ESKOM HOLDINGS SOC LIMITED

Basic Assessment (BA) and Environmental Management Programme (EMPr) for Frankfort: Proposed Construction of a Substation and a single 132kV power line, Free State Province

Final Draft Environmental Management Programme (EMPr)

DEA Reference Number: 14/12/16/3/3/1/800

NEAS Reference Number: DEA/EIA/0001625/2013

Issue Date: 13 December 2013

Revision No.: 1

Project No.: 11707

Date:	13 December 2013
Document Title:	Basic Assessment (BA) and Environmental Management Programme (EMPr) for the Frankfort Strengthening Project: Proposed Construction of a Substation and a single 132kV Power Line: Final Draft Environmental Management Programme (EMPr)
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ESKOM HOLDINGS SOC LIMITED

BASIC ASSESSMENT (BA) AND ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR FRANKFORT: PROPOSED CONSTUCTION OF A SUBSTATION AND A SINGLE 132KV POWER LINE, FREE STATE PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

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Glossary of terms:

Construction Phase: The activities pertaining to the preparation for and the physical construction of the proposed development.

Contractor: Persons/organisations contracted by Eskom to carry out parts of the work for the proposed development.

Decommissioning: Means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned.

Engineer (E) / Project Manager (PM): Person/organisation appointed by the Contractor to oversee the work of all consultants, sub-developers, contractors, residents and visitors.

Environment: NEMA defines "environment" as "the surroundings within which humans exist and that are made up of the land, water and atmosphere of the earth; micro-organisms, plant and animal life; any interrelationships among and between them and the physical, chemical aesthetic and cultural properties and conditions that influence human health and well-being".

Environmental Control Officer (ECO): Person/organisation appointed by the Contractor who will provide direction to the Project Manager concerning the activities within the Construction Zone, and who will be responsible for conducting the environmental audit of the project during the construction phase of the project according to the provisions of the Environmental Management Plan.

Environmental Management Programme (EMPr): The EMPr is a detailed plan for the implementation of the mitigation measures to minimise negative environmental impacts during the life-cycle of a project. The EMPr contributes to the preparation of the contract documentation by developing clauses to which the contractor must adhere for the protection of the environment. The EMPR specifies how the construction of the project is to be carried out and includes the actions required for the Post-Construction Phase to ensure that all the environmental impacts are managed for the duration of the project's life-cycle.

Operational Phase (Post Construction): The period following the Construction Phase, during which the proposed development will be operational.

Pre-Construction Phase: The period prior to commencement of the Construction Phase, during which various activities associated with the preparation for the Construction Phase will be undertaken.

Rehabilitation: Rehabilitation is defined as the return of a disturbed area to a state which approximates the state (where possible) which it was in before disruption. Rehabilitation for the purposes of this specification is aimed at post-reinstatement re-vegetation of a disturbed area and the insurance of a stable land surface. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment.

Site Manager: The person, representing the Contractor, responsible for all the Contractor's activities on the site including supervision of the construction staff and activities associated with the Construction Phase. The Site Manager will liaise with the Project Manager in order to ensure that the project is conducted in accordance with the Environmental Management Programme.

Abbreviations:

BA	Basic Assessment
BAR	Basic Assessment Report
C	Contractor
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EMPr	Environmental Management Programme
EA	Environmental Authorisation
I&APs	Interested and Affected Parties
kV	Kilovolt
MC	Main Contractor
SO	Safety Officer
PM	Project Manager
MSDS	Material Safety Data Sheets

ESKOM HOLDINGS SOC LIMITED

BASIC ASSESSMENT (BA) AND ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE PROPOSED CONSTRUCTION FOR A SUBSTATION AND SINGLE 132KV POWER LINE, FREE STATE PROVINCE

DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME

1 INTRODUCTION

Eskom Holdings SOC Limited (hereafter referred to as Eskom) is proposing to construct a substation and a single 132kV line from Heilbron to Villiers, passing via Frankfort. The power line will be approximately 95km in length and will consist of four sections that will connect to four existing and one newly proposed substation via a loop-in loop-out connection. The four existing substations include Frankfort Municipal Substation, Windfield Rural Substation, Villiers Municipal Substation and Heilbron Municipal Substation. The newly proposed substation will be located near to the existing Tweefort Rural Substation.

The network in the area needs to be strengthened as there is no additional load growth possible on the existing 88kV network in the Heilbron/Frankfort/Villiers area. All developments have therefore been halted as electricity provision could not be guaranteed.

This EMPr has been compiled in line with the recommendations from the Basic Assessment (BA) being undertaken for the proposed project, as well as from issues identified by SiVEST Environmental Division. This EMPr will be updated with the conditions of the Environmental Authorisation (if approved) and re-submitted to the DEA for final approval prior to the commencement of construction on the project site. Additional details will also be provided by the appointed contractors and engineers once the detailed design has been completed.

1.1 Overview of the proposed project

The project is for the proposed construction of a substation and a single 132kV power line. The power line will be approximately 95km in length and will consist of four main sections that will connect to four existing substations and one newly proposed substation via a loop-in loop-out connection. The four existing substations include Frankfort Municipal Substation, Windfield Rural Substation, Villiers Municipal Substation and Heilbron Municipal Substation. The newly proposed substation will be located near to the existing Tweefort Rural Substation. The proposed power lines therefore are not separate power lines but rather connecting lines between the existing substations and the newly proposed substation along the greater power line network. The registered servitude width will be 31 metres (15.5 metres either side of the centre line). The four main sections of power lines include the following:

- Proposed construction of a power line from Heilbron Substation to the newly proposed Tweefort Substation near Tweefort Rural Substation (approximately 40km in length);
- Proposed construction of a power line from Tweefort Substation to Frankfort Municipal Substation (approximately 25km in length);
- Proposed construction of a power line from Frankfort Municipal Substation to Windfield Rural Substation (approximately 15km); and
- Proposed construction of a power line from Windfield Rural Substation to Villiers Substation (approximately 15km).

1.1.1 Proposed Route Alternatives

For each section of the proposed power line, two main alternative routes are proposed for the four main power line connections. Additionally, four sub-alternatives are proposed for the proposed power line alignments from the main alternative power lines originating from Heilbron routing to the newly proposed Tweefort Substation. Twelve alternatives alignments are therefore proposed in total. The proposed study area for each of the alternative power lines includes a corridor width of 1km (500m either side of the centre line). The width of the corridor will provide Eskom with sufficient space to negotiate and secure a servitude of 31m that would be required for the proposed 132kV power line. Each Alternative Route is outlined below:

- Alternative 1C – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 37km in length);
- Alternative 1D – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 43km in length);
- Alternative 1E – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 40km in length);
- Alternative 1F – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 41km in length);

- Alternative 2C – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 22km in length);
- Alternative 2D – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 28km in length);
- Alternative 2E – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31km in length);
- Alternative 2F – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31.5km in length);
- Alternative 3A – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 3B – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 4A – Windfield Rural Substation to Villiers Substation (approximately 15km); and
- Alternative 4B – Windfield Rural Substation to Villiers Substation (approximately 16km).

