegetation • Eradication of alien invader and densifier species that cause a fire hazard ***Mechanism:*** • Follow procedures for site identification (see above). • Adhere to site clearing limits set out in this EMPr • Extent & method of clearing to be mapped & agreed by ECO prior to construction • Locate and map all plants and natural features to be protected. • Do not remove any tree or large shrub without permission from the ECO. • Avoid blading (grading of bulldozing) the ground to remove vegetation and damaging roots. • No vegetative matter may be removed for firewood. • No natural materials may be harvested for construction purposes, with the exception of those found within the site footprint. • Any exotics that are encountered are to be removed immediately, making use of mechanical methods • If a suspected Red Data Species is encountered, construction activities are to stop immediately. ECO/DEA authority needs to be contacted for identification and way forward. • Only 6m vegetation cleared along the centre of	• Site layout plan showing demarcations of areas to be cleared, fire breaks, trees and shrubs not to be removed. • Amount of stumps of vegetation on river and stream embankments • Visible herbicide damage to the vegetation along the servitude one year after completion of the contract due to incorrect herbicide use • Litigation due to unauthorised removal of vegetation	• Site Inspection	• ECO • Eskom Envir. Advisor	Prior to construction

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				the servitude for access purposes				
				• Protected or endangered species of plants shall not be removed unless they are interfering with a structure. • Where such species have to be removed due to interference with a structure, the necessary permission and permits shall be obtained from Provincial Nature Conservation. • All protected species not to be removed must be clearly marked and such areas fenced off if required. No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks. Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard. **Contractor requirements:** • Contractor must be in possession of a valid herbicide applicators licence • Contractor to have necessary knowledge to identify protected species as well as species not interfering with operation of the line due to their height and growth rate • Contractor to be able to identify all declared weeds & alien species that can be totally eradicated	Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.			
7.4.15 Use of ablution facilities and kitchen facilities	*Refer to 7.4.9 for details*	•		• *Refer to 7.4.9 for details*		•		
7.4.16 Use of vehicles for material, equipment and personnel transportation	Refer to 7.4.10 for details			*Refer to 7.4.10 for details*	•			

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.17 Fuel Storage facilities	Refer to 7.4.11 for details			Refer to 7.4.11 for details				•
7.4.18 Maintenance of Roads	• Regular maintenance of access roads • Erosion • Dust	• Erosion may be accelerated by inappropriate location of new roads and access tracks. • Damage to original road surfaces that will limit use by farmers and the public. • Excessive generation of dust	NEMA	**Objective:** • To minimise the risks and inconvenience to other road users. **Mechanism:** • Road and track will be planned such that it is limited to the minimum necessary for safe and workable access. • Develop a Road Maintenance Plan detailing method to be used and the frequency • Undertake regular maintenance of roads and tracks as per the Road Maintenance Plan. • All damage to existing roads due to construction traffic to be repaired immediately. • The construction of any new road should be preceded by an environmental scan. • Road rehabilitation to begin as soon as construction activities cease. • During wet weather the use of any road or track must be restricted to prevent damage to the road or track. • Dust monitoring must be employed, especially where the roads are within 500m of villages or dwellings.	• Maintenance programme • Incident reports	Road maintenance report	Site Supervisor ECO	Monthly
7.4.19 Set up batching plant	*Refer to 7.4.13 for details*	•		*Refer to 7.4.13 for details*	•			

Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.

Golden Rule: Never make new tracks where there are existing tracks (or roads). Always rehabilitate existing tracks for use instead of creating new ones.

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.20 Tower Pegging	• Vehicle driving in veld • Surveyor pegging towers	• Damage to protected / endangered vegetation • Oil Spills • Littering of packaging & pegging materials	BDA NHRA NWA ROD NEMA ECA	***Objective**:* To minimise environmental impact ***Mechanism**:* • Re-seeding shall be done on disturbed areas as directed by the Environmental Control Officer. In accordance with the Conservation of Slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced. Other methods of rehabilitation of tower sites may also be used at the discretion of the ECO, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slope on tower sites. The type of soil shall also be taken into consideration. • Vehicle access to the power line servitude must be limited to existing roads. • Vehicle access to the power line servitude must be limited to existing roads. • Refer to littering under site establishment.	Visual assessment of disturbed areas and packaging materials	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly
7.4.21 Power Line Crossing	New power line crossing an existing power line	• Electrical flash over • Power supply interruption		***Objective**:* To minimise power supply interruptions ***Mechanism**:* **Refer to Eskom Guidelines**	Number of power outages as a result of flash over caused by power line crossings		ECO Eskom's Envir Advisor	During construction where crossing occurs
7.4.22 Road Crossing	New power line crossing a road	Traffic flow interruption		***Objective**:* To minimise traffic flow and to minimise number of accidents as a result of power line construction ***Mechanism**:* • Contact provincial Roads Dept	Number of accidents resulting from construction activities	Number of accidents	ECO Eskom's Envir Advisor	During construction where crossing occurs

Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.23 River/ Wetland Crossing	New power line crossing a waterbody	• Damage to protected / endangered vegetation • Impact on aquatic fauna and flora • Potential siltation of the water body	ROD NEMA ECA	***Objective**:* Streams and wetlands were noted along the power line route. The design, construction and operation phases should take all waterbodies into consideration to avoid or minimise impact. ***Mechanism**:* • Avoid construction in wetland areas or 50m within a river/stream. • However, should this not be possible, an engineer with experience in construction in wetlands, and a wetland specialist, should be appointed to advice during the design and construction phases. • Maintenance vehicles to avoid driving through wetlands or close to the banks of water bodies • Obtain a water use licence from DWAF	Disturbed areas near the water courses	Water Use Licence	ECO Eskom Envir Advisor	Daily

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.24 Gate installation	• Flattening of fences to gain access • Tying off fence and straining fence wires • Dig holes • Insert gate and pour concrete • Installation of concrete sill in Vermin proof fence	• Damage to fences • Damage to electrical fencing • Wire off cuts and broken fences • Disturbance of topsoil • Waste concrete	FA TRMPVACV2 REV1 TRMSCAAC1 REV 3 CARA	***Objective:*** • To install gates to allow access for construction • Minimise damage to existing fences and gates • To limit access to Eskom & contractor employees by using keys • All fences properly tied off to the gate posts • All fences properly and neatly installed according to specifications • The hierarchical approach to integrated waste management with the preferred option being reduction, reuse and recycling followed by treatment and disposal, must be adopted ***Mechanism:*** • No waste material shall be left on site that may harm man or animals. • Surplus concrete may not be dumped indiscriminately on site, but shall be disposed of in designated areas as agreed by the Landowner. • Concrete trucks shall not be washed on site after depositing concrete into foundations. Any spilled concrete shall be cleaned up immediately • The Landowners shall be kept abreast of all developments and shall be kept informed about the progress and phases of the contract. • All gates shall be fitted with locks and be kept locked at all times during the construction phase. • Gates shall only be left open on request of the Landowner if he accepts partial responsibility for such gates in writing, once the Contractor have left site and the gates are fitted with Eskom locks.	• Litigation records • Number of complaints from land owners	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly

Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				• Such gates shall be clearly marked by painting the posts green. • All claims arising from gates left open shall be investigated and settled in full by the Contractor. • Game gates, drawing 0.00/10280 Rev 0, shall be installed where necessary. • All gates installed in electrified fencing shall be re-electrified. • The Environmental Control Officer shall approve gate positions. • All gate positions shall be three (3) metres off centre to allow for continued access when stringing takes place. ***Mechanism***: • At any gate poles where conventional foundations are installed, the Contractor shall remove the topsoil separately and store it for later use during rehabilitation. • During backfilling operations, the Contractor shall take care not to dump the topsoil in the bottom of the foundation and then put spoil on top of that.	Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.			

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.25 Access Roads	• Mark access roads • Vehicles driving off servitude road • Illegal use of private roads	• Damage to protected / endangered vegetation • Damage to drifts and bridges & irrigation lines • Damage to protected / endangered vegetation • Damage to heritage sites, Damage to private roads	BDA ROD	***Objective:*** • Minimise damage to embankments. • Minimise erosion of embankments • Vehicle access to the power line servitude must be limited to existing roads ***Mechanism:*** • A physical access plan along the servitude shall be compiled and the Contractor shall adhere to this plan at all times. • Proper planning when the physical access plan is drawn up by the ECO in conjunction with the Contractor shall be necessary to ensure access to all tower sites. • New access roads will be subjected to a separate assessment including inspection and reporting by qualified botanist. • All access roads will be marked • Agreed on Access to be used at all times. • No illegal use of private roads during construction due to damage anticipated as a result of heavy vehicles and equipment • All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. • Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect. • Upon completion of the project all roads shall be repaired to their original state. • No roads shall be cut through river- and stream banks as this may lead to erosion causing siltation of streams and downstream dams.	• Access plan approved by ECO • Number of complaints from residents and landowners Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	Bulldozer blading access roads	• Damage to protected / endangered vegetation • Damage to heritage sites, Damage to private roads	BDA NHRA ROD	***Objective:*** If red data flora or fauna occurs in the servitude, it must be demarcated as no-go areas for construction workers. ***Mechanism:*** • No scalping shall be allowed on any part of the servitude road unless absolutely necessary. • The removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed. • All trees and vegetation cleared from the site shall be cut into manageable lengths and neatly stacked at regular intervals along the line. • No vegetation shall be pushed into heaps or left lying all over the servitude. • Protected or endangered species of plants shall not be removed unless they are interfering with a structure. • Where such species have to be removed due to interference with a structure, the necessary permission and permits shall be obtained from Provincial Nature Conservation	Environmental scan report	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly
	Blading of access roads through dongas	Causing erodable areas, Erosion and loss of topsoil	CARA	***Objective:*** Minimise destabilisation of banks which could result in loss of top soil. ***Mechanism:*** • Vegetation clearing must be kept to a minimum. • Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed.	• Only 8m vegetation cleared along the centre of the servitude for access purposes • Litigation due to unauthorised removal of vegetation • Litigation due to unauthorised removal of vegetation	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				• Stumps shall be treated with herbicide. • Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. Any vegetation cleared shall be removed or flattened and not be pushed to form an embankment.				
7.4.26 Borrow pits for Construction (Roads/ Building) Material from Quarries	Excavations	• Erosion • Aesthetic value of the burrowed area • Loss of biodiversity • Risk to the safety of people and animals.		***Objective:*** To reduce the proliferation of burrow pits that results in: • the scarring of the landscape • risks to the safety of both people and animals. ***Mechanism:*** All borrow pits are subject to environmental laws and must receive government authorization before use. As a guide, the following will be needed: • Undertake environmental scan • Geotechnical Investigations • Rehabilitation Plan	Environmental scan report		Project Manager	Prior to sourcing burrow / fill material

Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.27 Tower Construction	Excavation of foundation	Disturbance of topsoil and vegetation Loss of topsoil with seedbank	CARA TRMSCAAC1 REV 3 ROD	***Objective:*** • Disturbed areas must be rehabilitated immediately to prevent soil erosion ***Mechanism:*** • Disturbance of topsoil on tower sites with severe slopes shall be minimised at all costs. • At any tower sites where conventional foundations are installed, the Contractor shall remove the topsoil separately and store it for later use during rehabilitation of such tower sites. • During backfilling operations, the Contractor shall take care not to dump the topsoil in the bottom of the foundation and then put spoil on top of that • Re-seeding shall be done on disturbed areas as directed by the Environmental Control Officer. • Slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced. Other methods of rehabilitation of tower sites may also be used at the discretion of the Environmental Control Officer, e.g. stone pitching, logging, etc. • Contour banks shall be spaced according to the slope on tower sites. The type of soil shall also be taken into consideration.	Photographic record of soil storage Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.	Site inspection	ECO/ Eskom Envir. Advisor	Daily Weekly

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	Drilling of foundation	Noise and dust pollution	NEMA ECA	***Objective:*** To avoid dust nuisance from excavated material And avoid noise nuisance from operating construction equipment ***Mechanism:*** • Implement dust suppression measures e.g. regular watering • Develop and implement dust monitoring programme • Limit working hours of noisy equipment to daylight hours (06:00-18:00) • Fit silencers to equipments	Number of complaints from landowners	Site inspection	ECO/ Eskom Envir. Advisor	Daily Weekly
	Installation of steel reinforcing	Waste material	NEMA ECA ROD CTB	***Objective:*** • Proper waste management on site • The hierarchical approach to integrated waste management with the preferred option being reduction, reuse and recycling followed by treatment and disposal, must be adopted. ***Mechanism:*** • No waste material shall be left on site that may harm man or animals. • Any broken insulators shall be removed and all shards picked up. • Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site.	Amount of visible waste material on site after activity		ECO/ Eskom Envir. Advisor	Daily Weekly
	Casting of concrete & washing of concrete truck on site	Waste concrete	NEMA ECA TCB ROD CTB	***Objective:*** • Proper waste management on site • The hierarchical approach to integrated waste management with the preferred option being reduction, reuse and recycling followed by treatment and disposal, must be adopted ***Mechanism:*** • Surplus concrete may not be dumped	Amount of visible waste material on site after activity	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				indiscriminately on site, but shall be disposed of in designated areas as agreed by the Landowner. • Concrete trucks shall not be washed on site after depositing concrete into foundations. • Any spilled concrete shall be cleaned up immediately • Surplus concrete may not be dumped indiscriminately on site, but shall be disposed of in designated areas as agreed by the Landowner				
	• Assembling of towers • Dressing of towers with hardware and insulators	• Waste bolts and nuts • Insulator breakage littering glass shards in veld	NEMA ECA ROD CTB	***Objective:*** • Proper waste management on site • The hierarchical approach to integrated waste management with the preferred option being reduction, reuse and recycling followed by treatment and disposal, must be adopted ***Mechanism:*** • No waste material shall be left on site that may harm man or animals. • Any broken insulators shall be removed and all shards picked up. • Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site.	Amount of visible waste material on site after activity	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.28 Stringing Operations	Installation of phase and earth conductors	Damage to structures and agricultural crops	TRMSCAAC1 REV 3	***Objective:*** • Prevent damage to expensive structures and crops, • Prevent disruption of services ***Mechanism:*** • The necessary scaffolding / protection measures must be installed to prevent damage to structures supporting certain high yield agricultural crops as well as the crops itself • All structures supplying services such as telephone and smaller power lines, as well as main and farm roads, shall be safeguarded by measures to prevent disruption of services • Use of "rugby" posts to protect roads and telephone lines are sufficient.	• Number of claims emanating from damage to supporting structures and crops • Number of complaints or claims arising from disruption of services	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly
					Photographic record of the site to be kept before construction activities commence. This will support any disputes relating to damages and will support the rehabilitation process after construction.			

