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# MOKOPANE INTEGRATION PROJECT, GAUTENG PROVINCE

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## CONSTRUCTION & OPERATION ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE MOKOPANE INTEGRATION PROJECT:

### PRINCIPLES OF ENVIRONMENTAL MANAGEMENT SUPPORTED BY AREA SPECIFIC GUIDELINES

Submitted as part of the Final EIA Report

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## PROJECT DETAILS

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## DEFINITIONS AND TERMINOLOGY

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**Alternatives:** Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

**Cumulative impacts:** Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

**Direct impacts:** Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

**Do nothing alternative:** The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

**Endangered species:** Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

**Environment:** the surroundings within which humans exist and that are made up of:

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

**Environmental Impact:** An action or series of actions that have an effect on the environment.

**Environmental impact assessment:** Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be

applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

**Environmental management:** Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

**Environmental management plan:** An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

**Heritage Resources:** That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

**Indirect impacts:** Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

**Interested and Affected Party:** Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

**Insufficiently known species:** Taxa that are suspected but not definitely known to belong to any of the above categories, because of the lack of information (Note, most of South African literature has used the term "Uncertain (U) for this category).

**Rare species:** Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

**Red data species:** Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

**Significant impact:** An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

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## OVERVIEW OF THE PROJECT

## CHAPTER 1

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Eskom Holdings Limited, as the primary supplier of electricity in South Africa, is currently responding to the growing electricity demand and predicted future demand within South Africa through the establishment of new generation and transmission capacity.

Eskom uses a modelling tool called Integrated Strategic Electricity Planning (ISEP) to plan its future capacity strategy. By analysing usage patterns and growth trends in the economy, and matching these with the performance features of various generation technologies and demand side management options, ISEP identifies the timing, quantity and type (base load or peaking) of new generation capacity options required in the long-term (i.e. over the next 15–20 years). These options include the return-to-service of the three mothballed coal-fired Simunye Power Stations (i.e. Camden, Komati and Grootvlei), the establishment of new coal fired power plants, pumped storage schemes, gas-fired power plants, nuclear plants, renewable energy technologies (mainly wind and solar projects), and import options within the Southern African Power Pool. As the older Eskom power plants reach the end of their design life from approximately 2025 onwards, the use of all available technologies will need to be exploited to replace these in order to supply the country's growing electricity demand.

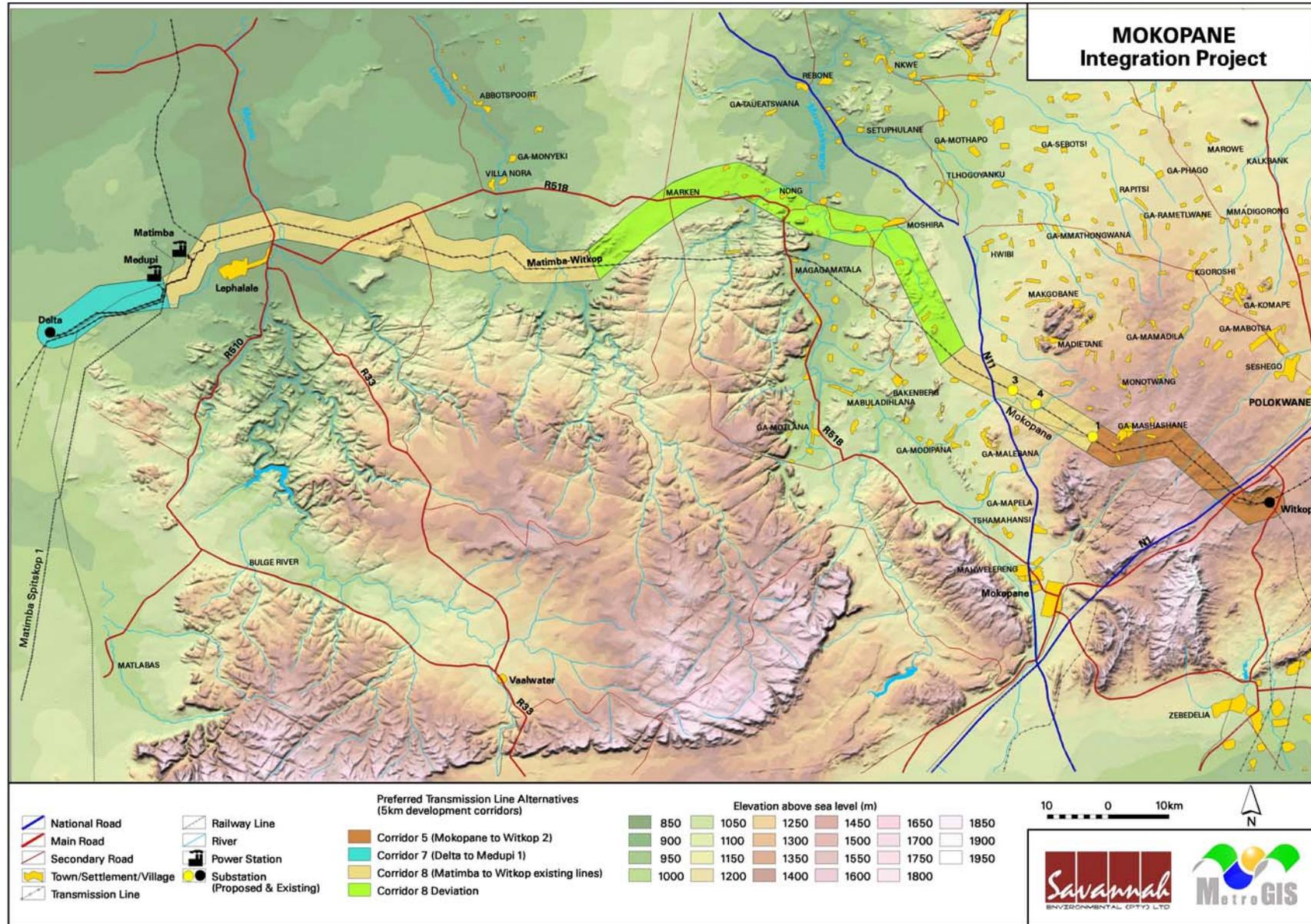
As part of its capacity expansion programme, Eskom is currently constructing the new Medupi coal-fired power station, in the Lephalale area of the Limpopo Province. In order to integrate this power station into the electricity transmission grid, Eskom Transmission is considering linkages to various points within the electricity transmission system. In addition, in order to support the upsurge in demand for the platinum group metals in the Mokopane area, and to improve the reliability of electricity supply to the Polokwane area, Eskom Transmission is proposing the development and implementation of the **Mokopane Integration Project**. This proposed project includes the construction of the following:

- » **A new transmission substation** on a site near Mokopane.
- » **Two 400kV transmission power lines** running in parallel, looping in and out of one of the existing Matimba-Witkop 400kV transmission lines (i.e. two lines in parallel for a maximum distance of 1 km) in order to integrate the new substation into the transmission system or grid.
- » **Two new 400kV transmission power lines in parallel** between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:
  - \* A new 400kV transmission power line between the Delta Substation and the new Mokopane Substation (a distance of approximately 150 km); and

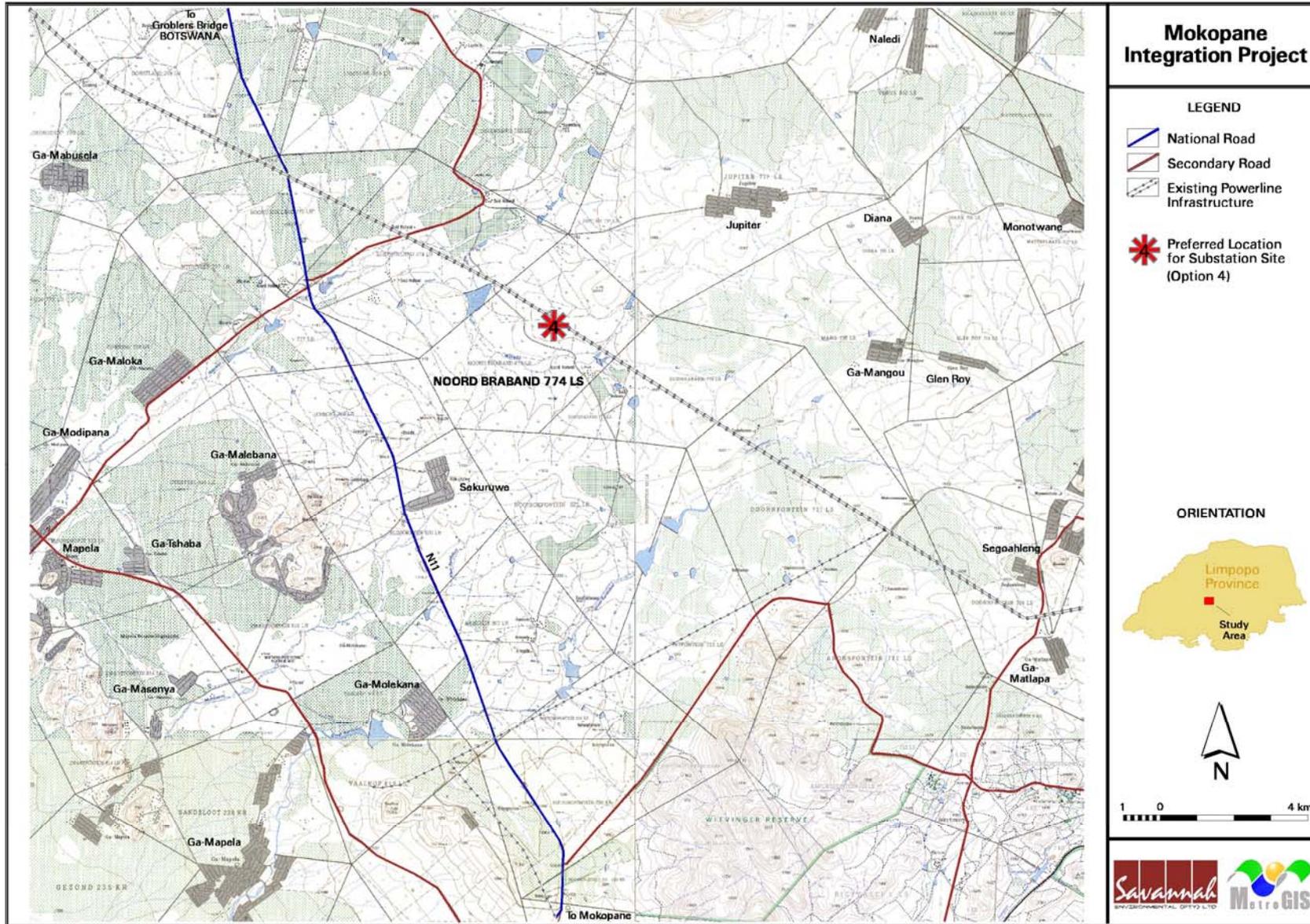
- \* a new 400kV transmission power line between the new Mokopane Substation and the Witkop Substation (a distance of approximately 60 km).
- \* A new 400kV transmission power line between Delta Substation and the Witkop Substation (a distance of approximately 200 km).
- » **Associated infrastructure** to integrate the new transmission power lines and substation into the Transmission grid (such as access roads, communication tower, etc) and accommodate the new lines at existing substations (such as the construction of new feeder bays within the existing Witkop substation site).

From a comparative assessment of identified substation site options and transmission power line development corridors undertaken within the EIA process, the following corridors and substation site option have been nominated as the preferred alternative corridors and site option from an environmental perspective (refer to Figures 1.1 and 1.2):

- » Construction of the new **substation** at proposed **Site Option 4**.
- » Construction of **two new 400kV transmission power lines in parallel** between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:
  - \* Within **Corridor 7** and **Corridor 8 Deviation** between the Delta Substation and the new Mokopane Substation.
  - \* Within **Corridor 5** between the new Mokopane Substation and the Witkop Substation.
- » **Associated works** to integrate the proposed new substation and transmission power lines into Eskom's electricity Transmission grid.



**Figure 1.1:** Nominated preferred alternative corridors for the Mokopane Integration Project



**Figure 1.2:** Nominated preferred alternative substation site for the Mokopane Integration Project

## 1.1. Project Construction Phase

### 1.1.1. Construction Camps

It is expected that all construction workers will be accommodated within construction camps outside of any sensitive areas and within the existing accommodation within the study area as far as possible. The construction of the power lines and substation will require the establishment of construction camps at appropriate locations along the route. The exact siting of construction camps is required to be negotiated with the relevant landowner/s, and must take cognisance of any no-go and sensitive areas identified by the EIA studies. The location of these construction camps must be approved by the project Environmental Control Officer (ECO).

### 1.1.2. Construction Process for Transmission Lines

Transmission lines are constructed in the following simplified sequence:

- Step 1:** Determination of technically feasible alternatives
- Step 2:** EIA input into route selection
- Step 3:** Negotiation of final route with affected landowners
- Step 4:** Survey of the route (by air)
- Step 5:** Determination of the conductor type
- Step 6:** Selection of best-suited conductor, towers, insulators, foundations
- Step 7:** Final design of line and placement of towers (including final walk-through survey by environmental specialists and compilation of site-specific Environmental Management Plan (EMP)).
- Step 8:** Issuing of tenders, and award of contract to construction companies
- Step 9:** Vegetation clearance and construction of access roads (where required)
- Step 10:** Tower pegging
- Step 11:** Construction of foundations
- Step 12:** Assembly and erection of towers
- Step 13:** Stringing of conductors
- Step 14:** Rehabilitation of disturbed areas and protection of erosion sensitive areas
- Step 15:** Testing and commissioning

Construction of the power lines proposed as part of the Mokopane Integration Project will take approximately 24 months to complete. Construction of these lines is anticipated to begin in 2011.

Construction crew for the transmission power lines will constitute mainly skilled and semi-skilled workers. Construction camps must be located within the construction area but only in consultation and agreement with the landowner. It is generally preferred that the construction camps be in close proximity to the construction site.

Construction of the transmission power lines is required to be undertaken in accordance with the specifications of this EMP.

### *1.1.3. Construction Process for the Substation*

The proposed substation would be constructed in the following simplified sequence, and will take approximately 12 months to complete:

- Step 1:** Survey of the substation site (including a final survey by environmental specialists and the compilation of a site-specific Environmental Management Plan (EMP))
- Step 2:** Site clearing and levelling and construction of access road to substation site
- Step 3:** Construction of terrace and substation foundation, including the installation of stormwater drainage on the surface to dispose of such stormwater on the terrace
- Step 4:** Assembly, erection and installation of equipment (including transformers and control building)
- Step 5:** Connection of conductors to substation infrastructure
- Step 6:** Rehabilitation of any disturbed areas and protection of erosion sensitive areas.