1.1.2 Tower Types

The tower types that are to be used will vary in relationship between the structure, the terrain to be traversed, ground clearance requirements, geology, etc. The various tower types include the following:

- Mono-pole guyed intermediate suspension structures;
- Mono-pole self-supporting intermediate suspension structures;
- Mono-pole angle suspension structures;
- Mono-pole strain structures;
- H-Pole structures; and
- 3 Pole strain structures.

The type of tower that would be used for this proposed 132kV power line will be determined once a routing has been negotiated and a servitude has been secured.

The foundation depths will range between 1.5-2m. Spanning lengths between tower type structures will be between 225-250m. The tower type structures will vary in length from 18-24m in height. Finally, a Chickadee conductor is to be used.

An illustration of an example of one of the proposed towers is provided in **Figure 1** below.

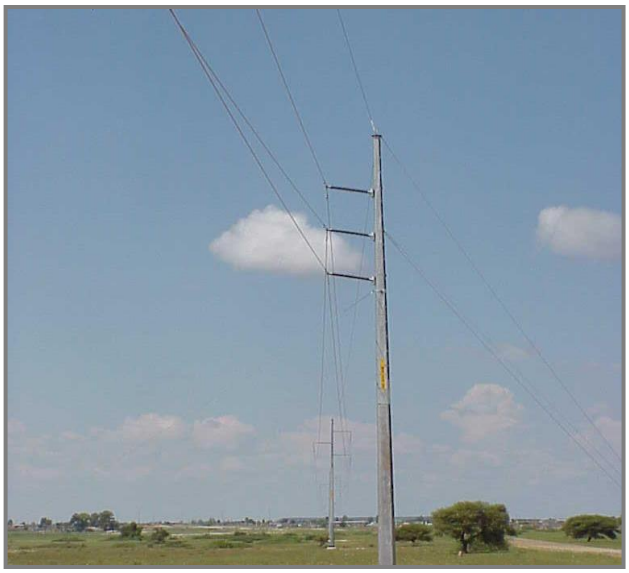

Figure 1. Proposed Tower Type

1.1.3 Proposed Substation

Tweefort Rural 88/22kV Substation is fed with a T-off from the Heilbron Rural – Frankfort Municipality 88kV line. Should there be a fault on the line it will cause total loss of the Tweefort Rural Substation. Three 22kV feeders are fed from this sub namely; Beta, Grasplaats and Kalkfontein feeder. The total length of the Kalkfontein feeder is 298km which it makes maintenance difficult. A large group of customers are affected for long periods of time during outages (due to time taken for maintenance on the long power line and adverse weather conditions). The unplanned durations per customer connected therefore are high, on the Kalkfontein line. If the Kalkfontein line is to be split at the TK32 T-off, it will minimize the number of customers affected and the time taken to resolve a fault. Therefore it is proposed that a new Tweefort Substation will be constructed. This will include the installation of a 132kV busbar (to accommodate 2 x 132kV feeder bays and 2 x transformer bays). 2 x 132kV feeder bays will be installed. The existing 1 x 4MVA complete transformer bay will be relocated from the Tweefort Rural Substation to the new Tweefort Substation. A 22kV busbar (to accommodate 2 x transformer bays and 5 x 22kV feeder bays) will be installed as well as 4 x 22Kv feeder bays. A new control room and yard stones will be required. The construction of a new access road as well as 2 x 14m lightening masts equipped with lights will be installed. The servitude to the substation will also be fenced off.

The substation will occupy an area of approximately 100m x 100m. The specifications of the substation will include the following:

- Install 132kV busbar (to accommodate 2 x 132kV feeder bays and 2 x transformer bays);
- Install 2 x 132kV feeder bays;
- Install 1 x 5MVA complete transformer bay;
- Make provision for additional transformer for future growth;
- Install 22kV busbar (to accommodate 2 x transformer bays and 5 x 22kV feeder bays);
- Install 4 x 22kV feeder bays;
- Make provision for additional 22kV feeder bay for future growth;
- Build a new control room;
- Add yard stones;
- Build a new access road;
- Install 2 x 14m lightning masts and equip with lights; and
- Fence off the substation servitude.

The two alternatives for the proposed substation at Tweefort include the following:

- Alternative 1 – Proposed Northern Tweefort Rural Substation
- Alternative 2 – Proposed Southern Tweefort Rural Substation

1.2 Brief Description of the Receiving Environment

The study area (**Figure 2**) is located in the Free State Province near the towns Heilbron, Frankfort and Villiers. The proposed power lines will route through the Ngwathe and Mafube Local Municipality. Both local municipalities fall within the greater Fezile Dabe District Municipality. All the proposed alternatives run between the towns from Heilbron and route eastwards to Frankfort where it then deviates to the north to Villiers. The proposed power line follows on or in parallel to the R34 and the R26.

The landscape throughout the survey area is predominately rural in character. Land uses for the greater part of the proposed power line encompasses agricultural farming activities. Commercial and residential land uses can be found in the towns of Heilbron, Frankfort and Villiers.

The study area falls within the Grassland bioregion (Mucina and Rutherford, 2006). Within a bioregion, smaller groupings of vegetation units are classified which contain a set of general but more local biophysical characteristics as opposed to the entire bioregion. The proposed substation and power line is situated within the Frankfort Highveld Grassland vegetation unit.

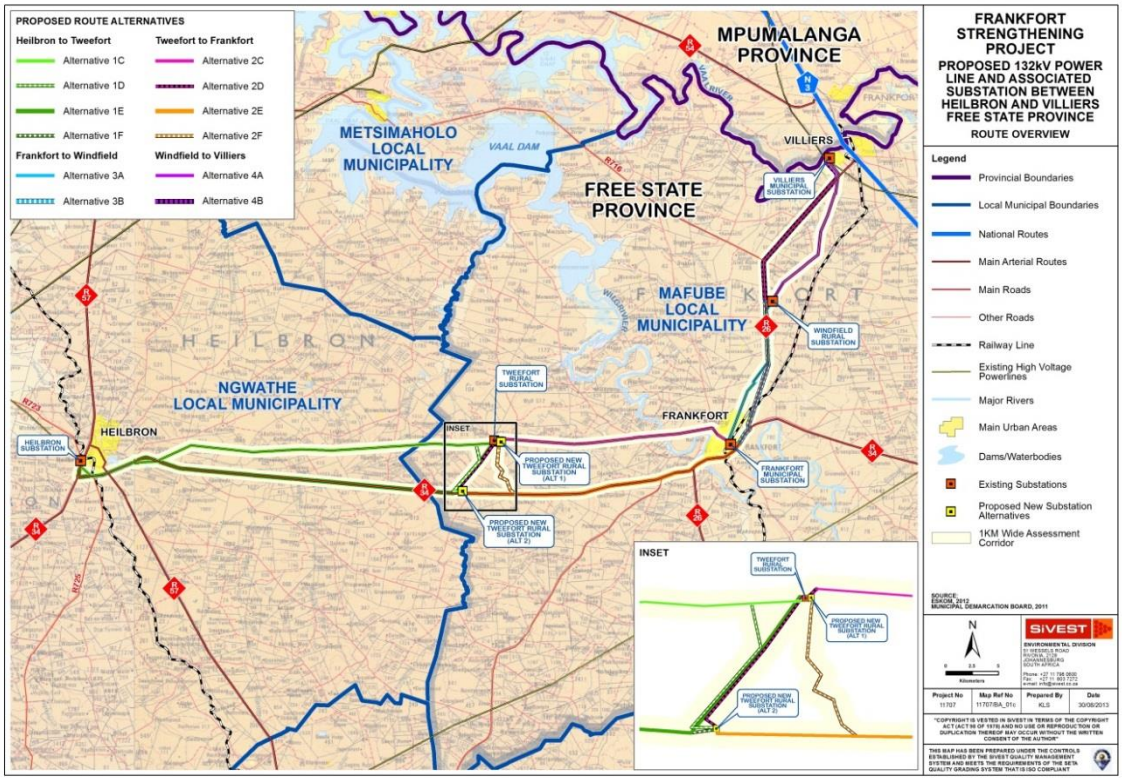

Figure 2: Route Overview Map

The route alternatives cross various biophysical and social features which may or may not be affected by the proposed power line. Detailed mitigation measures have been developed for the routes based on the specialist studies that were conducted for the project. The following studies were conducted for the proposed project:

- Biodiversity (fauna and flora) including avifauna;
- Floodline;
- Surface water;
- Agricultural potential and soil;
- Heritage;
- Visual;
- Socio-economic.

A summary of the major findings are indicated in the table below:

Table 1: Summary of findings

Environmental Parameter	Summary of major findings	Recommendations
Biodiversity	▪ The survey area does not include conserved areas, important birding areas, areas of conservation significance or areas of plant endemism. ▪ Migratory routes however of avifaunal species were identified. The survey area falls within the grassland biome. ▪ Cultivation and livestock is common through-out the area. ▪ No protected or Red Data List (RDL) floral species have been recorded ▪ Two orange listed species have been recorded as declining (*Boophane disticha* & *Crinum bulbispermum*). ▪ Of the 76 mammalian species that have been historically recorded from the region and the only RDL species is *Mystromys albicaudatus* (white tailed rat). ▪ Various groups of avi fauna are represented in the area. ▪ Inclusion of endemic reptilian species are relatively high (19 of 43 recorded species). Only the Giant girdled lizard (sungazer) *Cordylus giganteus* is of conservational significance and is regarded as vulnerable. ▪ There are 11 amphibian species recorded from the region. However none of these species are considered to be of conservational concern.	▪ Due to the higher disturbance factors (newly-established and existing tarred roads, overhead distribution power lines and telephone lines, and the greatest proportion of buildings), the alternatives that follow the main roads (Options 1F, 2E, 3B and 4B) are therefore the preferred alternatives and are thought to have the least overall ecological impact within the region. ▪ There was no preferred site for the proposed Tweefort Substation locality. ▪ Impacts on biodiversity and habitat conservation can be successfully mitigated with the sincere efforts of the contractor and construction teams. ▪ A walk through survey of the proposed alternative should be undertaken once a set route has been established. ▪ For potential avi-faunal impacts, it is recommended that the appropriate mitigation measures are taken by means of marking all of the sections of the power lines that pass through migratory routes. ▪ Towers should be fitted with perching aversion fixtures. ▪ It is also further recommended that routine surveys be undertaken once construction has been completed in order to identify any further avifaunal collision hotspot areas. The sections

Environmental Parameter	Summary of major findings	Recommendations
		of line within these areas should also be marked. ▪ A holistic habitat conservation approach should be adopted by keeping general habitat destruction and construction footprints to an absolute minimum.
Surface Water	▪ Twenty eight (28) channelled valley bottom wetlands, forty nine (49) unchannelled valley bottom wetlands, ten (10) floodplain wetlands, seventeen (17) depression (pan) wetlands and twenty one (21) artificial wetlands were identified. ▪ Two major river systems included Wilge and Vaal rivers. ▪ A 50m buffer was applied to the delineated wetlands and a buffer zone of 100m was applied to the riparian habitat of the Vaal and Wilge rivers. ▪ A generic rehabilitation plan has been proposed to remediate anticipated potential construction impacts to the sensitive areas.	▪ The following alternatives are proposed as having the least potential impact: o Alternative 2 – Proposed Southern Tweefort Substation; o Alternative 1F o Alternative 2D o Alternative 3B o Alternative 4B ▪ A final wetland walk-down study is to be conducted once the final power line route has been planned. ▪ Present Ecological Status (PES) and Environmental Importance and Sensitivity (EISC) assessments should also be undertaken where relevant for the wetlands that fall directly within the power line route. A surface water risk assessment should accompany this assessment.
Floodlines	Several water courses and rivers are intersected by the various route alternatives. These points of intersection are shown on the accompanying maps where the route corridors overlap the 1:100 year flood line envelopes. Some routes intersect more 1:100 year flood line envelopes than others. A summary of the impact of each of the routes on the flood lines is as follows:	Flood lines should serve only as a guideline to Eskom in the selection of the routing and the siting of towers. A demarcated 1:100 year flood line does not mean that a tower cannot be sited in the delineated area. But it does mean that if such a siting is intended, then a WULA will have to be applied for, and the engineering of the tower will need to take into account flood protection.

Environmental Parameter	Summary of major findings	Recommendations
	▪ Alternative 1C – Intersects 6 flood lines. ▪ Alternative 1D – Intersects 6 flood lines. ▪ Alternative 1E – Intersects 4 flood lines. ▪ Alternative 1F – Intersects 4 flood lines. ▪ Alternative 2C – Intersects 6 flood lines. ▪ Alternative 2D – Intersects 6 flood lines. ▪ Alternative 2E – Intersects 6 flood lines. ▪ Alternative 2F – Intersects 6 flood lines. ▪ Alternative 3A – Intersects 2 flood lines. ▪ Alternative 3B – Intersects 1 flood line. ▪ Alternative 4A – Intersects 1 flood line. ▪ Alternative 4B – Intersects 1 flood line. The main factors or features of the flood line envelopes that impact on the power line routes and proposed substations are: ▪ The width of the flood line envelopes impacts on the siting of the towers and the available tower spacing to swing the power lines across the flood lines. ▪ The elongation of the flood lines within the power line corridors impacts on the available width within the	The preferred routing from a floodline perspective includes: ▪ Alternative 1F Heilbron to Tweefort, ▪ Alternative 2E Tweefort to Frankfort, ▪ Alternative 3B Frankfort to Windfield, and ▪ Alternative 4B Windfield to Villiers. The preferred substation location is as follows: ▪ Alternative 2 – Proposed Southern Tweefort Substation;

Environmental Parameter	Summary of major findings	Recommendations
	corridors to route the power lines past the flood lines. ▪ The number of successive flood lines that need to be crossed by the power lines impacts on the efficient and uniform spacing of the towers. ▪ The proximity of flood lines to the sites selected for the proposed substations.	
Agricultural potential and soils	▪ Agricultural (cultivation and grazing) is one of the dominant land uses. ▪ High value agricultural resources are relatively scarce and found in pockets throughout the study area. These areas are of primary concern and need to be protected from non-agricultural land uses and developments. ▪ The only loss of agricultural land will be directly below the proposed electricity tower footprints which are relatively insignificant.	▪ It is recommended that careful routing of the power line and tower placement should be considered to mitigate potential impacts. ▪ Tower placement should be on the edge of existing agricultural areas and span active agricultural fields as far as possible. ▪ Following existing roads and utilising the edge of road servitudes is also highly recommended due to the existing impacts associated with these areas. ▪ The following alternative routes were preferred: o Alternative 1C & 1D o Alternative 2F o Alternative 3A o Alternative 4B ▪ Both substation alternatives (1 and 2) avoid actively cultivated land and are both located on unimproved veld and thus are acceptable from an agricultural perspective. ▪ If the recommendations and mitigation measures outlined are implemented then the proposed developments will have a very limited impact on agricultural