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	• Clearing of drum, tensioner and winch stations • Creating fire breaks around drum stations	Damage to protected / endangered vegetation	BDA	***Objective:*** • Minimise damage to vegetation • Minimise damage to topsoil • Successful rehabilitation of barren areas ***Mechanism:*** • The siting of winch and tensioner stations shall be done in conjunction with the landowner and ecologist/botanist and archaeologist that participated in the compilation of the EMPr where necessary. • Specifications require the protection of Eskom supplied material on site, especially conductor drums. • This normally means that a firebreak is bladed around a drum station in the veld. These areas are left to rehabilitate on their own which could be disastrous. Once the stringing of conductor has been completed in a certain area, the winch- and tensioner stations shall be rehabilitated where necessary. If the area was badly damaged, re-seeding shall be done and fencing in of the area shall be considered and carried out.	• Extent of damage to vegetation outside the servitude	Site inspection	ECO Eskom Envir. Advisor	

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	Using bulldozer for tension purposes	Damage to heritage sites, Disturbance of topsoil and vegetation	NHRA BDA CARA ROD	***Objective:*** • Protection of archaeological sites and land considered to be of cultural value • Protection of known sites against vandalism, destruction and theft • The preservation and appropriate management of new archaeological finds should these be discovered during construction • Protection of sites and land considered to be of cultural value • The preservation and appropriate management of new finds should these be discovered during construction ***Mechanism:*** • The position of known sites will be shown on the final profiles. Such areas shall be marked as no go areas. • Artefacts shall not be removed under any circumstances. • Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. • Permits shall be obtained from the South African Heritage Resources Association (SAHRA) should the proposed line affect any world heritage sites or if any sites are to be destroyed or altered. • No dolomite, breccia or stomatolites may be removed or disturbed without the required permits from SAHRA. • Any graves shall be clearly marked and treated as no go areas. • Should it be necessary to remove any graves, the necessary procedures shall be followed and permits obtained.	• Management of existing sites and new discoveries in accordance with the recommendations of the Archaeologists • Number of litigations due to destruction of sites	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	• Jointing and crimping of conductors • Discarding wooden cable drum material on site	Waste material littering in veld	NEMA ECA ROD CTB	***Objective:*** • Proper waste management on site • The hierarchical approach to integrated waste management with the preferred option being reduction, reuse and recycling followed by treatment and disposal, must be adopted ***Mechanism:*** Any broken insulators shall be removed and all shards picked up. Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site.	Amount of waste material on site that may harm man or animals.	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly
	No protection for fences during stringing	Damage to fences	FA	***Objective:*** No damage to fences ***Mechanism:*** • All fences shall be protected against damage during stringing operations. • All damage to be repaired immediately and to the satisfaction of the landowner.	Visible damage to fences Number of complaints from landowners	Site inspection	ECO Eskom Envir. Advisor	Daily Weekly
	Tractor pulling out pilot wire	Damage to protected / endangered vegetation	BDA					
7.4.29 Noise	Noise from construction equipment	• Amenity of neighbours may be disturbed. • Game and livestock may be affected • Nuisance to wildlife In certain locations where construction		***Objective:*** To contain noise within reasonable limit so as to minimise disturbances to ambient conditions. ***Mechanism*:** • Operations may be limited to 06:00 – 18:00 Monday to Saturday in noise sensitive areas. Operations outside these hours to be with the consent of potentially affected public. • All equipment brought onto the site (including compressors and vehicles) to be in good working order with factory fitted silencers.	Noise monitoring results	Noise measurements	• ECO • Site Supervisor	Monthly review

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
		activities approach closer than 500m to any dwelling, farm house or village, these management precautions will apply						
7.4.30 Fire control	• Making fires in winter due to cold weather • Cooking food on site / smoking	Veld fires	NVFFA FA	***Objective:*** No fires allowed ***Mechanism:*** • No open fires shall be allowed on site under any circumstance except in designated cooking areas • The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.	The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months	• Inventory of fire fighting equipment • Evidence of open fires	ECO Eskom Envir. Advisor	Daily Weekly
7.4.31 Cultural Heritage & Archaeological Resources	Destruction of archaeological sites	Damage to archaeological sites or artefacts	NHA ROD NEMA	***Objective:*** To minimise damage to cultural and heritage resources ***Mechanism:*** • Construction supervisors and crews must be trained to recognise archaeological or cultural-historical 'chance finds' during construction. • If finds are encountered, then these will not be disturbed, damaged or removed, but will be brought to the immediate attention of the ECO. An archaeologist will be brought in to assess the finds, and who will make specific recommendations at that time. • All work around the site should be immediately discontinued so as to avoid damage to the site until the specialist has given the go-ahead for work to continue.	• Training report • Training manual • Certification of competence • Records of archaeological finds	• Number of artefacts and heritage sites	• ECO • Site Supervisor • Operators	• Training on archaeological awareness to be conducted prior to the commencement of the excavation work. • On the discovery of any archaeological material.