A number of fences will be installed to secure the substation and the substation site. These fences include a 2.4 m high security fence to enclose all assets, a 1.8 m high fence around the yards, and a 1.2 m high boundary fence on the property-line.

Construction crews for construction of the substation will constitute mainly skilled and semi-skilled workers. No construction workers will reside on site. It is most likely that construction workers will be accommodated within formal housing within villages and small homesteads surrounding the study area. It is expected that construction of the substation would begin late 2010 or early 2011 and would take 1 year to complete.

Construction of the substation is required to be undertaken in accordance with the specifications of this EMP.

### *1.1.4. Potential Environmental Impacts Associated with the Construction Phase*

The proposed substation site alternatives and transmission power line corridors are situated within areas of moderate or moderate-high biophysical habitat sensitivity. Potential impacts identified through the EIA process to be associated with the construction of the transmission power lines and substation includes:

- » Impacts on flora and fauna as a result of disturbance and/or loss of sensitive species and habitats.
- » Impacts on avifauna as a result of the disturbance and/or destruction of habitats.

- » Impacts on heritage sites as a result of disturbance or destruction of these sites due to construction activities.
- » Visual impacts associated with the construction phase.
- » Impacts on agricultural land and game farms.
- » Impacts on the social environment as a result of influx of construction workers and job seekers, disruption in daily movement patterns and nuisance impacts (such as noise and dust impacts).
- » Economic impacts.

## 1.2. Project Operation Phase

The expected lifespan of the proposed transmission power line and substation is expected to be between 35 and 40 years, depending on the maintenance undertaken on the power line and substation structures.

During the life-span of the transmission power line and substation, on-going maintenance is performed. Power line inspections are undertaken on an average of 1 – 2 times per year, depending on the area. During this maintenance period, the line is accessed via the access routes established during the construction phase. During maintenance activities on the substation, components may require replacement in order to significantly extend the lifespan of the substation. Maintenance of the power line and substation is required to be undertaken in accordance with the specifications of this Environmental Management Plan (EMP).

The creation of additional employment opportunities during the operational phase of the power lines and substation will be limited, and will be restricted to skilled maintenance personnel employed by Eskom.

### 1.2.1. *Servitude Maintenance Responsibilities*

The management of transmission power line servitudes is dependent on the details and conditions of the agreement between the landowner and Eskom Transmission, and are therefore site-specific. These may, therefore, vary from one location to another. However, it is a common occurrence that there is a dual responsibility for the maintenance of the servitude:

- » Eskom Transmission will be responsible for the tower structures, maintenance of access roads, watercourse crossings, and gates and fences relating to servitude access.
- » The landowner will retain responsibility for the maintenance of the land and land use within the servitude (e.g. cropping activities, veld management, etc.).

Exceptions to the above may arise where, for example dual use is made of the access roads and gates or specific land use limitations are set by Eskom Transmission within

the servitude which directly affect the landowner (e.g. the planting of tall trees or erection of permanent structures). Maintenance responsibilities are, ultimately, clearly set out in the servitude agreement which is established between the landowner and Eskom Transmission. Once agreed upon, these maintenance agreement conditions must be deemed to form part of this EMP and must be adhered to at all times.

### *1.2.2. Potential Environmental Impacts Associated with the Operation and Maintenance Phases*

Potential impacts identified through the EIA process to be associated with the operation and maintenance phase of the transmission power line and substation include:

- » Impacts on flora and fauna as a result of disturbance of sensitive species and habitats during maintenance activities.
- » Impacts on avifauna as a result of collisions with the earth wire of the transmission lines and the disturbance of habitats during maintenance activities.
- » Visual impacts associated with the power lines and substation on the surrounding areas.
- » Visual impacts on heritage sites located within the power line servitudes and in surrounding areas.
- » Impacts on the social environment as a result of influx of maintenance workers, nuisance impacts (such as noise and dust impacts during maintenance activities), impacts on sense of place (as a result of the visual impact associated with the transmission power lines and the substation), and impacts on tourism potential.

Although some impacts of potential high significance are associated with the transmission lines and substation, there are no environmental fatal flaws that should prevent these proposed lines and substation from being constructed within the nominated preferred corridors and the proposed substation site respectively, provided that the recommended no-go areas are adhered to and the recommended mitigation measures are implemented.

## **PURPOSE & OBJECTIVES OF THE EMP**

## **CHAPTER 2**

An Environmental Management Plan (EMP) provides a link between the impacts predicted and mitigation measures recommended within the EIA report, and the implementation and operational activities of a project. As the construction and maintenance of transmission power lines and substations can have a major impact on the environment, it is imperative that these activities are managed and mitigated so that unnecessary or preventable environmental impacts do not result.

The purpose of the draft EMP is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhance positive effects during the construction and operation of the project. An effective EMP is concerned with both the immediate outcome as well as the long-term impacts of the project.

The draft EMP has the following objectives:

- » To outline mitigation measures, and environmental specifications which are required to be implemented for the planning, construction, rehabilitation and operation/maintenance phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Mokopane Integration Project.
- » To identify measures that could optimise beneficial impacts.
- » To ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts, and ensure that any potential environmental benefits are enhanced.
- » To ensure that all environmental management conditions and requirements as stipulated in the Environmental Authorisation (once issued) are implemented throughout the project life-cycle.
- » To ensure that all relevant legislation (including national, provincial and local) is complied with during the construction and operation phases
- » To identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- » To propose mechanisms for monitoring compliance, and preventing long-term or permanent environmental degradation.
- » To facilitate appropriate and proactive response to unforeseen events or changes in project implementation that were not considered in the EIA process.

The draft EMP has been developed as a set of environmental specifications (i.e. principles of environmental management for the Mokopane Integration Project), which are appropriately contextualised to provide clear guidance in terms of the implementation of these specifications within the project area.

It should be noted that since this EMP is part of the EIA process undertaken for the proposed Mokopane Integration Project, it is important that this guideline document be read in conjunction with the Final Scoping Report (March 2009) and Draft EIA Report (October 2009). This will contextualise the EMP and enable a thorough understanding of its role and purpose in the integrated environmental process. This draft EMP for construction and operation activities has been compiled in accordance with Section 34 of the EIA Regulations and will be further developed in terms of specific requirements listed in any authorisations issued for the proposed project. This EMP will be further supported by the Eskom Transmission Draft Environmental Management Plan (which has been compiled in fulfilment of ISO 14001 requirements, forms part of the construction and maintenance contracts, and is supplementary to Eskom's TRMSCAAC1 REV 3 – refer to Appendix A), as well as method statements to be detailed by the contractors.

## STRUCTURE OF THIS EMP

## CHAPTER 3

The first two chapters provide background to the EMP (including objectives and purpose) and the proposed project. The chapters which follow consider the:

- » Planning and design activities
- » Construction activities
- » Operation activities
- » Decommissioning activities

These chapters set out the procedures necessary for Eskom to achieve environmental compliance. For each of the phases for the Mokopane Integration Project, an overarching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The management plan has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions monitoring requirements and performance indicators. A specific environmental management plan table has been established for each environmental objective. The information provided within the EMP table for each objective is illustrated below:

**OBJECTIVE:** Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies

<b>Project component/s</b>	List of project components affecting the objective, i.e.: <ul style="list-style-type: none"> <li>» power line</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	Brief description of potential environmental impact if objective is not met
<b>Activity/risk source</b>	Description of activities which could impact on achieving the objective
<b>Mitigation: Target/Objective</b>	Description of the target; include quantitative measures and/or dates of completion

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures

<b>Performance Indicator</b>	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.
<b>Monitoring</b>	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting

The objectives and EMP tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- » Planned activities change (i.e. in terms of the alignment of the power line within the approved corridor).
- » Modification to or addition to environmental objectives and targets.
- » Relevant legal or other requirements are changed or introduced.
- » Significant progress has been made on achieving an objective or target such that it should be re-examined to determine if it is still relevant, should be modified, etc.

### 3.1. Project Team

This draft EMP was compiled by:

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	Dr. Julius Pistorius - Heritage specialists	Dr Julius Pistorius
	Megan Diamond – Avifauna specialist	Endangered Wildlife Trust (EWT)
	Lourens du Plessis – Visual specialist	MetroGIS
	Garry Paterson - Agricultural specialist	ARC - ISCW
	Anita Bron – Social specialist	MasterQ Research
	Nonka Byker – Social specialist	MasterQ Research

The Savannah Environmental Team has extensive knowledge and experience in environmental impact assessment and environmental management. They have managed and drafted environmental management plans for other transmission projects for Eskom Holdings Limited throughout South Africa.

### **3.2. Legislation and Guidelines that have informed the preparation of this EMP**

Acts, standards or guidelines which have informed the project process and the scope of issues assessed within the EIA are summarised in the EIA Report (refer to Chapter 3 of the EIA Report). The following environmental legislation is applicable to the proposed project:

- » Constitution of South Africa (Act No. 108 of 1996)
- » National Environmental Management Act (Act No 107 of 1998) – NEMA
- » Environment Conservation Act (Act No 73 of 1989)
- » National Forest Act (Act No 30 of 1998)
- » National Water Act (Act No 36 of 1998)
- » National Veld and Forest Fire Act (Act 101 of 1998)
- » National Environmental Management: Biodiversity Act (Act No 10 of 2004)
- » National Environmental Management: Waste Act (Act 59 of 2008)
- » Conservation of Agricultural Resources Act (Act No 43 of 1983)
- » National Heritage Resources Act (Act No 25 of 1999)
- » Hazardous Substances Act (Act No. 15 of 1973)
- » National Road Traffic Act (Act No 93 of 1996)

## MANAGEMENT PLAN FOR THE MOKOPANE INTEGRATION PROJECT: PLANNING & DESIGN

## CHAPTER 4

### 4.1. Goal for Planning and Design

**Overall Goal for Planning and Design:** Undertake the planning and design phase of the Mokopane Integration Project in a way that:

- » Ensures that the design of the project components responds to the identified environmental constraints and opportunities.
- » Ensures that adequate regard has been taken of landowner concerns and that these are appropriately addressed through planning and design (where appropriate and possible).
- » Ensures that the best environmental options are selected for all components of the project.
- » Enables the required construction activities to be undertaken without significant disruption to other land uses in the area.

### 4.2. Objectives for Planning and Design

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

*OBJECTIVE: To ensure that the design of the project responds to the identified environmental constraints and opportunities*

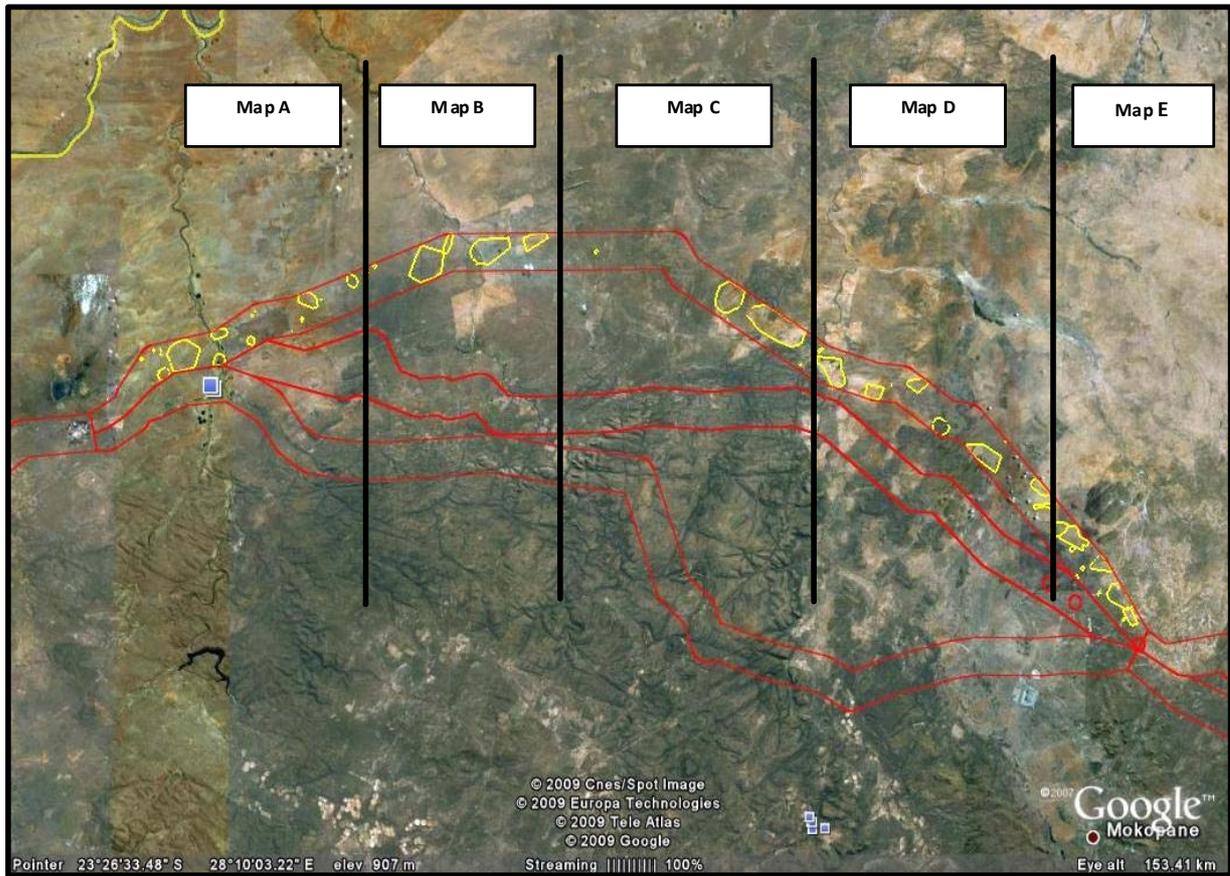
In terms of the conclusions of the specialist investigations undertaken for the proposed Mokopane Integration Project, the nominated preferred alternatives for the Mokopane Integration Project are:

- » Construction of the new **substation** at proposed **Site Option 4**.
- » Construction of **two new 400kV transmission power lines in parallel** between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:
  - \* Within **Corridor 7** and **Corridor 8 Deviation** between the Delta Substation and the new Mokopane Substation.
  - \* Within **Corridor 5** between the new Mokopane Substation and the Witkop Substation.