Environmental Parameter	Summary of major findings	Recommendations
		production.
Visual	▪ Most of the study area has a rural pastoral visual character. ▪ No visually sensitive receptors were identified. ▪ Several farmsteads are present and the proposed development may be an unwelcome intrusion ▪ Visual sensitivity varies across the study area. ▪ The proposed development would have a low to moderate visual impact on receptors within most of the study area.	▪ The following alternatives were preferred from a visual perspective: o Alternative 1C o Alternative 2C o Alternative 3A or 3B o Alternative 4A or 4B o Alternative 1 Tweefort Substation ▪ Align the power line as far away from sensitive receptor locations as possible. ▪ Align the power line to run parallel to existing power lines of equal or greater magnitude. ▪ Avoid crossing areas of higher elevation, especially ridges, koppies or hills. ▪ Avoid areas of natural wooded vegetation where possible. ▪ The visual impacts resulting from the proposed power line and substation would be low as long as the recommended mitigation measures are implemented.
Heritage	▪ The study area is located mainly within a highly modified agricultural area. ▪ The only sites of heritage significance that were identified were two burial sites. ▪ The first burial site consists of several thousand graves in the Namahadi Township and the second burial site is much smaller consisting of at least four graves.	▪ The first burial site should preferably not be traversed. The township access road could be used as an alternative to avoid the burial sites. However, it is suggested that the second alternative (Alternative 3B) to the south be utilized. ▪ The second burial site could easily be avoided through specific pylon placement. The choice of alternative 4B will avoid the large cemetery site. ▪ Two burial sites are located within

Environmental Parameter	Summary of major findings	Recommendations
		the alternative corridors. It is possible that further sites might be found in the various alternative corridors that have not been identified by the initial study. It is therefore recommended that the chosen alternative undergoes a walk-down evaluation on the finals pylon placement choice. ▪ The following power line alternatives were preferred: ▪ The following power line alternatives are recommended and preferred: o Alternative 1E o Alternative 2E o Alternative 3B o Alternative 4A or 4B ▪ The following substation alternatives are recommended and preferred: o Alternative 2 – Proposed Southern Tweefort Substation.
Socio-economic	▪ The calculated increase in population in these study areas will translate into an increased demand for electricity and therefore require greater electrical capacity. ▪ The projected increase in the number of households will have an upward impact on electricity demand in the study area, thus requiring greater electrical capacity. ▪ There is insufficient load growth capacity in the Frankfort region to increase household connectivity to 100%, thus implying the need for investment in electrical infrastructure.	▪ The following power line alternatives are recommended and preferred: o Alternative 1F o Alternative 2E o Alternative 3B o Alternative 4B ▪ The following substation alternatives are recommended and preferred: o Alternative 2 – Proposed Southern Tweefort Substation.

Environmental Parameter	Summary of major findings	Recommendations
	▪ The relative importance of agriculture and agro-processing to the local economy indicates the need to balance electricity provision with farmland preservation. ▪ Positive growth in the study area, particularly in the Mafube LM, is indicative of an increased demand for electricity. Growth in economic output and thus electricity consumption is also expected to accelerate in the coming years as the economy continues to recover. ▪ The labour force profile indicates high demand for employment in the narrow study area. The proposed power line and substation can address this issue, albeit marginally, through direct job creation during the construction phase. The project may also facilitate small business and industrial growth/employment by providing greater electrical capacity to the region. ▪ The labour intensity of agriculture implies a need to balance farming activity with infrastructure development. Therefore, the impact of constructing the proposed power line and substation on farmland should be minimised. ▪ The skills profile indicates that the availability of local labour for the proposed project is limited largely to low-skilled construction workers and a small number of skilled	

Environmental Parameter	Summary of major findings	Recommendations
	electrical staff. These workers should however be utilised as much as possible in order to alleviate local unemployment. ▪ The lower average income levels in the narrow study area (Mafube LM and Ngwathe LM) indicate a higher demand for employment and a lower level of household electricity consumption than in the wider economy. ▪ The farming activities currently conducted along the proposed power line routes and near the proposed substation can be safely continued underneath and around the planned 132KV power line. Therefore the anticipated impact of these activities on local farming output is minimal. ▪ The three villages situated along the proposed power line route currently serve as regional nodes in the larger rural economy. As identified in the Municipal IDPs these nodes have the potential for accelerated economic growth fuelled by the agro-processing, service and tourism industries. However, the further development of Heilbron, Frankfort and Villiers requires access to reliable electricity underscoring the importance of the proposed power line upgrade. ▪ The Namahadi village, located adjacent to Frankfort, is the only residential settlement which may be directly impacted by the	

Environmental Parameter	Summary of major findings	Recommendations
	proposed power line. ▪ The on-going operation of existing small businesses and agro-industries and the establishment of new enterprise requires access to reliable electricity supply. At present the only businesses that may be directly impacted by the proposed power line operate in the Namahadi village adjacent to Frankfort. ▪ Construction of the proposed power line along alternative routes 2A and 3A will have a significant impact on Namahadi village. This includes, at minimum, the relocation of 159 homes, 8 businesses and 12 subsistence farms.	

This EMPr has been compiled to ensure good environmental compliance during the construction of the power line and associated infrastructure. The EMPr will be strictly implemented during the construction phase of the project and will be consulted regularly during the lifespan of the project until decommissioning.

1.3 Project Responsibilities

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

The Project Manager is responsible for the implementation of the EMPr on the site during the pre-construction and construction phases of the project.

The ECO is responsible for monitoring the implementation of the EMPr during the design, pre-construction and construction phases of the project.

The contractor is responsible for abiding by the mitigation measures of the EMPr which are implemented by the Project Manager during the construction phase.

The contractor is responsible for the implementation of the EMPr during the operational and decommissioning phases of the project. It is unlikely that the proposed substation and power line will be decommissioned.

1.3.1 Project manager

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

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

1.3.2 Environmental Control Officer

The Environmental Control Officer is responsible for the implementation of the EMPr during the construction phase and liaison between the Contractor and the Landowners. The ECO will liaise and report to the Contractor, landowners and authorities. The following tasks will fall within his / her responsibilities:

- Be aware of the findings and conclusions of the Basic Assessment and the conditions stated within the environmental authorisation.
- Be familiar with the recommendations and mitigation measures of this EMPr.
- Conduct monthly audits of the construction site according to the EMPr and EA.
- Educate the construction team about the management measures of the EMPr and EA.
- Regular liaison with the construction team and the project leader.
- Recommend corrective action for any environmental non-compliance incidents on the construction site.
- Compile a regular report highlighting any non-compliance issues as well as good compliance with the EMPr.

- 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.

1.3.3 Contractor

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

- Ensure compliance with the EMPr at all times during construction
- 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

The Contractor shall under no circumstances interfere with the property of landowners or nearby communities.