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
7.4.32 Avifauna	• Electrocutions • Collisions	• Collision with earth wire. • Electrocutions • Habitat Disturbance	ROD NEMA	***Objective:*** To minimise bird mortality. ***Mechanism:*** • Fit Double Loop Bird Flight Diverter (or equivalent) as specified by bird specialist. • Construction work to be confined to servitude in order to minimise habitat destruction.	• Environmental scan	• Bird mortality incidences • Inspection of bird flight diverters and other devices designed to mitigate bird mortalities	• ECO	• Weekly reporting on bird mortalities • Monthly inspection of bird mortality mitigation devices
7.4.33 Dangerous Animals	Injury/death	Injury or death due to animal attack	None	***Objective:*** To avoid injury or death resulting from attack by dangerous animals such as venomous snakes, predators and disease vectors etc. ***Mechanism:*** • Avoid direct contact with dangerous animals; carefully walk away if you encounter a dangerous animal. Don't make sudden thrashing movements. Contact a ranger or ECO. • Follow the rules pertaining to wildlife within your working area. • Wear protective clothing. • First aid kit should always be kept in the working areas. This should be administered by the Health and Safety Officer. • Do not feed wild animals. • Do not kill or intimidate wild life.	• Rules and regulations on handling wildlife and other dangerous animals	Number of injuries due to attacks or bites.	• ECO • Site supervisor	• Monthly incidence reports.
7.4.34 Solid Waste Management	Environmental degradation due to pollution from waste	Pollution due to improper storage and disposal of solid waste.	NEMA ROD	***Objective:*** To manage solid waste as means of minimising environmental degradation. ***Mechanism:*** • Develop a waste management plan, to be signed off by the Project manager • If all waste is collected and removed off-site for disposal at a licensed landfill site, then a record	• Waste management plan • No solid waste left at construction sites (including removal of all concrete) • Evidence of bush defacation (toilet paper exhumed by jackal, etc.)	Record of waste disposal at a landfill site or any registered waste disposal site	• ECO • Labourers • Truck drivers • Operators for the earth moving machinery	• Weekly collection and disposal of waste

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				of all deliveries is to be kept. • *Collection and Disposal of Solid Waste* o Collection and disposal of household waste to be carried out through a registered waste carrier, and covered at all times. o Inert construction rubble may be disposed of at selected and approved burrow pits. Sites should be rehabilitated.				
7.4.35 Liquid Waste Management	Environmental degradation due to pollution from waste	Pollution due to improper storage and disposal of liquid waste.	NEMA ROD	• Provide portable toilets at all Work Sites unless acceptable pit latrines can be established Work shops • Ensure that the maintenance of all vehicles and equipment, including oil and lubricant changes, takes place at maintenance yards or workshops • All fuel waste, oils and wash effluent to be collected and disposed at a licensed site. • Collect contaminated runoff emanating from within a closed system (sump) for later disposal in the appropriate manner. • Ensure that adequate numbers of conveniently located site toilets are available on all Work Sites at all times in quantities related to the number of users (1 toilet per 20 users is the norm).	• Liquid waste storage facility • Vehicle workshop and lubricant storage facility including marked drums • Toilets	• Record of liquid disposal at a landfill site or any registered waste disposal site	• ECO • Truck drivers • Operators for motorized equipment	Weekly collection and disposal of waste
7.4.36 Liquid Waste Management at camps	Environmental degradation due to pollution from waste	Pollution of environment, including groundwater	RoD NEMA	Ablution facilities: • Soakage systems, pit latrines and septic tanks to be designed in accordance with soil conditions and watercourses in the area. • Ablutions to be designed for the correct number of camp staff • Groundwater table to be established before ablution facility located. • Soakage systems, etc., closer than 50m to a	• Assessment for location of waste water facilities (ablutions etc.) • Monitoring data for nearby boreholes and surface water (if any) • Visual inspection reports of contamination • Storage facilities for kitchen	Water quality monitoring equipment	• Camp manager • ECO	Assessment & design reports before operation of camp Regular inspections during