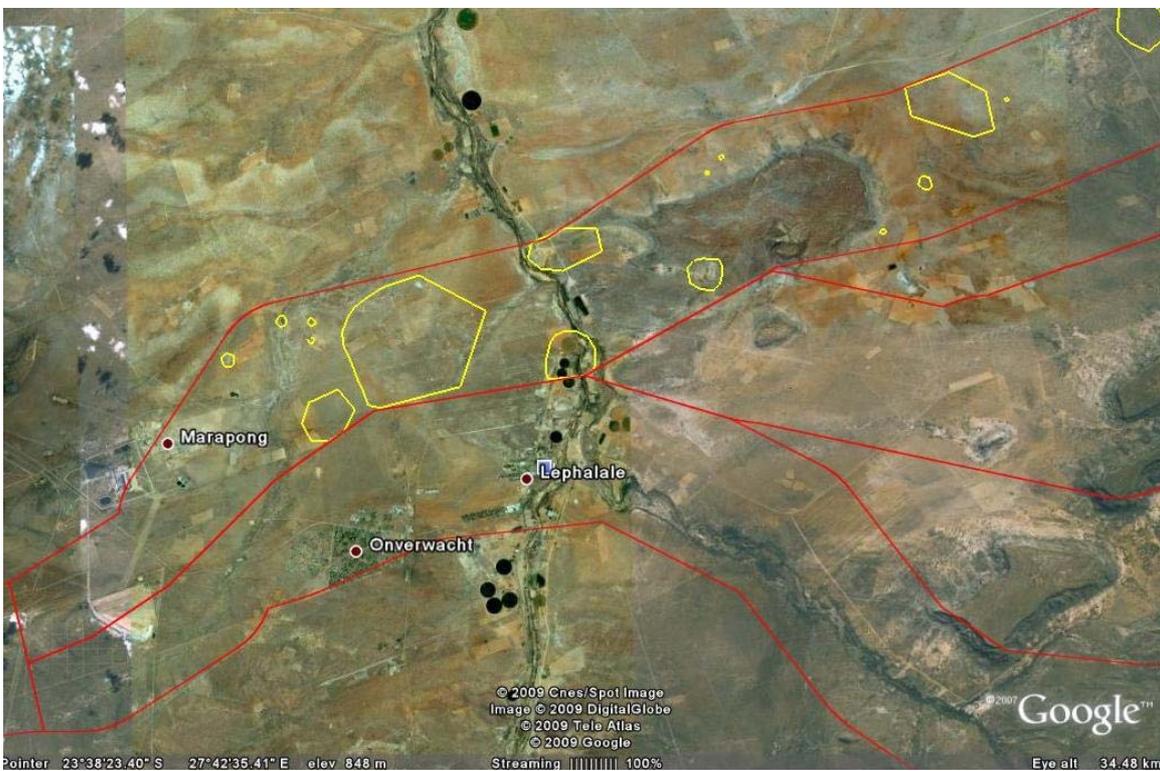
- » **Associated works** to integrate the proposed new substation and transmission power lines into Eskom's electricity Transmission grid.

The following conditions of this recommendation must, however, be met:

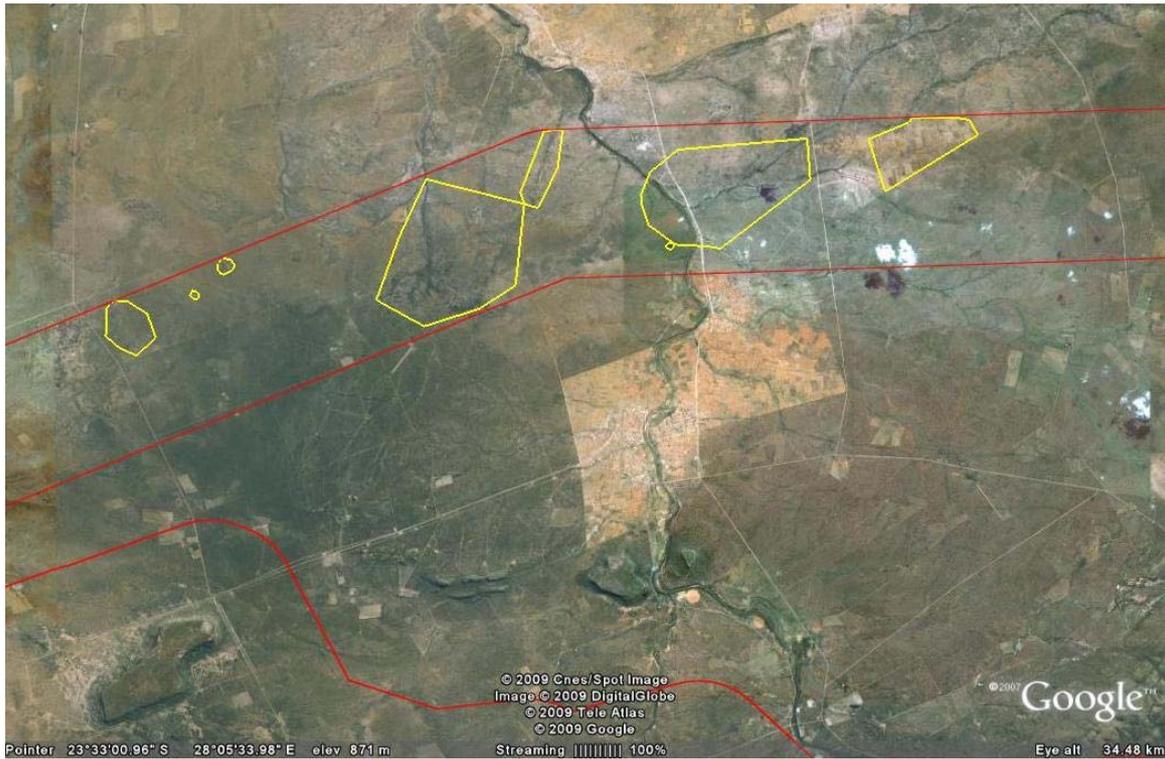
- » All mitigation measures detailed within the draft EIA report and the specialist reports must be implemented.
- » This draft Environmental Management Plan (EMP) should form part of the contract with the Contractors appointed to construct and maintain the proposed Mokopane Integration Project, and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMP for all life cycle phases of the proposed project is considered to be key in achieving the appropriate environmental management standards as detailed for this project.
- » Applications for all other relevant and required permits required to be obtained by Eskom must be submitted to the relevant regulating authorities. This includes permits for the transporting of all components (abnormal loads) to site and disturbance of protected vegetation.
- » The alignment of the power line within Corridor 2 (Medupi-Mokopane) must be negotiated and designed to avoid the no-go areas identified in the figures which follow. It must be noted that avoiding these areas does not preclude the marking of the proposed power lines in other areas within those portions of Corridor 2 which form part of the nominated preferred corridor. It is likely that extensive marking will be required within this corridor owing to the open nature of the vegetation and its ability to support the large terrestrial bird species recorded in the area. These areas will be required to be identified during the site specific walk down during the final EMP phase of the project.



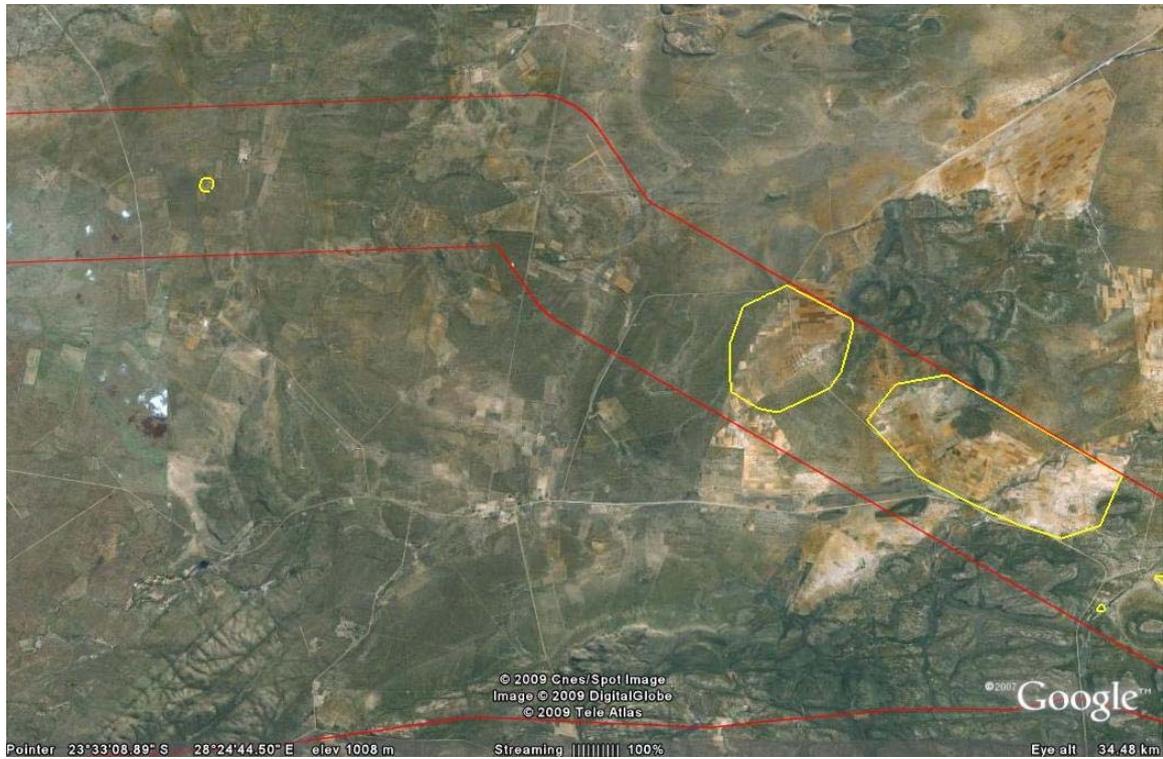
**Figure 4.1:** Overview map of no-go areas identified within Corridor 2 from an avifauna perspective



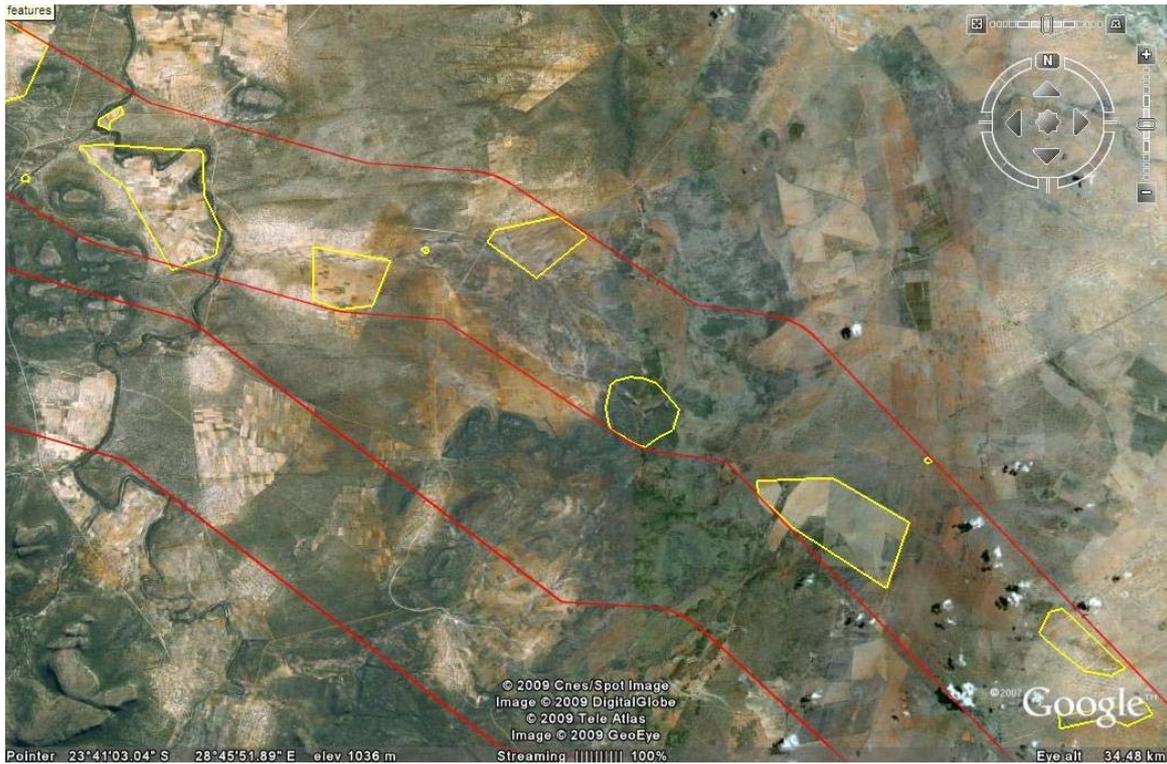
**Figure 4.2:** No go areas within Corridor 2 (Map A)



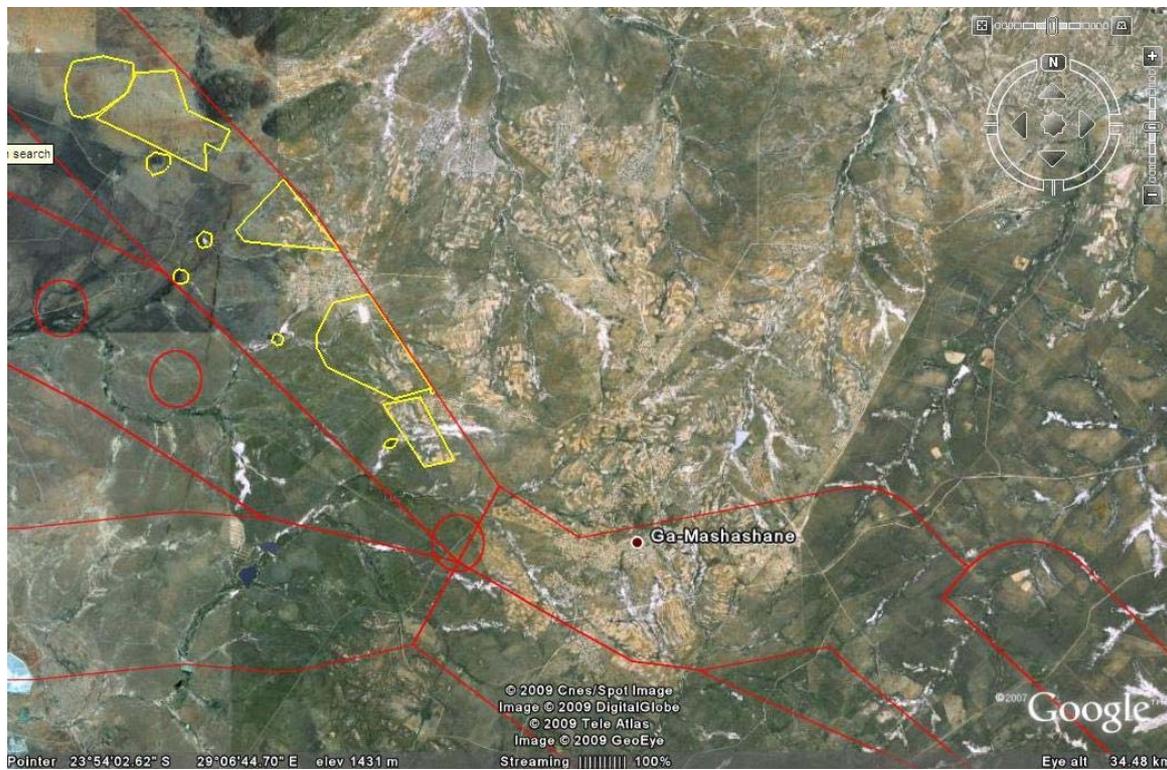
**Figure 4.3:** No go areas within Corridor 2 (Map B)



**Figure 4.4:** No go areas within Corridor 2 (Map C)



**Figure 4.5:** No go areas within Corridor 2 (Map D)



**Figure 4.6:** No go areas within Corridor 2 (Map E)

- » The transmission power lines within Corridor 7 (Delta-Medupi) should follow the existing lines in the corridor to consolidate the impact on sense of place.
- » The transmission line towers should, in spatially constrained sections of the development corridors (i.e. in built-up areas), consist of monopole structures that are less bulky (albeit slightly taller) and less visually intrusive than conventional power line towers. Where space and technical considerations permit, the utilisation of cross rope suspension tower structures is recommended above the conventional self supporting strain towers that are more obtrusive.