1.3.4 Proponent

Eskom are the proponent and will be responsible for constructing the power lines and substation. Eskom will assume ultimate responsibility for the project and all activities related to the construction process i.e. non-ompliance, penalties etc.

1.3.5 The Environmental Liaison Officer (ELO)

The ELO will be appointed by the Contractor to implement the EMPr and monitor activities on site on a daily basis. The ELO will be the ECO's representative on the site and will report back on all audit trips. The ELO must report any major incidents immediately to the ECO.

Table 2: Responsibilities

Function	Responsibility
Project Manager (PM) Eskom	▪ Overall management of project and EMPr implementation
Senior Site Supervisor/ Contract Manager (CM) Eskom	▪ Oversee site works, liaison with Contractor (ELO), PM and ECO
Environmental Control Officer (ECO) (independent) – Appointed by Eskom	▪ Implementation of EMPr, and monitoring of compliance with the requirements of the CEMP. ▪ Liaison between Eskom, Contractor and Landowners, including negotiation of access plan. ▪ Maintains close communication with the ELO, and oversees the ELO's environmental control, remediation and rehabilitation actions (including checking that the complaints register and register of environmental incidents are being maintained by the ELO). ▪ Environmental awareness training of the contractor and select main construction staff ▪ Settlement of damage claims and completion of Damage Release Forms ▪ Negotiating and acquiring release forms from affected landowners at the end of the construction period.
Contractor (MC)	▪ Ensures the implementation and compliance with recommendations and conditions of the EMPr as well as the EA; Appoints dedicated person (ELO) to work with ECO
Contractor-appointed Environmental Liaison Officer (ELO)	▪ Monitoring of compliance with EMPr, environmental control of site actions, adjusting of environmental quality of works performed by construction staff, remediation and rehabilitation work. ▪ Reports back to the ECO through compilation of regular site inspection reports. ▪ Ensures compliance of construction activities with relevant environmental legislation. ▪ Maintains the complaints register that is kept on-site. ▪ Keeps record of all environmental incidents and ensures that corrective action is taken. ▪ Compiles method statements from the project-specific EMPr. ▪ Environmental awareness training of all staff. ▪ Day-to-day management of landowner requirements and

Function	Responsibility
	landowner liaison; ensures all landowner special conditions are met.
Environmental Advisor (Eskom)	▪ Environmental advice and internal auditing

- The ELO will be the responsible party for all compliance of this EMPr during the construction phase.
- The monitoring party will be the ECO.
- Method of record keeping will be monthly audits.
- Audit Technique will be the review of records that will be kept on site by the ELO and/ or site inspections.
- Eskom will bear ultimate responsibility.

Table 3: Environmental Management Responsibilities

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
1.1	**PRE-CONSTRUCTION (SITE ESTABLISHMENT)**			
1.1.1	Site preparation	MC, ELO	ECO	SITE VISIT
1.1.2	Consultation	MC, ELO	ELO,ECO	SITE VISIT
1.2	**CONSTRUCTION ACTIVITIES**			
1.2.1	Site Clearing	MC	ELO,ECO	SITE VISIT
1.2.2	Construction traffic and access	MC, ELO	ECO	SITE VISIT
1.2.3	Construction Camp	MC, ELO	ECO	SITE VISIT
1.2.4	Environmental Education and Training	MC, ELO,ECO	ECO	SITE VISIT
1.2.5	Soils and Geology	MC, ELO	ECO	SITE VISIT
1.2.6	Erosion Control	ELO	ECO	SITE VISIT
1.2.7	Water Use and Quality	ELO	ECO	SITE VISIT
1.2.8	Surface Water and Groundwater	ELO	ECO	RECORDS REVIEW
1.2.9	Waste Management	ELO	ECO	SITE VISIT
1.2.10	Flora	ELO	ECO, Ecologist (When necessary)	SITE VISIT
1.2.11	Fauna	ELO	ECO, Ecologist (When necessary)	RECORDS REVIEW, SITE VISIT
3.1.12	Air Pollution	ELO	ECO	RECORDS REVIEW, SITE VISIT

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
3.1.13	Noise and Vibrations	ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.14	Energy use	ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.15	Agricultural Potential	ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.16	Employment	ESKOM, MC	ECO	RECORDS REVIEW, SITE VISIT
3.1.17	Occupational Health and Safety	MC, ELO	ECO, Safety Officer	SITE VISIT
3.1.18	Security	MC, ELO	ECO	SITE VISIT
3.1.19	Socio-economic Environment	MC, ELO	ECO	RECORDS REVIEW, SITE VISIT
3.1.20	Community Engagement	ELO	ECO	SITE VISIT
3.1.21	Visual Impact	ELO	ECO	SITE VISIT
4.1	**OPERATION ACTIVITIES**			
4.1.1	Construction Site Decommissioning	ESKOM		RECORDS REVIEW
4.1.2	Operation and Maintenance			RECORDS REVIEW
4.1.3	Surface and Groundwater	ESKOM		RECORDS REVIEW
4.1.4	Air Quality	ESKOM		RECORDS REVIEW
4.1.5	Noise	ESKOM		
4.1.6	Pollution Control	ESKOM		
4.1.7	Biodiversity	ESKOM, ELO		

ITEM	PROJECT COMPONENT AND ACTIVITY	RESPONSIBLE PARTY	MONITORING PARTY	AUDIT TECHNIQUE
4.1.8	Waste Management	ELO		
4.1.9	Health and Safety	ELO, SO		
4.1.10	Visual Impact	ELO		
5.1	**DECOMMISSIONING ACTIVITIES**			
5.1.1	Ongoing Stakeholder involvement	ELO		SITE VISIT
5.1.2	Community health and safety	ELO		
5.1.3	Waste management	ELO		
5.1.4	Surface and groundwater	ELO		
5.1.5	Biodiversity	ELO		

1.3.6 Environmental Audits

Table 4 below provides an outline of the generic process involved in the auditing process. It briefly describes the activities of the process initially beginning with defining the objectives and scope of the auditing process as well as the responsibilities of the various parties. The procedure for the auditing process is explained through to the production of audit findings and the compliance (or non-compliance) of the audit findings.

The Independent auditor will undertake the following:

- Conduct audits
- Submit audit reports to ECO and relevant authority
- Engage specialist sub consultants when required.