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				borehole or watercourse will need approval. • All nearby boreholes and surface water streams/springs to be monitored (monthly) for change in contamination. Kitchen facilities: • All kitchen liquid waste to be collected on-site and disposed off-site. This included cooking oils, detergent wastewater (unless biodegradable detergents are used)	liquid waste • Disposal records			operation of camp
7.4.37 Hazardous Waste Management	• Injury due to hazardous waste • Pollution	Pollution due to improper storage and disposal of hazardous waste.	Basel Convention	• Eskom should acquire the Directive regarding hazardous waste. • Materials Safety Data Sheets (MSDSs) will be kept at a defined location for all materials brought to sites, including those carried by contractors. • Liquid materials will be clearly labelled and stored in appropriate containers. • An inventory will be carried for all quantities of oils, fuels and chemicals at all sites. • Spill control and clean-up kits will be made available for all sites and mobile plant where risks of spills exist. • All wastes classified as hazardous must be collected by a licensed contractor for disposal at an approved facility.	• Directive for Hazardous waste • Develop a database of hazardous waste as derived from Basel Convention • On site register for all hazardous waste (should facilitate tracking of the waste therefore include: o Place of origin o Labelling of storage containers o Transportation route tracking o Place of destination	• Regular review of on site hazardous waste inventory	• ECO • Truck drivers	Storage of on – site of hazardous waste over a period of six months thereafter has to be exported to the appropriate hazardous waste disposal facility (non exist in Botswana)

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**

7.4.38 Rehabilitation of Servitudes	Fixing of fences	Waste material littering in veld	NEMA
			
			ECA
			
			CTB
				Objective:
				• Minimise damage to topsoil and environment at tower positions
				• Successful rehabilitation of all damaged areas
				• Maintain ecological integrity of the project area
				• Prevention of erosion
				
				Mechanism:
				• Re-seeding shall be done on disturbed areas as directed by the ECO.
				• Slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced.
				• Other methods of rehabilitation of tower sites may also be used at the discretion of the ECO e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slope on tower sites.
				• The type of soil shall also be taken into consideration.
				• A mixture of seed can be used provided the mixture is carefully selected to ensure the following:
				  o Annual and perennial plants are chosen
				  o Pioneer species are included
				  o All the plants shall not be edible
				  o Species chosen will grow in the area without many problems.
				  o Root systems must have a binding effect on the soil.
				  o The final product should not cause an ecological imbalance in the area.
				• Re-seeding, as well as fencing in of badly damaged areas, will always be at the discretion of the ECO, unless specifically requested by a Landowner.
				• Areas to be rehabilitated must be planted with a mixture of endemic pioneer grass species
					Signs of damage on fences	Site inspection	ECO
							
							Eskom Envir. Advisor
								Daily

CONSTRUCTION								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	Re-seeding of barren areas	Wrong seed used	BDA FA TRMSCAAC1 REV 3 ROD		• Evidence of loss of topsoil due to construction activities • All disturbed areas successfully rehabilitated within three months of completion of the contract· • Evidence of visible erosion scars three months after completion of the contract	Site inspection	ECO Eskom Envir. Advisor	Weekly Weekly
	Picking up and proper disposal all rubble and litter	Servitude left clean and neat	NEMA ECA HAS CTB ROD CTB	• To get the best results in a specific area, it is that a vegetation specialist or the local extension officer of the Dept of Agriculture be consulted • The Contractor shall dispose of all excess material on site in an appropriate manner and at a designated place. All packaging material shall be removed from site and disposed of and not burned on site. No landfill may be used without the consent from the Landowner. Should a landfill be used for biodegradable materials only, the rubble shall be compacted and at least 1m of soil shall cover the waste material. No hazardous material, e.g. oil or diesel fuel shall be disposed of in any unregistered waste site.			ECO Eskom Envir. Practitioner / Advisor	Daily Weekly
		Unauthorised access		No camping shall be allowed on any private property. If the Contractor wants to leave guards on site, it shall only be done with the written consent of the Landowners involved				
7.4.39 Landowner relations	Refer to 7.4.12 for details			Refer to 7.4.12 for details	•			

OPERATIONS & DECOMMISSIONING								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
				Experience of decommissioning is limited and should be reviewed by an ECO prior to decommissioning and demolition activities. Until such a review is done, all the items under CONSTRUCTION shall be assumed to apply.				
7.4.40 Access for servitude inspection and maintenance.	• Breach of security • Invasion of privacy • Monitoring of damage and theft. • Access keys fall into the wrong hands.	• Theft of property • Personal safety of landowners and tenants • Invasion of privacy • Unfair claims of damage or theft. • Uncontrolled access by third parties.		Eskom servitude managers and their contractors must seek permission prior to access all properties except under emergency situations. Except for emergency situations, the landowner has the right to order all Eskom staff and contractors who have accessed the property without permission.	• Complaints by landowners, • Claims from landowners, • Events of unauthorised access by an Eskom gate, • Maintenance of an up-to-date landowner register by the regional manager.		Eskom Regional Manager	6-monthly review
7.4.41 Fire and waste control	• Incidents of bush fires, • Pollution of property	• Fire damage to property, crops and facilities, • Loss of livestock, • Human injury or death • Damage to livestock through intake of pollutants (plastic, wire, etc) • Human waste on property.		Refer to 7.4.30 (Fire) and 7.4.34 (Solid waste) for details	•			
7.4.42 Servitude clearing	• Security breach, • Disruption of farm/business	• Security risks as above, • Economic loss,	CARA ESKASABG3 ESKPBAAD4	Eskom's guidelines are detailed in setting out the requirements for servitude maintenance and clearing:	•			