In addition, once the final transmission power line route and substation footprint has been negotiated, surveyed and pegged, a walk-through survey must be undertaken by suitably qualified specialists as follows:

- » An ornithologist must identify the exact power line spans requiring marking in order to minimise the risk of collision of birds with the earth wire. Recommendations must be made regarding the installation of bird guards on all self-supporting towers according to the existing Eskom guidelines. This will prevent birds from perching in high risk areas on the towers directly above live conductors.
- » An ecological specialist must conduct a final walkthrough before construction in order to identify and relocate any possible plant species of conservation importance.
- » A heritage specialist must conduct a final walkthrough before construction in order to identify any important heritage resources. Transmission lines can be rerouted or realigned in order to avoid heritage sites and heritage resources can be conserved unaffected underneath power lines.

Finally, to ensure that social impacts are mitigated during construction and operation it is recommended that the following be implemented and monitored by a Social Engagement Officer:

- » A Local Labour and Workforce Plan;
- » An Influx Management Plan;
- » A Decommissioning and Closure Plan;
- » A Grievances Mechanism for the construction and operational phases; and
- » A Stakeholder Engagement and Education plan for construction and operation.

<b>Project component/s</b>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» Power line towers</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Design fails to respond optimally to the environmental considerations</li> <li>» Power line route and substation design that degrades the environment unnecessarily, particularly with respect to visual aesthetics, loss of indigenous flora, erosion, and impacts on local communities/residents</li> </ul>

<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Alignment of power line and positioning of towers and access roads within the approved power line corridor</li> <li>» Positioning of the substation within the approved substation footprint</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure that the design of the project components respond to the identified environmental constraints and opportunities</li> <li>» To ensure selection of best environmental option for alignment for the power lines and location of the substation</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Undertake negotiations with affected landowners within the approved power line corridor and agree on landowner-specific conditions for construction and maintenance	Negotiator	Planning Phase
Obtain necessary tribal resolutions for State-owned land on which the substation is proposed to be located	Negotiator	Planning Phase
Undertake a detailed geotechnical survey of the proposed substation site and transmission line tower positions in order to fully understand the soils in terms of founding conditions and erosion potential.	Eskom	Design Phase
Undertake specialist walk-through surveys of each tower footprint and the substation site in terms of ecology, heritage and avifaunal aspects	Specialist consultants	Planning & Design Phase
Consider planning and design level mitigation measures recommended by the specialists following the walk-through survey.	Engineering Design Consultant	Design Phase
Ensure that riparian areas are spanned/ towers are not placed within close proximity to rivers, streams. Ensure placement of footprints outside 1:100 year floodlines. Crossing of riparian systems is only permitted at existing/ approved crossing points, taking due care to prevent additional/ new impacts	Eskom	Planning phase
Ensure that bird-friendly power line towers and conductor designs are used.	Eskom Distribution design team	Design Phase
Balance technical and financial considerations against environmental constraints and opportunities in finalising the design of key elements (such as the tower design and required servitude width).	Eskom	Tender Design & Design Phase
Tower design should be carefully considered as it could limit negative construction related impacts.	Engineering Design Consultant	Planning & Design Phase
Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored.	Eskom	Duration of contract
A fire management plan should be developed in conjunction with the Lephalale, Mokopane and	Eskom	Planning & Design Phase

Mitigation: Action/control	Responsibility	Timeframe
Polokwane Local Municipalities as well as an emergency management plan (for fires and possible land invasions).		
The substation should be designed in such a manner as to limit any possible risks of fires.	Engineering Design Consultant	Planning & Design Phase
As far as possible, use should be made of existing crossings across non-perennial streams and larger rivers, ensuring proper maintenance/ upgrade.	Eskom, Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Design meets objectives and does not degrade the environment.</li> <li>» Design and layouts respond to the mitigation measures and recommendations in the EIA report and recommendations of the specialist walk-through surveys.</li> <li>» Final surveyed route alignment minimises any negative environmental impacts and maximises any benefits.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Ensure that the design implemented meets the objectives and mitigation measures in the EIA report through review of the design by the Project Manager and Environmental Control Officer (ECO) prior to the commencement of construction.</li> </ul>

***OBJECTIVE: To ensure adequate regard has been taken of landowner / stakeholder concerns and that these are appropriately addressed***

For a 400kV transmission power line a servitude of approximately 55 m is required. This servitude is established along the entire length of the power line, for which the affected landowner is required to be appropriately compensated. Within this servitude, Eskom Transmission has certain rights and controls that support the safe and effective operation of the power line. The negotiation process for this servitude is undertaken by Eskom Transmission directly with the appropriate landowner and culminates in the signing of a servitude agreement. Here Eskom Transmission enters into a legal agreement with the landowner. The agreements will detail such aspects as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities, as well as any specific landowner requirements for construction and maintenance of the power line, as well as regarding rehabilitation measures.

Negotiation for and development of the substation site must be undertaken in accordance with the appropriate legislation and the required tribal resolutions and Minister approvals must be obtained, as appropriate.

<b>Project component/s</b>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» Power line</li> <li>» Substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Landowners impacted by proposed alignment of the power lines, positioning of towers and access road/s</li> <li>» Landowners affected by the proposed substation and access roads</li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Positioning of towers and access roads</li> <li>» Alignment of power line and placement of towers within the approved corridor</li> <li>» Positioning of substation and access roads</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure adequate regard has been taken of concerns of affected and surrounding landowners and that these are appropriately addressed</li> <li>» Minimise potential impacts on local land use and business potential</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Initiate negotiations with all affected landowners timeously.	Eskom Lands and Rights	Ideally initiated together with submission of final EIA. Finalised prior to construction.
Address reasonable expectations/requests of landowners, where possible.		
Avoid the resettlement and/or displacement of households as far as possible. If resettlement is unavoidable, compensate at market related rates for property value loss as indicated by an independent valuations expert.	Eskom Lands and Rights	Planning phase
Careful consideration should be given to the final route alignment and tower placements to limit the negative impact on properties as far as possible	Engineering Design Consultant	Planning phase
Careful consideration should be given to the tower designs	Engineering Design Consultant	Planning phase
Balance technical and financial considerations against environmental constraints and opportunities in finalising the design of key elements (such as the tower design and required servitude width).	Eskom	Tender Design & Design Phase
Where possible, towers should be placed on the border of properties	Engineering Design Consultant	Planning phase
Route transmission lines as far away from existing structures as possible	Engineering Design Consultant	Planning phase
The construction schedule and details of construction activities to be taken place on the prison property should be pro-actively discussed with and be approved by the area commissioner	Eskom	Planning phase

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Careful consideration should be given to the final route alignment and tower placements to limit the negative impact on the existing and planned developments and activities on the affected properties	Engineering Design Consultant	Planning phase
Secured areas around facilities on the farms and property should be avoided	Engineering Design Consultant	Planning phase
A specific contact person should be identified to allow community members and property owners to easily direct their queries and concerns and obtain general information regarding the construction process	Eskom	Planning phase & continuing throughout project implementation
Residents should be informed of the construction activities and schedules prior to the construction workforce entering any property	Eskom	Duration of contract
Eskom should liaise with landowners and developers in the area, including members of farmers associations and project proponents during the negotiation phase of the project to ensure a route alignment which would ensure the protection of the land value and resources and which would also be to the socio-economic benefit of the communities	Eskom	Planning phase

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Appropriate and fair negotiation should be undertaken with all affected landowners.</li> <li>» Landowners should be afforded reasonable and appropriate rights/access.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Not applicable</li> </ul>

## MANAGEMENT PLAN FOR THE MOKOPANE INTEGRATION PROJECT: CONSTRUCTION

## CHAPTER 5

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### 5.1. Overall Goal for Construction

**Overall Goal for Construction:** Undertake the construction phase of the Mokopane Integration Project in a way that:

- » Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- » Enables the construction activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to effects on local residents, farming practices, traffic and road use and noise impacts.
- » Minimises the impact on the vegetation, fauna, avifauna and habitats within the area, and where possible adds to the botanical record of this area.
- » Minimises the impact on the archaeological and historical value of the area, and where possible adds to the archaeological record of this area.

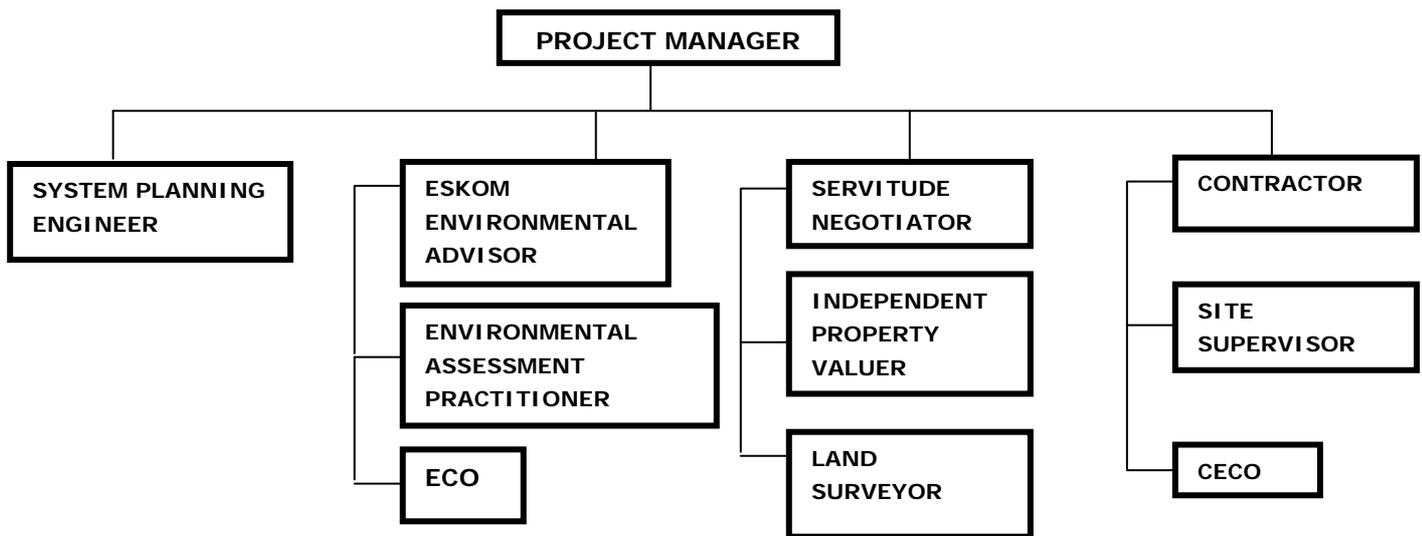
This section should be read in conjunction with Eskom Transmission's Draft Environmental Management Plan (EMP) for construction, which is included within Appendix A. Generic environmental specifications and guidelines included within this draft EMP are not repeated here.

### 5.2. Project Responsibilities and Reporting Structure during the Construction Phase

Several professionals will form part of the construction team. The most important from an environmental perspective are the **Project Manager/Site Manager**, the **Environmental Control Officer** (ECO), the **contractor** and the **developer**.

The Project Manager/Site Manager represents and acts on behalf of Eskom Transmission regarding the administration of contracts, and is responsible for the implementation of the EMP on the site during the pre-construction and construction phases of the project. The ECO is responsible for monitoring the implementation of the EMP during the design, pre-construction and construction phases of the project. The contractor is responsible for abiding by the mitigation measures of the EMP which are implemented by the Project Manager during the construction phase.

Figure 5.1 details the reporting structure for the construction phase of the transmission power lines and substation.



**Figure 5.1:** Reporting structure for the construction phase of the transmission power lines and substation (as per the Eskom Transmission Draft EMP – refer to Appendix A)

The developer (i.e. Eskom Transmission) is responsible for the implementation of the EMP during the operational and decommissioning phases of the project. Decommissioning will entail the appointment of a new professional team and responsibilities will be similar to those during the design, pre-construction and construction phases.

Specific responsibilities of each of these parties are detailed in the sections which follow.

### *5.2.1. Project Manager/Site Manager*

The Project Manager/Site Manager is responsible for overall management of project and EMP implementation. The following tasks will fall within his/her responsibilities:

- » Be aware of the findings and conclusions of the Environmental Impact Assessment and the conditions stated within the Environmental Authorisation (once issued).
- » Be familiar with the recommendations and mitigation measures of this EMP, and implement these measures.
- » Monitor site activities on a daily basis for compliance.
- » Conduct internal audits of the construction site against the EMP.
- » Confine the construction site to the demarcated area.
- » Rectify transgressions through the implementation of corrective action.