Table 4: Example of Procedure for Conducting Audits

Objective	To ensure that formal audits of the EMPr are scheduled and performed so as to verify compliance with the requirements of the EMPr.
Scope	This procedure describes the sequence of events required to perform a compliance audit

	and the verification of implemented corrective action
Responsibilities	The ECO or a person authorised and appointed by him, is responsible for the maintenance of the Environmental Audit System The ECO is responsible for the scheduling and execution of the audit, as well as the verification of the implementation of corrective action. At his/her discretion, this authority may be delegated to responsible company personnel or to an independent Environmental Auditing Authority to perform the audit on his/her behalf. Auditors shall have no direct responsibility in the area/system being audited. They will be trained in techniques for auditing environmental systems. The head of department (HOD)/supervisor for an area/system to be audited (or a responsible person nominated by him/her) will assist the audit team in the execution of the audit. The HOD will also be responsible for timely corrective actions based on the findings of the audit.
Procedure	
Planning the audit	The ECO or his authorised delegate, shall plan the audit of a particular environmental area or system as follows: ▪ He shall inform, in writing, the division to be audited of the intention to conduct an audit at least two weeks prior to the audit. This notification should include the audit objective, scope and duration and any assistance required from the division. ▪ On completion of the audit, an audit

	findings sheet shall be prepared and submitted to company senior management as well as to the Department/section, which was audited. ▪ Corrective actions shall be implemented, within eight weeks after the audit, where possible.
Audit External Schedule	The external environmental audits will be scheduled annually.
Audit Check List	Auditing will be performed by collecting evidence for verification through interviews, relevant documentation and observation of activities and conditions. Instances of non-conformity to EMPr criteria should be recorded. An environmental audit checklist can be used as a guide to address all relevant issues.
Audit Compliance	See below.
Audit Findings and Reporting of non-compliances	The audit team shall review all evidence of their audit findings to decide on non-compliance. Audit findings of non-compliance must be documented and supported by evidence in the Audit Findings Report. The non-compliance findings will be communicated to the Project Manager and his representatives during an audit feedback meeting. The person responsible for corrective action, will sign the audit findings report sheet to indicate acceptance and commitment to the required corrective action. Findings identified during auditing not covered in the EMPr should be included and the EMPr updated as and when identified.

1.4 Layout of Environmental Management Programme

1.4.1 Introduction

This EMPr addresses both generic issues as well as specific issues. The generic and specific issues in the EMPrs are separated into different phases. Each phase has specific issues unique to that period of the development and operation of the power lines, substations and associated infrastructure. The impact is identified and given a brief description. The phases of the development are then identified as below:

- Pre-construction (Site Establishment)
- Construction (including associated rehabilitation of affected environment)
- Operation Phase
- Decommissioning of substations

This EMPr seeks to manage and keep to a minimum the negative impacts of a development and at the same time, enhance the positive and beneficial impacts.

The EMPr specifies mitigation measures for the following environmental aspects:

1.4.2 Pre-construction (Site establishment)

- Site preparation
- Consultation
- Site clearing

1.4.3 Construction

- Construction Camp
- Construction Traffic and Access
- Environmental Education and Training
- Soils and Geology
- Erosion Control
- Water Use and Quality
- Surface and Groundwater
- Waste Management
- Flora

- Fauna
- Air Pollution
- Noise and Vibrations
- Energy use
- Climate Change
- Agricultural Potential
- Employment
- Occupational Health and Safety
- Security
- Social Environment
- Community Engagement
- Visual Impact
- Cultural and Heritage Artefacts

1.4.4 Operation

- Construction Site Decommissioning
- Operation and Maintenance
- Surface and Groundwater
- Air Quality
- Noise
- Biodiversity
- Waste Management
- Health and Safety
- Visual Impact

1.4.5 Decommissioning Phase

- Ongoing Stakeholder involvement
- Community health and safety
- Waste Management
- Surface and Groundwater
- Biodiversity
- Air pollution

1.5 Objectives of an EMPr

The objectives of this EMPr are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels.
- To identify measures that could optimize beneficial impacts.
- To create management structures that address the concerns and complaints of I&APs with regards to the development.
- To establish a method of monitoring and auditing environmental management practices during all phases of development.
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management and Environmental Management System (EMS) ISO 14001 Principles.
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project.
- Ensure that the safety recommendations are complied with.
- Propose mechanisms for monitoring compliance with the EMPr and reporting thereon.
- Specify time periods within which the measures contemplated in the environmental management plan must be implemented, where appropriate.

The EMPr seeks to highlight the following:

- Avoiding impacts by not performing certain actions.
- Minimising impacts by limiting aspects of an action.
- Rectifying impacts through rehabilitation, restoration, etc of the affected environment.
- Compensating for impacts by providing substitute resources or environments.
- Minimising impacts by optimising processes, structural elements and other design features.
- Provide ongoing monitoring and management of environmental impacts of a development and documenting of any digressions /good performances.

The EMPr is a legally binding document that all parties involved in the project must be made aware of.

1.5.1 Environmental monitoring

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

- Monthly audits will be conducted by the Environmental Control Officer, which are according to the EMPr and ROD'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 EMPr. This report will be submitted to the relevant authorities.

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 should be directed to the ECO for appraisal. A register shall be kept of all complaints from the landowner or community (Annexure A). All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

A copy of the EMPr must be kept on site during the construction phase. The EMPr will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. Those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

1.6 Compliance with the EMPr

The Contractor is deemed not to have complied with the EMPr if:

- Within the boundaries of the site, site extensions and access roads there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence;
- The contractor fails to comply with corrective or other instructions issued by the ECO or Authorities within a specified time; or
- The Contractor fails to respond adequately to complaints from the public.

Eskom is deemed not to have complied with the EMPr if:

- Within the boundaries of the site there is evidence of contravention of clauses;
- If environmental damage ensues due to negligence; or
- They fail to respond adequately to complaints from the public.

1.6.1 Method Statements

It is standard practice that method statements for various construction-related activities be produced by the contractor's Environmental Liaison Officer (ELO). These method statements will outline in detail how various activities should be undertaken so as not to cause any environmental damage / impacts. It is very important that these method statements be signed off by the ECO. Any changes to the method statements that are made during the construction period must be approved by the ECO. Method statements must be kept on site as part of the official environmental documentation.

1.6.2 Penalties for non- compliance

Application of a penalty clause to the contractor will apply for incidents of non-compliance. The penalty imposed will be per incident and will be deducted from the contractor's monthly payment certificate. Unless stated otherwise in the project specification, the penalties imposed per incident or violation will be pre-determined and agreed upon between the Contractor and the ECO. These will vary in amount based upon the severity and/or regularity of the incidence occurring.

The ECO in consultation and with the approval of the Senior Site Supervisor shall issue spot fines if the Contractor infringes specifications of the EMPr and EA. The Contractor shall be advised in writing of the nature of the infringement and the amount of the spot fine. The Contractor shall be liable for the fine and it is his responsibility to recover the fine from the relevant employee. The Contractor (through the Environmental Officer) shall also take the necessary steps (e.g. training) to prevent a recurrence of the infringement. The Contractor is also advised that the imposition of spot fines does not replace any legal proceedings the authorities, landowners and/or members of the public may institute against the Contractor. Spot fines for minor offences shall be between R500.00 and R5 000.00, depending upon the severity of the infringement. The decision on how much to impose will be made by the ECO and will be final. In addition to the spot fine, the Contractor shall be required to make good any damage caused as a result of the infringement at his own expense. A preliminary list of infringements for which spot fines will be imposed is as follows:

- Using areas outside the working areas without permission/accessing "no-go areas";
- Clearing and/or leveling area outside of the working areas;
- Littering of the site and surrounds;
- Burying/burning waste on site and surrounds;
- The undertaking of informal ablutions
- Making fires on site;
- Spillage onto the ground or water bodies of oil, diesel, or any other potential pollutants;

- Picking/damaging plant material, especially that from the residual areas of natural bush on the site;
- Damaging/killing wild or domestic animals/birds;
- Discharging effluent and/or stormwater onto the ground or into surface water;
- Repeated contravention of the specification or failure to comply with instruction

In this context the ECO shall retain records or all fines issued. Monies for the spot fines will be deducted from the Contractors monthly certificate.