OPERATIONS & DECOMMISSIONING								
Activity/Issue & Phase	**Aspects**	**Potential impact**	**Relevant Legislation/ Eskom Spec**	**Management Measures & Procedures**	**Key Performance Indicators**	**Monitoring Method**	**Responsibility**	**Schedule /Frequency**
	activities, • Damage to property (e.g. crops), • Loss of property (e.g. wood from cut trees)	• Damage to quality of land (e.g. grazing) • Environmental damage.	Rev 0 ESKPBAAD6 Rev 6 ESKPVAAZ1 Rev 1 TRR/S91/032	• Eskom has a right to clear vegetation and structures that may interfere with the safe operation of their power lines, • The contractor shall only be on site with permission of the landowner, • All cut material to be left for the landowner as his/her property. • Servitude management by controlled burning is preferred to cutting grass and low vegetation, but this is only to be done under Eskom guidance and training. • The landowner shall be given the choice of maintaining the servitude himself/herself, compensated by Eskom. Eskom then has the right to inspect the servitude.				

8. METHOD STATEMENTS FOR THE CONTRACT

The Contractor shall supply method statements for all works required as stated throughout this document **as per specific contract requirement**. All agreements regarding **extra works for environmental compliance** shall be in writing and well documented. Work shall only commence upon approval by Eskom.

The ECO shall ensure that all works are in accordance with method statements and contract specifications (**Refer to Appendix 9 for example of method statement and incident template**).

9. LEGAL & CLIENT GUIDELINE REGISTER

Name of Act / Eskom Specification/ Procedure	Abbreviation
Access to Farms	TRMPVACV2 REV1
Agricultural Pests Act of 1983 (Act No. 36 of 1983)	APA
Air Quality Act of 2004 (Act No 39 of 2004)	NAQA
Animals Protection Act of 1962 (Act No. 71 of 1962	APA
Atmospheric Pollution Prevention Act of 1965 (Act No. 45 of 1965)	APPA
Biodiversity Act of 2004 (Act No. 10 of 2004)	BDA
Bush Clearing	ESKASABG3
Conservation of Agricultural Resources Act of 1993 (Act No. 43 of 1983)	CARA
Contractor Environmental Control Officer	CECO
Department of Environmental Affairs and Tourism	DEAT
Department of Water Affairs	DWAF
Environment Conservation Act of 1989 (Act NO. 73 of 1989)	ECA
Eskom Manual on Storage and Handling of Flammable and Combustible Liquids	ESKAMAAD1
Eskom Herbicide Management	ESKPBAAD4 Rev 0
Eskom Environmental Policy	ESKPBAAD6 Rev 6
Eskom Environmental Management Procedure	ESKPVAAZ1 Rev 1
Fencing Act of 1963 (Act No. 31 of 1963)	FA
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947)	FFFAS

Name of Act / Eskom Specification/ Procedure	Abbreviation
Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act of 1947 (Act No. 36 of 1947)	FFASA
Game Theft Act of 1991 (Act No. 105 of 1991)	GTA
Hazardous Substances Act of 1973 (Act No. 15 of 1973)	HAS
Labour Relations Act of 1995 (Act No.66 of 1995)	LRA
Mineral and Petroleum Resources Development Act of 2002 (Act No. 28 of 2002)	MPRDA
Mountain Catchment Areas Act of 1970 (Act No. 63 of 1970)	MCAA
National Environmental Management Act of 1998 (Act No. 107 of 1998)	NEMA
National Forests Act of 1998 (Act No. 84 of 1998)	NFA
National Veld and Forest Fire Act 1998 (Act No. 101 of 1998)	NVFFA
National Water Act of 1998 (Act No. 36 of 1998)	NWA
Natural Heritage Resources Act of 1999 (Act No. 25 of 1999)	NHRA
Eskom Nesting Guideline	TRMAGAAZ3
Eskom Guideline for Herbicide Use	TRR/S91/032
Occupational Health and Safety Act of 1993 (Act No. 85 of 1993)	OHSA
Protected Areas Act of 2003 (Act No. 57 of 2003)	PAA
Protected Areas Amendment Act of 2004 (Act 31 of 2004)	PAAA
Skills Development Act of 1998 (Act No. 97 of 1998)	SDA
Standard passive fire protection for oil-filled equipment in High Voltage yards	TRMASAAQ8 Rev 4
Transmission Line Towers and Line Construction	TRMSCAAC1 REV3
Water Services Act of 1997 (Act 108 of 1997)	WSA
World Heritage Convention Act of 1999 (Act No. 49 of 1999)	WHCA

APPENDIX A

POWER LINE CONSTRUCTION PROCESS AND CONSTRUCTION CAMPS

TECHNICAL NOTE

Power Line Construction Process and Construction Camps

The Construction Process

The following is a process that will be adopted for the entire route, beginning at the starting point of the new line. Each activity will follow the previous one, such that at any one point an observer will see a chain of events, with different teams involved over time. At any one time some or all of the different teams may be working at different points along the line. There may be days of no activity in the process. There are some 35 active days of construction at any point, though this may take place over a period of two years.