### *5.2.2. Environmental Control Officer*

The Environmental Control Officer is responsible for the implementation of the EMP during the construction phase, as well as for liaison between Eskom, the Contractor and the Landowners. The following tasks will fall within his/her responsibilities:

- » Be aware of the findings and conclusions of the Environmental Impact Assessment and the conditions stated within the Environmental Authorisation (once issued).
- » Be familiar with the recommendations and mitigation measures of this EMP.
- » Convey the contents of this document, the conditions of the Record of Decision (Environmental Authorisation) from DEA as well as the Landowner Special Conditions to the Contractor site staff and discuss the contents in detail with Eskom Project Manager and Contractor at a pre-construction meeting.
- » Educate the construction team about the management measures stipulated within the EMP and Environmental Authorisation. This formal induction training is a requirement of ISO 14001 and shall be done with all main and sub-contractors. Records of the training date, people who attended and discussion points shall be kept by the ECO.
- » Undertake regular liaison with the construction team and the project leader.
- » Conduct weekly / monthly audits of the construction site according to the EMP and Environmental Authorisation.
- » Maintain records of non-compliance with the conditions of the Environmental Authorisation and the EMP.
- » Recommend corrective action for any non-compliance incidents on the construction site.
- » Report progress made on a monthly basis to the Project Manager/Site Manager and Land & Rights EIA Manager. These reports shall be available at all times, on site or in project file and on request by auditors, DEA and other I&APs.
- » All negotiations for any reason shall be between the ECO, the affected parties and the Contractor. No verbal agreements shall be made. All agreements shall be recorded in writing and all parties shall co-sign the documentation.
- » The affected parties shall always be kept informed about any changes to the construction programme should they be involved. If the ECO is not on site the Contractor should keep the affected parties informed. The contact numbers of the Contractor and the ECO shall be made available to the affected parties. This will ensure open channels of communication and prompt response to queries and claims.

### *5.2.3. Contractor*

The contractor is responsible for the implementation and compliance with recommendations and conditions of the EMP.

- » Ensure compliance with the EMP at all times during construction.

- » Provide all necessary supervision during the execution of the project. He/ She should be available on site all the time.
- » Comply with special conditions as stipulated by landowners during the negotiation process.
- » Inform and educate all employees about the environmental risks associated with the various activities to be undertaken, and highlight those activities which should be avoided during the construction process in order to minimise significant impacts to the environment.
- » Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - \* Public involvement / complaints
  - \* Health and safety incidents
  - \* Hazardous materials stored on site
  - \* Non-compliance incidents
- » Where construction activities are undertaken is close to any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants.
- » The Contractor shall under no circumstances interfere with the property of landowners, Grid staff or nearby communities.
- » Should the Contractor require clarity on any aspect of the EMP the Contractor must contact the Environmental Consultant/Officer for advice.

### 5.3. Environmental Monitoring

A monitoring programme shall be implemented for the duration of the construction phase of the project. This programme must include:

- » Two weekly audits during the first month whereafter monthly audits should be conducted by the ECO, which are according to the EMP and Environmental Authorisation's conditions. These audits can be conducted randomly and do not require prior arrangement with the Project Manager.
- » Compilation of an audit report with a rating of the compliance with the EMP. This report must be submitted to the relevant authorities (i.e. DEA).

The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. 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 damage shall be directed to the ECO for appraisal. The Contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the landowner, Grid or community. All complaints/claims must be handled immediately to ensure timeous rectification/ payment by the responsible party.

#### 5.4. Objectives for Construction

In order to meet the goals, the following objectives have been identified, together with necessary actions and monitoring requirements.

**OBJECTIVE: Environmentally sensitive location of construction equipment camps along the power line servitude and at the substation site**

It is expected that all construction workers will be required to be accommodated within construction camps outside of any sensitive areas and within the existing accommodation within the study area as far as possible. In addition, construction equipment will need to be stored at the substation site for the duration of the construction period.

<b>Project component/s</b>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Damage to protected / endangered vegetation</li> <li>» Damage to and/or loss of topsoil</li> <li>» Compacting of ground</li> <li>» Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities at construction crew camp</li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Bush clearing and levelling of equipment storage area/s</li> <li>» Access to and from the equipment storage area/s</li> <li>» Construction crew camp</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise impacts on the social and biophysical environment.</li> <li>» To limit equipment storage to within the demarcated site</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Before construction commences, representatives from the local authority and community-based organisations (e.g. residents associations), as well as neighbouring residents should be informed of the details of the construction company, size of the workforce and construction schedules	Eskom	Pre-construction
The exact siting of construction equipment camp/s shall be negotiated with the relevant landowner, and must take cognisance of any no-go and sensitive areas identified by the EIA studies. The location of this construction equipment camp (or camps) shall be approved by the project Environmental Control Officer (ECO)	Contractor	Pre-construction

Mitigation: Action/control	Responsibility	Timeframe
Undertake search and rescue of Red Data and protected plant species prior to the establishment of the equipment storage area. A permit shall be obtained from the provincial conservation authority prior to this being undertaken.	Specialist & Contractor	Pre-construction
Minimise bush clearing and levelling for equipment storage areas.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
Minimise the possibility of erosion due to removal of vegetation.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
Establish the necessary ablution facilities with chemical toilets should such facilities not be available at the construction crew camp at commencement of construction.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
Supply a wastewater management system that will comply with legal requirements and be acceptable to Eskom.	Contractor	Pre-construction
Provide adequate sanitary facilities and ablutions for construction workers (1 toilet per every 15 workers) at appropriate locations along the servitude.	Contractor	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Ablution or sanitary facilities should not be located within 100 metres from a 1:100 year flood line including water courses, wetlands or within a horizontal distance of less than 100 metres, whichever is applicable	Contractor	During site establishment, construction and maintenance
Supply adequate waste collection bins at construction equipment camps and at site where construction is being undertaken.	Contractor	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Dispose of all solid waste collected at an appropriately	Contractor	Erection: during

Mitigation: Action/control	Responsibility	Timeframe
registered waste disposal site. The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may waste be burnt on site.		site establishment Maintenance: for duration of Contract within a particular area
Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management.	Contractor	Site establishment
Rehabilitate all disturbed areas along the servitude and at the construction camps as soon as construction is complete within an area.	Contractor	Duration of Contract
Rehabilitate all disturbed areas at the substation site not occupied by permanent infrastructure as soon as construction is complete.	Contractor	Duration of Contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Written agreement between landowner and Contractor regarding occupation of the construction site.</li> <li>» No visible erosion scars once construction in an area is completed.</li> <li>» No claims regarding damage leading to litigation due to unauthorised removal of vegetation.</li> <li>» All damaged areas successfully rehabilitated one year after completion</li> <li>» No damage to wet areas.</li> <li>» Appropriate waste management.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular audits of the construction camps and areas of construction along the servitude and at the substation site.</li> <li>» An incident reporting system (which is in line with Eskom's requirements in this regard) should be used to record non-conformances to the EMP.</li> </ul>

**OBJECTIVE: Securing of the site**

The Contractor must recognise that the site is situated in relatively close proximity to residences in some areas (albeit rural setting), and must therefore take all reasonable measures to ensure the safety of the public in the surrounding area during the construction phase. Where the public could be exposed to danger by any of the works or site activities, the Contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in all appropriate languages for the area, all to the approval of the Site Manager.

Care should be taken that the construction activities do not pose any safety risks to the animals (especially the livestock and game) or to children.

Some concerns were raised that the servitude could serve as a route for illegal hunting and poaching. If the servitudes are thus not effectively managed and controlled these illegal hunting activities could result in grave problems, fire risks and subsequent financial consequences. Other concerns in this regard relate to possible theft of animals and animal losses due to gates being left open. All unattended open excavations shall be adequately demarcated and/or fenced (fencing shall consist of a minimum of three strands of wire wrapped with danger tape). Adequate protective measures must be implemented to prevent unauthorised access to the working area and the access routes.

<b>Project component/s</b>	Project components affecting the objective: » power lines » substation » access roads
<b>Potential Impact</b>	» Hazards to landowners and public » Security of materials and equipment
<b>Activities/risk sources</b>	» Open excavations (foundations) » Movement of construction vehicles in the area and within the servitude and substation site
<b>Mitigation: Target/Objective</b>	» To secure the site against unauthorised entry » To protect members of the public/landowners/residents

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Secure site, working areas and excavations in an appropriate manner, as agreed with the SHE Representative.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
Where necessary to control access, fence and secure the area.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
Fence and secure Contractor's equipment camp.	Contractor	Erection: during site establishment Maintenance: for duration of Contract
The construction sites should be fenced off to avoid any unauthorised individuals, especially children entering the site	Contractor	During of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Site is secure and there is no unauthorised entry.</li> <li>» No members of the public/ landowners injured.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular visual inspection of fence for signs of deterioration/forced access.</li> <li>» An incident reporting system (which is in line with Eskom's requirements in this regard) should be used to record non-conformances to the EMP.</li> </ul>

***OBJECTIVE: Appropriate sourcing of labour***

Construction of the substation and power lines will largely require the use of skilled labourers. However, some unskilled labour opportunities exist, mainly associated with excavation of foundations, erection of fencing, etc. Opportunities for low to medium skilled local labour are possible although limited. It is expected that the low to medium skilled people could be sourced from the nearby villages and towns.

To ensure that social impacts are mitigated during construction it is recommended that the following be implemented and monitored by a Social Engagement Officer:

- » A Local Labour and Workforce Plan;
- » An Influx Management Plan;
- » A Grievances Mechanism for the construction phase; and
- » A Stakeholder Engagement and Education plan for construction.

<b>Project component/s</b>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	» Job opportunities for unskilled labourers from the local communities
<b>Activities/risk sources</b>	» Unskilled job opportunities (excavation activities, erection of fences, eradication of weed species by hand, etc.)
<b>Mitigation: Target/Objective</b>	» To ensure that local labour is utilised as far as possible

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
The use of labour intensive construction measures should be used where appropriate.	Contractor	Duration of Contract
Training of labour should be undertaken to benefit individuals beyond completion of the project	Contractor	Duration of Contract
Labour should be sourced from the local community where possible, by developing a strategy to involve local labour in the construction process.	Contractor	Duration of Contract

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
The tender documentation for the construction of the power lines and substation should stipulate the use of local labourers or enterprises	Eskom	Duration of Contract
Eskom should ensure an equitable process whereby minorities and previously disadvantaged individuals (women) are also taken into account.	Eskom	Duration of construction
The contractors should liaise with the appropriate ward councillors and community structures to determine possible candidates to be employed as sub-contractors.	Contractor	Duration of Contract
Contractors should use local skills, or train semi-skilled people or re-skill appropriate candidates for employment purposes where possible. Onsite training should focus on the development of transferable skills (technical, marketing and entrepreneurial skills) to ensure long term benefits to the individuals involved.	Contractor	Duration of Contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Site is secure and there is no unauthorised entry.</li> <li>» No members of the public/ landowners are injured.</li> <li>» To a certain extent, local economic development (LED) is supported.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular visual inspection of fence for signs of deterioration/forced access.</li> <li>» An incident reporting system (which is in line with Eskom's requirements in this regard) should be used to record non-conformances to the EMP.</li> </ul>

**OBJECTIVE:** *To ensure landowner / stakeholder concerns are adequately addressed*

<b>Project component/s</b>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Landowners impacted by proposed alignment of the power line, positioning of towers and access road/s</li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Lack of awareness of landowner concerns</li> <li>» Lack of communication with landowners</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure adequate regard has been taken of concerns of affected and surrounding landowners and that these are appropriately addressed</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
A Community Liaison Officer or Social Engagement Officer should be on site at all times	Contractor	Construction
Members of the construction team should behave fittingly at all times	Contractor	Duration of contract
Eskom personnel should not access private properties without prior notification of the property owners	Eskom / Contractor	Duration of contract
Eskom should coordinate with landowners in terms of access and construction activities in order to minimise disturbance	Eskom / Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received regarding construction activities from property owners.</li> <li>» All complaints and issues received are timeously attended to and addressed</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» An incident reporting system must be used to record non-conformances to the EMP.</li> </ul>

***OBJECTIVE: Protection of sensitive areas, vegetation and faunal habitats***

The construction of a power line requires the clearance of vegetation at the tower footprints, along access roads, at construction equipment camps and along the centre line of the servitude for stringing of the conductors. Construction of the substation requires the clearance of vegetation within the development footprint and along any new access roads.

Impacts on sensitive areas (such as wetlands and ridges), vegetation and faunal habitats at the construction stage are expected to be mainly as a result of direct permanent loss of vegetation in development footprint areas. In order to minimise impacts on flora, fauna and ecological processes, the development footprint and associated disturbance to topsoil should be limited.

In addition, disturbance to avifauna in the area can be expected during the construction phase and could potentially have an impact on the breeding population of large raptors and other bird species occurring in the study area. The timing of construction activities is vital to minimise impacts in this regard.

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» power line towers</li> <li>» substation</li> </ul>
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	<ul style="list-style-type: none"> <li>» access roads</li> <li>» construction equipment camp</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Localised loss of sensitive, protected and/or Red Data plant species</li> <li>» Disturbance and/or destruction of sensitive terrestrial habitats</li> <li>» Disturbance to plant communities and habitats</li> <li>» Disturbance to avifauna</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Clearing of tower footprints, servitude centre line and access roads</li> <li>» Clearing and levelling of substation site</li> <li>» Traffic to and from site during all phases of construction (i.e. from surveying to rehabilitation of an area)Site preparation and earthworks</li> <li>» Excavation of foundations</li> <li>» Mobile construction equipment</li> <li>» Dumping or damage by construction equipment outside of demarcated construction areas.</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To retain natural vegetation as far as possible.</li> <li>» To minimise footprints of disturbance of vegetation/habitats along the servitude and on the substation site</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Undertake specialist walk-through surveys of each tower footprint and the substation site in terms of biodiversity aspects.	Specialist consultants	Preconstruction
Wherever possible, nest sites must be identified during the final EMP phase of the project and mitigated on a site specific basis.	Specialist consultants	Preconstruction
A site rehabilitation programme shall be formulated following the specialist walk-through survey, and must be implemented as soon as possible after construction is completed in an area.	Contractor in consultation with Specialist	Duration of contract
Construction of new/ temporary bridges across non-perennial streams and larger rivers is regarded a prohibited activity. Use should be made of existing crossings, ensuring proper maintenance/ upgrade.	Eskom, Contractor	Duration of contract
Areas to be cleared shall be clearly marked in the field to eliminate unnecessary clearing.	Contractor in consultation with Specialist	Pre-construction
The extent of clearing and disturbance to the indigenous vegetation shall be kept to a minimum so that the impact on flora and faunal habitats is restricted.	Contractor	Site establishment & duration of contract
During construction, unnecessary disturbance to habitats shall be strictly controlled. Avoiding any sensitive habitats with construction vehicles and equipment during construction must be ensured.	Contractor in consultation with Specialist	Duration of contract
Timing of construction activities must take the breeding season of large raptors and other sensitive bird species	Contractor in consultation with	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
in the area into account. The breeding season for the large raptor species is from March to November. The most critical period within this time span is from April to May when the eggs are incubated. Another sensitive period is from October to November when the young birds are almost ready to fledge. Every attempt will have to be made to restrict the disturbance of raptors and other bird species to a minimum during construction.	Specialist	
Identify areas where surface disturbances will occur and remove topsoil to a depth of approximately 0.75m	Contractor	Construction phase
Utilise existing access roads as far as possible.	Contractor	Duration of contract
A weed eradication programme shall be compiled and implemented, where necessary.	Contractor in consultation with Specialist	Duration of contract
Prevent impacts on any surface water as a result of hazardous materials, contamination, unnecessary crossing by vehicles or personnel, extraction, drinking or other human uses, construction and maintenance activities	ECO, Contractor, Eskom	Construction phase
Develop emergency maintenance operational plan to deal with any event of contamination, pollution or spillages, particularly in riparian areas	Eskom, Contractor	Construction phase
Sensitive animal or bird species on private properties should be screened from the dust and construction activities in consultation with the property owners and/or breeders	Contractor	Duration of contract
Demarcate areas of importance that should be protected during construction phase	ECO	Construction phase