The Senior Site Supervisor, on recommendation from the ECO, may also order the Contractor to suspend part or all the works if the Contractor repeatedly causes damage to the environment by not adhering to the EMPr (i.e. more than 3 cases of infringements). The suspension will be enforced until such time as the offending actions, procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the Contractor.

1.6.3 Training and awareness

- Training of construction workers

The Construction Workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimisation of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must be informed of how to recognise historical / archaeological artefacts that may be uncovered. They must also be appraised of the EMPr's requirements.

- Contractor performance

The Contractor must ensure that the conditions of the EMPr are adhered to. Should the Contractor require clarity on any aspect of the EMPr the Contractor must contact the Environmental Control Officer for advice.

1.7 Applicable Legislation, Development Strategies and Guidelines

The following legislation applies:

- Atmospheric Pollution Prevention Act (Act No. 45 of 1965)
- Conservation of Agricultural Resources Act (Act No 43 of 1983)
- Constitution of South Africa (Act No. 108 of 1996)
- Environment Conservation Act (Act No 73 of 1989)

- Hazardous Substances Act (Act No. 15 of 1973)
- National Environmental Management Act (Act No 107 of 1998) – NEMA
- National Environmental Management: Air Quality Act (Act No. 39 of 2004)
- National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
- National Forests Act (Act No 84 of 1998)
- National Heritage Resources Act (Act No 25 of 1999)
- National Veld and Forest Fire Act (Act No 101 of 1998)
- National Water Act (Act No 36 of 1998)
- Northern Cape Nature Conservation Act (Act No 9 of 2009)
- Occupational Health and Safety Act (Act No 85 of 1993)
- Protected species – provincial ordinances

2 MITIGATION GUIDELINES

2.1 Introduction

Mitigation guidelines are addressed through four phases namely Pre-construction (Site Establishment) Phase; Construction Phase (and associated rehabilitation of affected environment); Operational Phase (Post-Construction) as well as Decommissioning Phase. Each phase has specific issues unique to that period of the development and operation of the proposed infrastructure. The impact is identified and given a brief description. The four phases of the development are then identified as below:

- Pre-construction
- Construction
- Post Construction
- Decommissioning

2.2 Pre-Construction Phase

2.2.1 Site preparation

Table 5: Site preparation

IMPACT	**SITE PREPARATION** **This section deals with the preparation of the site and actions that need to be implemented before construction commences**	**RESPONSIBILITY**
PHASE	**SITE ESTABLISHMENT**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Specialist Investigations** 1. A detailed walk down by the faunal and floral specialist should be undertaken prior to the onset of the construction phase to survey the area in detail for any RDL species to limit the impacts imposed by the proposed development activities at each tower site. 2. Prior to the onset of the construction phase, a thorough search through the approved alignment route and servitude roads (walk-through survey) should be undertaken during the flowering season	

IMPACT	SITE PREPARATION **This section deals with the preparation of the site and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**SITE ESTABLISHMENT**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	of known RDL floral species in order to remove and rescue potentially affected species. 3. A walk down by the avifaunal specialist should be undertaken to identify the spans that will require mitigation devices to be installed, once the exact routing is chosen and the tower positions are pegged. 4. A walk down should be undertaken by the heritage specialist prior to finalising the tower positions and commencing with construction. This will be done in order to mitigate and manage the impact of the proposed project on any heritage resources. 5. Detailed geotechnical investigations should be undertaken prior to the construction of the approved substation alternatives. 6. A final walk-through surface water study should be undertaken to identify wetlands that are at risk to damage during the construction process and will require site specific mitigation measures. Once a selected power line route has been determined, it will then be necessary to accurately delineate each wetland along the chosen alignment and include the findings in a wetland final walk-down report. **Appoint construction team and suitable manager** 7. Appoint an Environmental Control Officer and Environmental Liaison Officer. The ELO is appointed on the contractor's behalf while the ECO is appointed on the proponent's behalf. 8. The Contractor must draw up method statements for relevant construction activities. The ECO must approve all of the method statements before they become operational.	

IMPACT	SITE PREPARATION **This section deals with the preparation of the site and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**SITE ESTABLISHMENT**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	Site demarcation and compliance 9. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable and practical. 10. All tower positions must be pegged by a qualified surveyor prior to the onset of construction. 11. All existing boreholes within the power line alignment have to be identified and surveyed. 12. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access. 13. The contractor and ECO must ensure compliance with conditions described in the EA. 14. All no-go areas on the servitude must be properly fenced off and signage placed prior to the onset of construction. If this is not practical (such as where the area is too large to fence off), the area should be demarcated with barrier tape and signage should be erected. 15. Records of compliance / non-compliance with the conditions of the authorisation must be kept and be available on request. 16. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution. 17. Identify suitable landfill, which will accept the type of waste material to be generated.	

IMPACT	SITE PREPARATION **This section deals with the preparation of the site and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**SITE ESTABLISHMENT**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	18. Identify suitable site/borrow pit (if applicable) to obtain soil. **Labour** 19. All unskilled labourers should be drawn from the local market and where possible use should be made of local semiskilled and skilled personnel where possible. 20. Local suppliers must be used, as far as possible. 21. Labour intensive methods must be used where feasibly, cost effective and not time constraining. **Training of site staff** 22. Environmental awareness training for all construction staff must be undertaken by the ELO prior to construction starting. 23. The ECO must undertake training of the contractor and other main contractors (training of other staff is the responsibility of the ELO). 24. All stakeholders and key personnel should undergo an archaeological induction course, as part of their overall training. The course should highlight the appropriate communication channels to managers and educate workers with regard to recognising artefacts, features and significant sites. 25. Project manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. 26. Staff operating equipment (such as excavators, cranes, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and	

IMPACT	SITE PREPARATION **This section deals with the preparation of the site and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**SITE ESTABLISHMENT**	**MC, ELO, ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	certified competent by the Project Manager. 27. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager. 28. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts must be undertaken by the ELO. 29. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training.	

2.2.2 Consultation

Table 6: Consultation

IMPACT	CONSULTATION **This section deals with the public consultation of the site and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**PRE-CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Consultation** 1. Engage in thorough, open, and constructive consultation with any and all land owners. 2. The Landowners shall be informed of the starting date of construction as well as the phases in which the construction shall take place.	

IMPACT	CONSULTATION **This section deals with the public consultation of the site and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**PRE-CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	3. Provide a mechanism through which information could be exchanged between the project proponent and stakeholders. 4. Surrounding communities must be kept informed, through the identified and agreed consultation channels, of the commencement of construction. 5. Solicit views and concerns from the public and allow them to suggest mitigations and enhancement measures.	

2.2.3 Site Clearing

Table 7: Site Clearing

IMPACT	SITE CLEARING **This section deals with site clearing and actions that need to be implemented before construction commences**	RESPONSIBILITY
PHASE	**PRE-CONSTRUCTION**	**MC**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION/ METHOD STATEMENT	**Site clearing** 1. Site clearing must take place in a phased manner, as and when required. 2. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 6. Conduct construction walk down prior to	

	construction to conduct a search and rescue exercise. 7. Demarcation of sensitive areas prior to construction activities starting. 8. In terms of surface water, potential negative impacts are related primarily to vegetation clearing activities in the riparian habitat, wetlands and drainage lines. Mitigation measures should be strictly implemented.	