The following details are provided for each construction activity:

- Approximate team size per contractor: -
- An indication of the likely number of construction staff involved in each exercise.
- Approximate duration at a point: -

An indication of the likely time spent by the team at a point (typically a tower location) as they move along the route. These times may vary significantly depending on local conditions.

Activity		**Approx team size**	**Approx. duration at a point**
1.	Centre line pegging and identification of new gates *(light vehicle access)*	3	1 day
2.	Access Negotiations an access plan is developed and agreed to by the landowner, Eskom and the contractor rehabilitation measures are agreed photographs are taken before hand access road will be established through recurring use (i.e. there will be no blading or scraping of a new road) *(light vehicle access)*	1	1 day
3.	Tower Pegging the contractor will appoint a surveyor to undertake this work the footing of the pylons will be set out the contractor will report back if anything odd is found and the tower will be moved accordingly *(light vehicle access)*	5	1 days
4.	New gate installation *(light vehicle access)*	5	1 days

Activity		Approx team size	Approx. duration at a point
5.	Foundation nominations (for main structure and anchors) ✇ soil types are checked to determine foundation requirements ✇ trial pits are dug at the main foundation points – usually using mechanical back-actor/auger methods, though in a few circumstances manual labour may be used. *(heavy vehicle access)*	5	2 days
6.	Excavation of foundation ✇ foundations of up to 4 m x 4 m square are excavated and up to 4m deep depending on soil conditions ✇ foundation pit then need to be covered or fenced off until foundation is poured *(heavy vehicle access)*	10	2 days
7.	Foundation steelwork (reinforcing) ✇ the steelwork is usually made up at the base camp and brought on to site by truck ✇ all fitting, wiring is done on site (limited welding on site) *(heavy vehicle access)*	10	2 days
8.	Foundation (concrete) pouring ✇ shuttering ✇ standard concrete truck used ✇ if there are access problems, concrete will be mixed on site helicopters will be used in exceptional circumstances ✇ 28 day period required after concrete has been laid *(heavy vehicle access)* *(heavy usage of the servitude roads during this phase)*	20	2 days
9.	Delivery of tower steelwork ✇ steelwork is delivered in sections and assembled on site ✇ one truck can transport one tower ✇ transported from the factory to site (the towers are individually designed for each location) ✇ access roads are clearly marked to ensure the correct tower is delivered *(heavy vehicle access)* *(extra long trucks will be used)*	5	1 day
10.	Assembly team / Punching and painting ✇ the steelwork is fitted together and assembled on the ground ✇ nuts are punched and non-corrosive paint is placed on the nuts *(light vehicle access)*	10	3 days
11.	Erection ✇ Cranes (minimum of 50 tonne cranes) pick up the towers for final assembly. *(abnormal load vehicle access)*	20	2 days

Activity	Approx team size	Approx. duration at a point
12. Stringing ✇ cable drums are placed next to each other within the servitude ✇ stringing takes place in both directions from the drum stations –up to 4km can be strung from 1 station each way. ✇ the working area at each drum station will be as long as 130m, but will be confined to the servitude width. Intensive vehicle movement may take place within this working area ✇ a pilot tractor will place the pilot cable on the ground • this cable is then pulled up through the use of a pulley • conductors are never to touch the ground • in mountainous areas, a helicopter can be used or the pilot rope can be shot across valleys *(abnormal load vehicle access)* *(intensive vehicle activity likely within the working area)*	50	7 days
13. Sag and tension The line is tensioned from each cable station to ensure minimum ground clearance heights are achieved (15m for 765kv lines) *(heavy vehicle access)*	10	3 days
14. Rehabilitation ✇ rehabilitation is a continuous process during the construction phase ✇ rehabilitation will typically only commence after the first 100 towers have been strung ✇ there is a one year guarantee on the contractors work during which rehabilitation must be concluded– thereafter he is paid the outstanding amount *(heavy and light vehicle access)*	5 - 15	2 – 10 days dependent on site conditions

The location of construction camps

Construction Camps

The entire construction workforce is usually accommodated at various 'construction camps' that will be situated at various points along the route. The location is selected by the contractor who will take into account such aspects as access to the construction site, access to services, access to materials, etc. The contractor will enter into an agreement with a landowner for the establishment of the construction camp.

The various teams will travel from the camp to the construction site each day. The site moves continuously with the progression of the line, so the teams will perhaps travel a different distance to the site each time.

All materials are stored at the construction camp with the exception of the steel towers (which may come direct from the factory) and concrete (unless the site is very remote, when concrete may be mixed on site)

As a rule of thumb, there is usually one construction camp per 100km of transmission line. It is therefore anticipated that there will be between three and five construction camps along the route.