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No disturbance outside of designated work areas.</li> <li>» Minimised clearing of existing/natural vegetation.</li> <li>» Limited impacts on areas of identified and demarcated sensitive habitats/vegetation.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and monitoring of vegetation clearing activities by ECO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» An incident reporting system must be used to record non-conformances to the EMP.</li> </ul>

***OBJECTIVE: Protection of sites of heritage value***

The following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) were recorded in or near the study area:

- » Scatters of stone tools occur along the Vaalsloot, Klein Sandsloot and Mohlosane Rivers in the Langa Ndebele sphere of influence. Sites are more common along the central parts of both Corridor 1 and Corridor 8 in the mountainous Waterberg areas and include open sites as well as sites which are located in rock shelters.
- » Rock painting sites occur in the northern mountainous part of the project area, particularly along the central stretches of Corridor 1 and Corridor 8. A cluster with five rock art sites occurs near the start of both these corridors in the west. Here, the mountains of Ga Mabula and Tafelkoppe also hold high heritage significance as rock art sites (not documented as yet) occur in these mountain ranges.
- » EIA Eiland sites have been recorded near the central stretch of Corridor 8 and possibly also occur in or near the central stretch of Corridor 1. These sites are inconspicuous as they mostly cover small surface areas and are not associated with any stone walls. Their most characteristic feature, if visible on the surface of the land, is the presence of decorated potsherds.
- » LIA Moloko sites, some with stone walls and characterised by Moloko styled pottery as well as with Nguni types of pots, occur in and near the central stretches of both Corridor 1 and Corridor 8. These sites are also common in the Masebe Nature Reserve (e.g. Magagamatala) and in the Villa Nora area (e.g. Bobididi) between Corridors 1 and 8. These sites are also common in the Lange Ndebele sphere of influence in the south-east. The eastern stretch of Corridor 1 runs across this area. LIA Moloko stone walled sites in a poort in Thaba Tšweu fall inside Corridor 6 and are associated with the Langa Ndebele.
- » Historical remains, mostly consisting of homesteads, occur along the eastern stretch of Corridor 1 along the Fonthane mountains in the Langa Ndebele sphere of influence. Widely dispersed colonial farm residences (historical houses) occur in low numbers along the western and central stretches of Corridors 1, 2 and 8.
- » Graveyards occur along all stretches of all the power line corridors. Some of these graveyards are associated with villages which are scattered across the project area whilst others are associated with historical remains from the Langa Ndebele sphere of influence. Inconspicuous, undiscovered graves occur along the eastern stretch of Corridor 1. Graveyards in association with colonial farmsteads are generally low in numbers. Those that are associated with villages are higher in numbers considering the population numbers in these areas.
- » A commemorative beacon has been erected in the Kloof Pass.
- » Other heritage phenomena such as an open-air church occur near the village of Ga-Mathekgwa.

The main cause of impacts to archaeological sites is physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose archaeological artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large-scale excavations for foundations will damage archaeological sites, as will road construction activities.

<b>Project component/s</b>	List of project components affecting the objective: » Power line towers » substation » access roads
<b>Potential Impact</b>	» Heritage objects or artefacts found during construction are inappropriately managed or destroyed
<b>Activity/risk source</b>	» Site preparation and earthworks » Excavation of foundations » Construction equipment movement on site
<b>Mitigation: Target/Objective</b>	» To ensure that any heritage objects found on site are recorded and/or treated appropriately and in accordance with the relevant legislation

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Undertake a specialist walk-through survey of each tower footprint and the substation site in terms of heritage aspects.	Specialist consultant	Preconstruction
Areas required to be cleared during construction shall be clearly marked in the field to avoid unnecessary disturbance of adjacent areas (which will not be surveyed in detail by a heritage specialist).	Contractor in consultation with Specialist	Pre-construction
Familiarise all staff and contractors with procedures for dealing with heritage objects/sites.	ECO/specialist	Pre-construction
Project employees and any contract staff should maintain, at all times, a high level of awareness of the possibility of discovering heritage sites.	Eskom/Contractor	Duration of contract
If a heritage object is found, work in that area shall be stopped immediately, and appropriate specialists brought in to assess to site, notify the administering authority of the item/site, and undertake due/required processes.	Eskom/Contractor in consultation with Specialist	Duration of contract
Apply for sampling permits from SAHRA for work on any archaeological sites identified as needing intervention – in other words any archaeological site that will be directly affected by the proposed transmission power lines, substation or access roads.	Eskom in consultation with Specialist	Pre-construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No disturbance of heritage sites outside of designated work areas.</li> <li>» All heritage items located are dealt with as per the legislative guidelines.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation of excavation activities by ECO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» Due care taken during earthworks and disturbance of land by all staff and any heritage objects found reported, and appropriate permits obtained from SAHRA prior to the disturbance or destruction of heritage sites.</li> <li>» An incident reporting system should be used to record non-conformances to the EMP.</li> </ul>

***OBJECTIVE: Appropriate management of topsoil***

Topsoil will be required to be stripped in areas affected by construction activities, including excavation of tower foundations, clearance and levelling of the substation site and establishment of access roads (where required).

<b>Project component/s</b>	<p>List of project components affecting the objective:</p> <ul style="list-style-type: none"> <li>» power line towers</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Loss of topsoil</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Site preparation and earthworks</li> <li>» Excavation for tower base foundations</li> <li>» Construction of access roads</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise disturbance to topsoil</li> <li>» Appropriately remove and store topsoil in such a way to ensure effective use of this topsoil in subsequent rehabilitation of disturbed areas</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Areas to be cleared shall be clearly marked to eliminate the potential for unnecessary clearing of topsoil.	Contractor	Pre-construction
Construction activities shall be restricted to demarcated areas so that impact on soils is restricted.	Contractor	Site establishment & duration of contract
Prior to the commencement of earthworks the average depth of topsoil shall be determined. The full depth of topsoil should be stripped from areas affected by	Contractor and ECO	Site establishment & duration of

Mitigation: Action/control	Responsibility	Timeframe
construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas.		contract
Excavated topsoil shall be stockpiled separately from subsoil and adequately protected against erosion until replaced during rehabilitation. As far as possible, topsoil should not be stored for longer than 3 months.	Contractor	Site establishment & duration of contract
The maximum topsoil stockpile height should not exceed 2m in order to preserve micro-organisms within the topsoil, which can be lost due to compaction and lack of oxygen.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No disturbance outside of designated work areas.</li> <li>» Minimise loss of topsoil.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and monitoring of topsoil stripping and storage activities by ECO throughout construction phase.</li> <li>» Supervision of all clearing and earthworks.</li> <li>» An incident reporting system should be used to record non-conformances to the EMP.</li> </ul>

***OBJECTIVE: Erosion and sediment control***

The construction of the transmission power lines and the substation requires foundations to be constructed in order to increase the stability of the structures. The depth of the foundations will be determined by the underlying geology of an area.

The greatest impact on the geology and soil associated with the construction of any structures is the potential for soil erosion. This impact depends on the soil erosion potential of the overlying soils. The potential soil erosion rate of the area is considered to be high due to the nature of the soils in the area, and numerous eroded areas present within the study area.

<b>Project component/s</b>	Project components affecting the objective: <ul style="list-style-type: none"> <li>» Power line towers</li> <li>» Substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Erosion and soil loss associated with both wind and water</li> <li>» Sediment entering surrounding hydrological system</li> </ul>

<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Water and wind erosion of cleared and excavated areas</li> <li>» Stormwater run-off from sealed surfaces at the substation site</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise erosion on site and along gravel access roads during construction</li> <li>» To provide permanent erosion and sediment control measures, where required</li> <li>» To minimise the risk of sedimentation of water resources during the construction phase</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
A Stormwater Management Plan for the substation site, detailing the location and design of stormwater and sediment control devices shall be prepared and approved prior to the commencement of construction activities.	Contractor	Pre-construction
All areas susceptible to erosion shall be protected with suitable erosion control measures from the onset of the project.	Contractor	Duration of contract
All stockpiles shall be positioned away from drainage lines and rivers.	Contractor	During site establishment and any activity related to earthworks
The time from commencement of construction to rehabilitation shall be kept to a minimum in order to limit the period of surface exposure and thereby limit the potential for erosion.	Contractor	Duration of contract
Disturbance of vegetation and topsoil shall be kept to a practical minimum.	Contractor	Duration of contract
Movement of vehicles on-site must be on approved and formalised access roads only, which shall be adequately maintained throughout construction.	Contractor	Duration of contract
Culverts of adequate size must be provided across drainage lines for any access roads established to the substation site and within the power line servitude.	Contractor	Erection: during site establishment Maintenance: for duration of contract
The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.	Contractor	Duration of contract
Access roads and/or tracks used during construction which are not required for maintenance purposes or for use by the landowner shall be closed and appropriately rehabilitated.	Contractor	Completion of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No evidence of erosion is present in construction areas or along gravel access roads.</li> <li>» Surface and groundwater meet required water quality guideline levels.</li> <li>» No evidence of excessive sedimentation of water resources.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular visual inspections of the construction areas and along gravel access roads for signs of erosion.</li> <li>» Fortnightly visual inspection of sediment and water quality control devices throughout construction phase and during or following major rain events.</li> <li>» Immediate reporting by personnel of damaged or ineffective sediment control measures or potential water contamination to Site Manager.</li> <li>» An incident reporting system should be used to record non-conformances to the EMP.</li> </ul>

***OBJECTIVE: Appropriate Handling and Storage of Equipment and Materials***

Construction equipment and materials will be required to be stored on site. The appropriate handling of storage of these materials and equipment is important in order to minimise impacts on the surrounding environment.

<b>Project component/s</b>	<p>Project components affecting the objective:</p> <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Hazards to the natural environment, landowners, community members and the general public</li> <li>» Security of materials and equipment</li> </ul>
<b>Activities/risk sources</b>	<ul style="list-style-type: none"> <li>» Storage and handling of potentially hazardous materials</li> <li>» Storage and maintenance of construction equipment</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure environmental best practice in terms of the storage and handling of construction materials and equipment</li> <li>» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons</li> <li>» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
All construction equipment shall be stored within the formal construction equipment camp	Contractor	Duration of contract
Routine servicing and maintenance of vehicles will not	Contractor	Duration of

Mitigation: Action/control	Responsibility	Timeframe
take place on-site (except for emergency situations or large cranes which cannot be moved off-site). If repairs of vehicles must take place outside of designated areas, an appropriate drip tray will be used to contain any fuel or oils.		contract
All stored fuels must be maintained within a bund and on a sealed surface.	Contractor	Duration of contract
Only designated areas must be used for storage of construction materials, soil stockpiles, machinery and other equipment	Contractor	Duration of contract
Specific areas shall be designated for cement batching plants (if required). The cement batching plant must be contained within a bunded area. Sufficient drainage for these plants must be in place to ensure that soils do not become contaminated.	Contractor	Duration of contract
Cement, concrete and chemicals must be mixed on plastic linings and provisions should be made to contain spillages or overflows into the soil.	Contractor	Duration of contract
Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.	Contractor	Duration of contract
Any hazardous substances must be stored away from any water body	Contractor	Duration of contract
Noise created by the loading and off loading of construction material should be limited as far as possible	Contractor	Duration of contract
Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and remediated 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.	Contractor/ECO	Duration of contract
Hazardous waste handling and spill response training shall be included for staff and contractors as part of site induction.	Contractor/ECO	Duration of contract
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures.	Contractor	Duration of contract
Spill response procedures must include removal/disposal of potentially contaminated water and soil.	Contractor	Duration of contract
Any contaminated/polluted soil removed from the site	Contractor	Duration of

Mitigation: Action/control	Responsibility	Timeframe
must be disposed of at a licensed hazardous waste disposal facility.		contract
Oily water from bunds at the substation shall be removed from site by licensed contractors.	Contractor	Duration of contract
Spilled cement must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	Contractor	Duration of contract
Any storage and disposal permits/approvals which may be required shall be obtained, and the conditions attached to such permits and approvals shall be complied with.	Contractor	Duration of contract
Transport of all hazardous substances shall be in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
Once construction has been completed on site and all excess material has been removed, the storage area must be appropriately rehabilitated. If the area has been badly damaged, re-seeding shall be done and fencing in of the area shall be considered if livestock will subsequently have access to such an area.	Contractor	Completion of construction

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Construction equipment and materials are appropriately stored.</li> <li>» No impacts on the surrounding environment occur as a result of the inappropriate handling and storage of equipment and materials.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Regular inspection of the construction equipment camp to ensure that appropriate handling and storage practices are in place.</li> <li>» Regular monitoring of the area surrounding the construction equipment camp/s to identify any impacts on the environment from this area/s.</li> <li>» A complaints register shall be maintained, in which any complaints from the community will be logged. Complaints shall be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system (which is in line with Eskom's requirements in this regard) should be used to record non-conformances to the EMP</li> </ul>

### ***OBJECTIVE: Appropriate Access and Traffic Management***

The construction phase of the project will be the most significant in terms of generating traffic impacts; resulting from the transport of equipment (including substation and power line components) and materials and construction crews to the site and the return of the vehicles after delivery of materials and equipment to site.

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Impacts on traffic movement along major routes (e.g. N11) where components are to be transported</li> <li>» Risk of accidents</li> <li>» Generation of dust and noise from increased vehicles moving on gravel roads to and along the power line servitude and substation site</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Use of existing and new gravel roads to access the power line servitude and substation site</li> <li>» Increased traffic movement (especially heavy/abnormal load vehicles)</li> <li>» Traffic congestion from abnormal weight or sized loads</li> <li>» Transportation of ready-mix cement from batching plant to the power line servitude and substation site</li> <li>» Mobile construction equipment movement on-site</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To minimise impacts on existing gravel access roads, where these are to be used for construction purposes</li> <li>» To minimise the creation of new access roads along the power line servitude</li> <li>» To minimise impact of traffic associated with the construction of the power line and substation on local traffic</li> <li>» To minimise potential for negative interaction between pedestrians or sensitive users and traffic associated with the construction phase</li> <li>» To ensure all vehicles are roadworthy and all materials/equipment are carried appropriately and within any imposed permit/licence conditions</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Transportation of equipment and project components to site shall be in accordance with all relevant legislation as well as Eskom specifications. Permits for abnormal loads shall be applied for from the relevant authority, where required.	Contractor (or appointed transportation contractor)	Pre-construction
Strategic positioning of entry and exit points shall be undertaken to ensure as little effect as possible on the traffic.	Contractor (or appointed transportation contractor)	Pre-construction
Planning of access routes to the site for construction purposes shall be done in conjunction between the Contractor, Eskom and the landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall appropriately mark all access roads. Roads not to be used shall be marked with a "NO ENTRY" sign.	Contractor (or appointed transportation contractor)	Pre-construction
Signage shall be established at appropriate points warning of turning traffic and the construction site (all	Contractor	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
signage to be in accordance with prescribed standards).		
Existing access roads shall be used as far as possible. Access roads to and from the construction site should be kept to a minimum.	Contractor	Duration of contract
Where new access roads are constructed, this must be done according to design and contract specifications. Drainage channels shall be suitably designed to ensure erosion does not occur, especially at the outflow points. The creation of additional access roads especially on private properties should be limited.	Contractor	Duration of contract
Access roads and entrances to the actual construction sites should be carefully planned to limit any intrusion impacts, noise and dust pollution, as well as to limit any risks of accidents	Contractor	Duration of contract
Construction vehicles' journeys should be planned and managed to limit or avoid travelling through the residential areas during peak times and intersections that are at capacity	Contractor	Duration of contract
Where necessary suitable measures shall be taken to rehabilitate damaged areas next to newly constructed roads.	Contractor	Duration of contract
Movement of vehicles on-site must be on approved and formalised access roads only, which shall be adequately maintained throughout construction.	Contractor	Duration of contract
The main routes to the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-Contractors.	Contractor	Duration of contract
No deviation from approved transportation routes shall be allowed, unless roads are closed for whatever reason outside the control of the contractor.	Contractor	Duration of contract
Appropriate dust suppression techniques shall be used to minimise dust emissions on gravel roads (water spraying).	Contractor	Duration of contract
Vehicle movements on local roads shall be limited to standard construction operating hours wherever possible to limit noise impacts and dust nuisance.	Contractor	Duration of contract
Times for arrival and departure of heavy vehicles shall be co-ordinated as far as possible in order to minimise congestion.	Contractor	Duration of contract
All hazardous substances shall be transported in accordance with the relevant legislation and regulations.	Contractor	Duration of contract
Appropriate maintenance of all vehicles shall be ensured.	Contractor	Duration of contract
All vehicles travelling on public roads shall adhere to	Contractor	Duration of

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
the specified speed limits and all drivers shall be in possession of an appropriate valid driver's license.		contract
Landowners shall be informed timeously of the construction programme, duration, access requirements, and all interference with their daily activities	Contractor	Duration of contract
Access roads must be maintained for the duration of the construction phase in order to ensure that they are passable and that the potential for erosion is minimised.	Contractor	Duration of contract
Appropriate access gates shall be installed where required and fitted with locks. These shall be kept closed at all times,	Contractor	Installation: site establishment Maintenance: Duration of contract
Access roads and/or tracks used during construction which are not required for maintenance purposes or for use by the landowner shall be closed and appropriately rehabilitated.	Contractor	Completion of construction
The contractors should consult with the relevant officials and key stakeholders regarding the traffic schedule, routes, diversions, road closures and so forth.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Gravel access roads maintained in passable condition with no erosion occurring</li> <li>» Upon completion of construction, all private roads are left in at least the original condition</li> <li>» No traffic incidents involving Eskom personnel or appointed contractors</li> <li>» No complaints resulting from traffic congestion, delays or driver negligence associated with construction of the power lines and/or substation</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Pre-construction photographic record of existing access roads to be used for construction purposes.</li> <li>» Visual monitoring of the condition of access roads to ensure appropriate maintenance thereof.</li> <li>» Visual monitoring of traffic control measures to ensure they are effective.</li> <li>» Visual monitoring of dust produced by traffic movement.</li> <li>» A complaints register shall be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon.</li> <li>» An incident reporting system shall be used to record non-conformances to the EMP.</li> </ul>

**OBJECTIVE: Minimisation of visual impacts associated with construction**

The construction phase of the Mokopane Integration Project substation will take approximately 24 months to complete. This is dependent on a number of external factors that may not always be controlled. During this time heavy vehicles, components, cranes, civils equipment and construction crews will frequent the area and may cause, at the very least, a visual nuisance to landowners and residents in the area as well as road users.

Although the site proposed for the placement of the Substation site option 4 is not located adjacent to any sensitive visual receptors that may experience nighttime visual impacts in the form of glare or light trespass, careful planning and sensitive placement of security and operational light fixtures for the substation, designed to contain rather than spread the light is imperative.

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» Access road</li> <li>» Transmission power lines</li> <li>» substation</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Temporary visual intrusion</li> <li>» The potential scarring of the landscape due to the creation of new access roads/tracks or the unnecessary removal of vegetation causing the increased visual exposure of the substation to sensitive visual receptors</li> <li>» The potential scarring of the landscape due to the creation of cleared cut-lines and new roads/tracks, especially where the servitudes traverse elevated topographical features with natural vegetation.</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Transportation of substation and power line components to the site</li> <li>» Construction activities on-site at the substation and along power line servitudes</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» Minimal disturbance to vegetation cover in close vicinity to the proposed substation site.</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Adopt responsible construction practices aimed at containing the construction activities to specifically demarcated areas thereby limiting the removal of natural and/or planted vegetation to the minimum.	Contractor	Construction
The general appearance of construction activities, construction equipment camps and lay-down areas shall be maintained by means of the timely removal of rubble and disused construction materials.	Contractor	Construction
Construction activities shall be restricted to daylight	Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
hours (as far as possible) in order to negate or reduce the visual impacts associated with lighting. In the event that night-time construction activities are required to be undertaken, lighting shall be placed in such a manner as to limit impacts on the surrounding areas.		
Clearance of vegetation within the development footprint shall be minimised in order to minimise long-term visual disturbance, and rehabilitation efforts undertaken. Avoid the unnecessary removal of vegetation for the power line servitudes and limit access to the servitude along existing access roads.	Contractor	Duration of contract
Limit access to the substation site along existing access roads.	Contractor	Duration of contract
Ensure that proper planning is undertaken regarding the placement of lighting structures and that light fixtures only illuminate areas inside the substation site.	Contractor / Lighting engineer.	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints regarding visual intrusion associated with construction activities.</li> <li>» Vegetation cover that remains intact with no visible cut lines, access roads or erosion scarring in and around the power line servitudes.</li> <li>» The effective containment of the light to the substation site.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Monitoring of mitigation measures during construction to minimise visual impacts on surrounding communities.</li> <li>» The monitoring of vegetation clearing during the construction and operational phases of the project.</li> <li>» An incident reporting system shall be used to record non-conformances to the EMP</li> </ul>

***OBJECTIVE: Appropriate handling and management of waste***

The construction of the substation and power lines will involve the generation of various wastes. In order to manage the wastes effectively, guidelines for the assessment, classification and management of wastes, along with industry principles for minimising construction wastes must be implemented.

The main wastes expected to be generated by the construction of the Mokopane Integration Project will include:

- » general solid waste

- » hazardous waste
- » liquid waste (including grey water and sewage)

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> <li>» access roads</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Inefficient use of resources resulting in excessive waste generation</li> <li>» Litter or contamination of the site or water through poor waste management practices</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Construction wastes</li> <li>» Hydrocarbon use and storage</li> <li>» Spoil material from excavation, earthworks and site preparation</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To comply with waste management guidelines</li> <li>» To minimise production of waste</li> <li>» To ensure appropriate waste storage and disposal</li> <li>» To avoid environmental harm from waste disposal</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Construction contractors shall provide specific detailed waste management plans to deal with all waste streams.	Contractor	Pre-construction
Supply a wastewater management system that will comply with legal requirements and be acceptable to Eskom.	Contractor	Pre-construction
Supply waste collection bins at construction equipment and construction crew camps.	Contractor	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Specific areas shall be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste, and contaminated waste. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage and vermin control.	Contractor	Duration of contract
Hazardous and non-hazardous waste shall be separated at source. Separate waste collection bins must be provided for this purpose. These bins must be clearly marked and appropriately covered.	Contractor	Erection: during site establishment Maintenance: for duration of Contract within a particular area

Mitigation: Action/control	Responsibility	Timeframe
All solid waste collected shall be disposed of at a registered waste disposal site. A certificate of disposal shall be obtained and kept on file. The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt on site.	Contractor	Erection: during site establishment Maintenance: for duration of Contract within a particular area
Where possible, construction and general wastes on-site shall be reused or recycled. Bins and skips shall be available on-site for collection, separation and storage of waste streams (such as wood, metals, general refuse etc). A recycling plan shall be developed in accordance with the requirements of the National Waste Management Strategy and submitted for Eskom approval.	Contractor	Duration of contract
Disposal of waste will be in accordance with relevant legislative requirements, including the use of licensed contractors.	Contractor	Duration of contract
Where a registered waste site is not available close to the construction site, a method statement shall be provided with regard to waste management.	Contractor	Site establishment
Documentation (waste manifest) shall be maintained detailing the quantity, nature and fate of any regulated waste.	Contractor	Duration of contract
Regularly serviced chemical toilets facilities shall be used to ensure appropriate control of sewage.	Contractor	Duration of contract
An incident/complaints register shall be established and maintained on-site.	Contractor	Duration of contract
No waste may be buried or burnt on site under any circumstances.	Contractor	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received regarding waste on site or indiscriminate dumping</li> <li>» Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately</li> <li>» Provision of all appropriate waste manifests for all waste streams</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of waste management practices throughout construction phase</li> <li>» Waste documentation completed and maintained on site</li> <li>» A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon</li> <li>» An incident reporting system will be used to record non-conformances to the EMP</li> </ul>

**OBJECTIVE: Ensure disciplined conduct of on-site contractors and workers**

In order to minimise impacts on the surrounding environment, Contractors must be required to adopt a certain Code of Conduct and commit to restricting construction activities to areas within the development footprint. Contractors and their sub-contractors must be familiar with the conditions of the Environmental Authorisation (once issued), the EIA Report and this EMP, as well as the requirements of all relevant environmental legislation.

<b>Project component/s</b>	List of project components affecting the objective: » power lines » substation » access roads
<b>Potential Impact</b>	» Pollution/contamination of the environment » Disturbance to the environment
<b>Activity/risk source</b>	» Contractors are not aware of the requirements of the EMP, leading to unnecessary impacts on the surrounding environment » Worker conflict
<b>Mitigation: Target/Objective</b>	» To ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
The terms of this EMP and the Environmental Authorisation (once issued) will be included in all tender documentation and Contractors contracts.	Eskom	Tender process
Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored by selected community representatives (e.g. councillors, farmers, members of Conservancies and ward committee members) and Eskom	Contractor (and sub-contractor/s)	Duration of contract
No personnel other than night watchmen and shift security will be permitted to remain on the site overnight.	Contractor (and sub-contractor/s)	Duration of contract
Contractors will use chemical toilets/ablution facilities situated at designated areas of the site; no abluting will be permitted outside the designated area. These facilities will be regularly serviced by appropriate contractors.	Contractor (and sub-contractor/s)	Duration of contract
Cooking/meals will take place in a designated area; no firewood or kindling may be gathered from the site or surrounds.	Contractor (and sub-contractor/s)	Duration of contract
All litter will be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area;	Contractor (and sub-contractor/s)	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
particular attention needs to be paid to food waste.		
No one other than the ECO or personnel authorised by the ECO, will disturb flora or fauna outside of the demarcated construction area/s.	Contractor (and sub-contractor/s)	Duration of contract
Contractors, Eskom personnel and temporary employees should behave fittingly at all times (e.g. no littering, not cause damage to properties, no unauthorised entry of properties, etc)	Contractor (and sub-contractor/s)	Duration of contract
Workers should receive fines if they do not adhere to the conditions, rules and regulations.	Contractor (and sub-contractor/s)	Duration of contract
Members of the construction team should be easily identifiable	Contractor (and sub-contractor/s)	Duration of contract
Workers should be made aware of property owners' concerns regarding construction work on their properties so that they are familiar with the sensitive issues.	Contractor (and sub-contractor/s)	Duration of contract
Privacy of residents and property owners should be respected and the construction team should obtain permission to enter properties	Contractor (and sub-contractor/s)	Duration of contract
Animals disturbed during construction activities should not be harmed but should be allowed to move off to an undisturbed area of the site.	Contractor (and sub-contractor/s)	Duration of contract
Hunting of wild animals including setting up of snares should not be allowed	Contractor (and sub-contractor)	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Compliance with specified conditions of Environmental Authorisation, EIA report and EMP</li> <li>» No complaints regarding contractor behaviour or habits</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Observation and supervision of Contractor practices throughout construction phase.</li> <li>» A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon</li> <li>» An incident reporting system will be used to record non-conformances to the EMP</li> </ul>

**OBJECTIVE:** *To ensure all construction activities/practices/procedures are undertaken with the appropriate level of environmental awareness to minimise environmental risk, in line with the specifications of the EMP*

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and Service Providers are required to outline

how any identified environmental risks will practically be mitigated and managed for the duration of the contract. That is, the Contractor will be required to describe how specified requirements will be achieved through the submission of written Method Statements to the Site Manager (and ECO).

A Method Statement is defined as “a written submission by the Contractor in response to the environmental specification or a request by the Project Manager/Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Project Manager/Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications”. The Method Statement must cover applicable details with regard to:

- » Construction procedures
- » Materials and equipment to be used
- » Getting the equipment to and from site
- » How the equipment/material will be moved while on-site
- » How and where material will be stored
- » The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur
- » Timing and location of activities
- » Compliance/non-compliance with the Specifications, and
- » Any other information deemed necessary by the Project Manager/Site Manager.

The Contractor may not commence the activity covered by the Method Statement until it has been approved, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the Method Statement will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

## MANAGEMENT PLAN FOR THE MOKOPANE INTEGRATION PROJECT: REHABILITATION OF DISTURBED AREAS CHAPTER 6

### 6.1. Overall Goal for the Rehabilitation of Disturbed Areas

**Overall Goal for the Rehabilitation of Disturbed Areas:** Undertake the rehabilitation measures in a way that ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed. In order to meet this goal, the following objective, actions and monitoring requirements are relevant:

**OBJECTIVE:** *To ensure rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed*

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular maintenance operations. The main areas requiring rehabilitation will be the construction camps, laydown areas adjacent to the servitudes, the centre line of the power line servitudes cleared for stringing purposes, access roads not required for maintenance purposes, and disturbed areas around the substation.

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» Power line servitudes (including temporary access roads and laydown areas)</li> <li>» Substation site</li> </ul>
<b>Potential Impact</b>	» Environmental integrity of substation site and power line servitude undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Temporary laydown areas alongside power line servitudes and substation site</li> <li>» Temporary access roads/tracks</li> <li>» Other disturbed areas/footprints</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To ensure and encourage site rehabilitation of disturbed areas</li> <li>» To ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
A site rehabilitation programme shall be formulated following the specialist walk-through survey, and must	Contractor in consultation with	Duration of contract

Mitigation: Action/control	Responsibility	Timeframe
be implemented as soon as possible after construction is completed in an area.	Specialist	
Implement an alien plant monitoring and control programme at the substation site and within the power line servitudes.	ECO, contractor	Construction, operational phases
Ensure immediate surface restoration and re-sloping in order to prevent erosion, taking cognisance of local contours and landscaping.	ECO, contractor	Construction phase
Use only local indigenous species in the rehabilitation/re-vegetation process.	ECO, contractor	Rehabilitation phase
All temporary facilities, equipment and waste materials shall be removed from site.	Contractor	Following execution of the works
Compacted areas that are no longer needed post-construction (e.g. laydown areas, and the crane tracks) shall be ripped and scarified.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Necessary drainage works and anti-erosion measures shall be installed, where required, to minimise loss of topsoil and control erosion.	Contractor	Following completion of construction activities in an area
Stockpiled topsoil shall be replaced in disturbed areas where rehabilitation is to be undertaken as a layer of at least 10 cm in thickness.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area
Disturbed areas shall be rehabilitated/re-vegetated with appropriate natural vegetation and/or local seed mix in the appropriate season.	Contractor in consultation with rehabilitation specialist	Following completion of construction activities in an area

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» Monitoring of all construction areas, including construction equipment camps and working areas, cleared of equipment and temporary facilities</li> <li>» Topsoil replaced on all areas and stabilised</li> <li>» Disturbed areas rehabilitated and acceptable plant cover achieved on rehabilitated sites</li> <li>» Closed site free of erosion and alien invasive plants</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» On-going inspection of rehabilitated areas in order to determine effectiveness of rehabilitation measures implemented</li> <li>» On-going alien plant monitoring and removal should be undertaken on an annual basis</li> </ul>

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## MANAGEMENT PLAN FOR THE MOKOPANE INTEGRATION PROJECT: OPERATION AND MAINTENANCE CHAPTER 7

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### 7.1. Overall Goal for Operation

**Overall Goal for Operation:** To ensure that the operation and maintenance of the Mokopane Integration Project does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the Mokopane Integration Project in a way that:

- » Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- » Enables operation and maintenance activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
- » Minimises impacts on birds and other fauna in the area.

### 7.2. Roles and Responsibilities for Operation and Maintenance

#### *7.2.1. Eskom Environmental Advisor*

Responsibilities include:

- » To implement and integrate environmental management systems by ensuring compliance to ISO 14000 and monitoring performance
- » Report environmental incidents
- » Provides environmental training
- » Ensures compliance to legislations and other legally binding documents

### 7.3. Objectives for Operation and Maintenance

In order to meet the goal for operation and maintenance, the following objectives have been identified, together with necessary actions and monitoring requirements.

#### ***OBJECTIVE: Protection of avifauna***

Bird interactions with the power lines can be anticipated during the operation phase of the power lines. These are, however, well researched in the South African context

(through the EWT and Eskom partnership). The main impacts expected are as a result of collisions with the earth-wire and disturbance of bird species in the area.

As a result of long-term monitoring, Eskom are in a position to make use of 'bird-friendly' towers and conductor configurations for their power lines. Exact spans requiring marking and towers requiring bird guards shall be determined by a suitably qualified specialist during an avifaunal walk-through survey to be conducted as part of the site-specific EMP phase.

Electrocutions of certain bird species within the substation during its operation, could potentially have a negative impact on a variety of bird species, particularly those species that regularly utilise the electrical infrastructure within the substation yard on which to breed and nest (e.g. crows, herons, sparrows, owls and geese). However, the more sensitive eagle species recorded in the area do not utilise substation yards extensively and therefore the significance of the impact is considered to be negligible.

A number of mechanisms exist through which birds are able to cause electrical faults. These include:

- » Bird streamer induced faulting, whereby the fault is caused by the bird releasing a "streamer" of faeces which can constitute an air gap intrusion between the conductor and the earthed structure.
- » Bird pollution, whereby a flashover occurs when an insulator string gets coated with pollutant, which compromises the insulation properties of the string.
- » Bird nests, which may cause faults through nest material protruding and constituting an air gap intrusion

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Loss of birds as a result of collision with the power line earth wire</li> <li>» Electrocution in the proposed substation HV yard</li> <li>» Disturbance to bird species in the area as a result of maintenance activities</li> <li>» Impact of birds on quality of supply</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Overhead power line</li> <li>» Substation HV yard</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» More accurately determine the impact of the operating substation and power lines on priority bird species</li> <li>» To minimise the number of bird collisions on the power line</li> <li>» To minimise the amount of natural habitat destroyed during construction of this power line</li> <li>» To minimise the number of electrical faults caused by birds</li> </ul>

Mitigation: Action/control	Responsibility	Timeframe
Suitable anti-collision marking devices should be fitted on earth wires of high risk sections of line identified during avifaunal walk down.	Eskom / specialist	Should be fitted at construction as soon as line is strung. Relevant sections to be identified by EWT once line profiles are available
Bird Guards should be fitted on all self-supporting type towers, as per Eskom Transmission guidelines (refer to Appendix B)	Eskom / specialist / construction teams.	Should be fitted at construction. Relevant towers should be identified by EWT once line profiles are available
Construction teams should take care in all sensitive areas (i.e. wetlands, streams and grassland) not to impact any more on natural habitat than is absolutely necessary. Vehicle and machinery access to these areas should be strictly controlled.	Eskom/ Construction Teams	Duration of contract

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No bird collisions on the power line once built – this will be monitored by standard Eskom line patrols, and random public detection of carcasses.</li> <li>» No undue destruction or alteration of natural habitat.</li> <li>» No bird related faulting on line once built – this will be monitored by Eskom’s line performance management systems.</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Eskom’s standard line patrols will detect any bird collisions that occur. Landowners are also likely to detect and report any collisions that occur</li> <li>» This will be checked regularly during construction by the ECO</li> <li>» Eskom’s standard line performance monitoring will detect whether any bird related faulting occurs on this power line once operational.</li> </ul>

***OBJECTIVE: Protection of vegetation and faunal habitats***

Indirect impacts on vegetation and habitats during operation and maintenance activities could result from maintenance activities and the movement of people and vehicles on site.

<b>Project component/s</b>	List of project components affecting the objective: » Power line servitudes and associated access roads » substation and access to substation
<b>Potential Impact</b>	» Disturbance to or loss of vegetation and/or habitats
<b>Activity/risk source</b>	» Movement of employee and visitor vehicles within and around site
<b>Mitigation: Target/Objective</b>	» To minimise impacts on flora and faunal habitats » To ensure and encourage plant regrowth in areas of post-construction rehabilitation

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Vehicle movements shall be restricted to designated roadways	Eskom	Operation
Remove invasive and alien vegetation, particularly in vicinity of riparian zones where alien and invasive trees are known to occur.	Eskom, Contractor	Operation
Prevent impacts on any surface water as a result of hazardous materials, contamination, unnecessary crossing by vehicles or personnel, extraction, drinking or other human uses, construction and maintenance activities	Eskom, Contractor	Operation
No new roads shall be created	Eskom	Operation
Existing roads shall be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Eskom	Operation
During maintenance activities, unnecessary disturbance to habitats shall be strictly controlled. Avoiding any sensitive habitats with maintenance vehicles must be ensured.	Contractor in consultation with Specialist	Duration of contract
An on-going weed eradication programme shall be implemented, where necessary.	Eskom	Operation

<b>Performance Indicator</b>	» No further disturbance to vegetation » Continued improvement of rehabilitation efforts
<b>Monitoring</b>	» Observation of vegetation on-site by Site Manager » Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation (6-12 monthly) compared to natural/undisturbed areas

***OBJECTIVE: Appropriate handling and management of hazardous substances and waste at the substation site***

The operation and maintenance of the substation and power lines will involve the generation of limited waste products. The main wastes expected to be generated by the operation and maintenance activities include:

- » general solid waste
- » hazardous waste
- » liquid waste

<b>Project component/s</b>	List of project components affecting the objective: <ul style="list-style-type: none"> <li>» power lines</li> <li>» substation</li> </ul>
<b>Potential Impact</b>	<ul style="list-style-type: none"> <li>» Inefficient use of resources resulting in excessive waste generation</li> <li>» Litter or contamination of the site or water through poor waste management practices</li> </ul>
<b>Activity/risk source</b>	<ul style="list-style-type: none"> <li>» Office and workshop facilities at the substation</li> <li>» Transformers and switchgear - substation</li> <li>» Fuel and oil storage</li> </ul>
<b>Mitigation: Target/Objective</b>	<ul style="list-style-type: none"> <li>» To comply with waste management guidelines</li> <li>» To minimise production of waste</li> <li>» To ensure appropriate waste disposal</li> <li>» To avoid environmental harm from waste disposal</li> </ul>

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Hazardous substances must be stored in sealed containers within a clearly demarcated designated area.	Eskom	Operation
Storage areas for hazardous substances must be appropriately sealed and banded.	Eskom	Operation
All structures and/or components replaced during maintenance activities shall be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	Eskom	Operation
Care shall be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance. Handling of these materials should take place within an appropriately sealed and banded area. Should any accidental spillage take place, it shall be cleaned up according to specified standards regarding bioremediation.	Eskom	Operation and maintenance

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Waste handling, collection and disposal operations shall be managed and controlled by a waste management contractor.	Eskom/waste management contractor	Operation
Wastewater: Water from bunds and oily water from oil/water separator shall be removed by a licensed contractor.	Eskom/waste contractor	Operation
Used oils and chemicals: » Appropriate disposal shall be arranged with a licensed facility in consultation with the administering authority. » Waste shall be stored and handled according to the relevant legislation and regulations.	Eskom/waste management contractor	Operation
General waste shall be recycled where possible or disposed of at an appropriately licensed landfill.	Eskom/waste management contractor	Operation
Hazardous waste (including hydrocarbons) shall be stored and disposed of separately.	Eskom/waste management contractor	Operation
Disposal of waste shall be in accordance with relevant legislative requirements, including the use of licensed contractors.	Eskom	Operation

<b>Performance Indicator</b>	<ul style="list-style-type: none"> <li>» No complaints received regarding waste on site or indiscriminate dumping</li> <li>» Internal site audits identifying that waste segregation recycling and reuse is occurring appropriately</li> <li>» Provision of all appropriate waste manifests</li> <li>» No contamination of soil or water</li> </ul>
<b>Monitoring</b>	<ul style="list-style-type: none"> <li>» Waste collection must be monitored on a regular basis.</li> <li>» Waste documentation must be completed and available for inspection on request</li> <li>» An incidents/complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon</li> <li>» Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the SHE Representative. All appropriate waste disposal certificates accompany the monthly reports.</li> </ul>

**OBJECTIVE:** *To ensure adequate regard is taken of landowner / stakeholder concerns and that these are appropriately addressed*

<b>Project component/s</b>	List of project components affecting the objective: » power lines » substation
<b>Potential Impact</b>	» Stakeholder concerns not addressed with regard to maintenance
<b>Activity/risk source</b>	» Maintenance of substation » Maintenance of transmission lines
<b>Mitigation: Target/Objective</b>	» To ensure adequate regard is taken of landowner / stakeholder concerns and that these are appropriately addressed

<b>Mitigation: Action/control</b>	<b>Responsibility</b>	<b>Timeframe</b>
Eskom maintenance personnel should be in possession of the required identification documents when undertaking maintenance work	Contractor	Duration of contract
Sound servitude management measures should be implemented. The implementation of the servitude management measures should be monitored on an ongoing basis	Contractor	Duration of contract
Eskom personnel should not access private properties without prior notification of the property owners	Contractor	Duration of contract

<b>Performance Indicator</b>	» No additional disturbance to avifaunal populations along the length of the power line routes » Continued improvement of avifaunal protection efforts
<b>Monitoring</b>	» Observation of avifaunal populations and incidence of injuries/death from collisions with the power line » Regular inspections to monitor casualties from collisions - delegate a suitable on-site monitor to assess avian mortality associated with the power lines.

## **MANAGEMENT PLAN FOR THE MOKOPANE INTEGRATION PROJECT: DECOMMISSIONING**

## **CHAPTER 8**

At this point of the project planning process, the necessity for and timing of the decommissioning of the Mokopane Integration Project is not known. Therefore, only general principles for decommissioning are detailed below. These principles will be required to be re-visited and refined in the event of the decommissioning of the power lines and substation.

In order to minimise the extent of rehabilitation activities required during the decommissioning phase, Eskom shall ensure that constant effort is applied to rehabilitation activities throughout the construction, operation and maintenance phases of the project.

In decommissioning the power line and/or the substation, Eskom shall ensure that:

- » All sites not already vegetated are vegetated as soon as possible after operation ceases with species appropriate to the area.
- » All structures, foundations and sealed areas are demolished, removed and waste material disposed of at an appropriately licensed waste disposal site.
- » All access/service roads not required to be retained by landowners are closed and fully rehabilitated.
- » All disturbed areas are compacted, sloped and contoured to ensure drainage and runoff and to minimise the risk of erosion.
- » All rehabilitated areas are monitored for erosion.
- » Components of the power lines and/or substation are removed from the site and disposed of appropriately. Equipment that is to be reused must be stored on Eskom property and equipment to be disposed of must be done so according to the manufacturer's recommendations.

**FINALISATION OF THE  
ENVIRONMENTAL MANAGEMENT PLAN**

**CHAPTER 9**

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The EMP is a dynamic document, which must be updated when required. It is considered critical that this draft EMP be updated to include site specific information and specifications following the final walk-through survey by specialists following the negotiation process and surveying of the power lines. This will ensure that the construction and operation activities are planned and implemented taking sensitive environmental features into account.