2.3 Construction Phase

2.3.1 Construction Camp

Table 8: Construction Camp

IMPACT	**CONSTRUCTION CAMP** **This section deals with construction camp and actions that need to be implemented during construction**	**RESPONSIBILITY**
PHASE	**CONSTRUCTION**	**MC / ELO / ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Site of construction camp** 1. Choice of site for the Contractor's camp requires the Project Manager and ECO's permission and must take into account location of local residents and / or ecologically sensitive areas, including flood zones. A site plan must be submitted to the Project Manager for approval. 2. The size of the construction camp should be minimized (especially where natural vegetation or grassland has had to be cleared for its construction). 3. Adequate parking must be provided for site staff and visitors. The Contractor must attend to drainage of the camp site to avoid standing water and / or sheet erosion. 4. Suitable control measures over the Contractor's	

IMPACT	CONSTRUCTION CAMP **This section deals with construction camp and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO / ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	yard, plant and material storage to mitigate any visual impact of the construction activity must be implemented. **Construction Camp** 5. The ECO and Contractor must inspect the Construction Camp site to confirm and note any environmental sensitivity. 6. The construction camp layout plan must be provided to the ECO for approval prior to the construction of the camp. 7. The construction camp must be fenced off and on-site security should be put in place prior to commencing with the construction activities. 8. The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to Eskom if this does not already exist on the site. 9. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site. 10. All construction equipment must be stored within this construction camp or the farm under lease. 11. All associated oil changes etc (no servicing) must take place within this camp on a sealed surface such as a concrete slab or a similar appropriate surface. 12. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment 13. All Construction Camps shall be provided with portable fire extinguishing equipment, in	

IMPACT	CONSTRUCTION CAMP **This section deals with construction camp and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO / ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	accordance with all relevant legislation and must be readily accessible. 14. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 100 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area. 15. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed. 16. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter. **Storage of materials (including hazardous materials)** 17. Choice of location for storage areas must take into account prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary. 18. Storage areas must be designated, demarcated	

IMPACT	CONSTRUCTION CAMP This section deals with construction camp and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO / ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	and fenced if necessary. 19. Storage areas should be secure so as to minimize the risk of crime. They should also be safe from access by unauthorised persons i.e. children / animals etc. 20. Fire prevention facilities must be present at all storage facilities. 21. Proper storage facilities for the storage of oils, grease, fuels, chemicals and any hazardous materials to be used must be provided to prevent the migration of spillage into the ground and groundwater regime around the temporary storage area(s). These pollution prevention measures for storage should include a bund wall high enough to contain at least 110% of any stored volume, and this should be sited away from drainage lines in a site with the approval of the Project Manager. The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential stormwater events. 22. All fuel storage areas must be bunded to avoid creation of dirty stormwater 23. These storage facilities (including any tanks) must be on an impermeable surface that is protected from the ingress of storm water from surrounding areas in order to ensure that accidental spillage does not pollute local soil or water resources. 24. Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible the available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental	

IMPACT	CONSTRUCTION CAMP **This section deals with construction camp and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO / ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	impacts during accidental releases or escapes. 25. Storage areas containing hazardous substances / materials must be clearly signposted. 26. Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures. 27. An approved waste disposal contractor must be employed to remove and recycle waste oil, if practical. The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training. 28. All excess cement and concrete mixes are to be contained within a bunded area on the construction site prior to disposal off site. 29. All major spills as specified in the contractor emergency response procedure of any materials, chemicals, fuels or other potentially hazardous or pollutant substances must be cleaned immediately and the cause of the spill investigated. Preventative measures must be identified and submitted to the ECO for information. Emergency response procedures to be followed and implemented. **Drainage of construction camp** 30. Surface drainage measures must be established in the Construction Camps so as to prevent ▪ Ponding of water; ▪ Erosion as a result of accelerated runoff; and,	

IMPACT	CONSTRUCTION CAMP **This section deals with construction camp and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO / ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	▪ Uncontrolled discharge of polluted runoff.	

2.3.2 Construction traffic and access

Table 9: Construction Traffic and Access

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS **This section deals with construction traffic and access and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Construction traffic** 1. All equipment moved onto site or off site during a project is subject to the legal requirements as well as Eskom specifications for the transport of such equipment. 2. The Contractor shall meet these safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place. 3. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken in the event of an accident. 4. Construction routes and required access roads must be clearly defined 5. No new access roads to be created through wetlands, watercourses and drainage lines. Existing tracks must be used. 6. Delivery of equipment must be undertaken with	

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS **This section deals with construction traffic and access and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	the minimum amount of trips to reduce the carbon footprint of these activities. 7. Access of all construction and material delivery vehicles should be strictly controlled, especially during wet weather to avoid compaction and damage to the topsoil structure. 8. Damping down of the un-surfaced roads must be implemented to reduce dust and nuisance. 9. Vehicles and equipment shall be serviced regularly to avoid the contamination of soil from oil and hydraulic fluid leaks etc. 10. Servicing must be done in dedicated service areas on site or else off site if no such area exists. 11. Oil changes must take place on a concrete platform and or over a drip tray to avoid pollution. 12. Soils compacted by construction shall be deep ripped to loosen compacted layers and re-graded to even running levels. 13. Any temporary access roads to be rehabilitated prior to contractors leaving the site. **Access** 14. The main routes on the site must be clearly signposted and printed delivery maps must be issued to all suppliers and Sub-Contractors. 15. Planning of access routes to the site for construction purposes shall be done in conjunction with the Contractor and the Landowner. All agreements reached should be documented and no verbal agreements should be made. The Contractor shall clearly mark all access roads. Roads not to be used shall be marked with a “NO ENTRY for construction vehicles" sign.	

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS **This section deals with construction traffic and access and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	Road maintenance 16. The ECO must establish and agree maintenance responsibilities with the landowner. 17. All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. 18. Where necessary suitable measures shall be taken to rehabilitate damaged areas. 19. Contractors should ensure that access roads are maintained in good condition by attending to potholes, corrugations and storm water damages as soon as these develop. 20. If necessary, staff must be employed to clean surfaced roads adjacent to construction sites where materials have spilt. **General** 21. The contractor shall meet safety requirements under all circumstances. All equipment transported shall be clearly labelled as to their potential hazards according to specifications. All the required safety labelling on the containers and trucks used shall be in place. 22. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken. 23. Care for the safety and security of community members crossing access roads should receive priority at all times. 24. It is not necessary to clear the 31m wide servitude of all vegetation. Clearance should be kept to a minimum. 'Only those woody vegetation directly under the line are allowed to be removed and an additional strip of 3 to 6 meters on both sides of	

IMPACT	CONSTRUCTION TRAFFIC AND ACCESS This section deals with construction traffic and access and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC / ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	the centre line'.	

2.3.3 Environmental Education and Training

Table 10: Environmental Education and Training

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Environmental training** 1. The project manager must appoint an ECO prior to construction. 2. Ensure that all site personnel have a basic level of environmental awareness training. The Contractor must submit a proposal for this training to the ECO for approval. Topics covered should include: ▪ What is meant by "Environment" ▪ Why the environment needs to be protected and conserved ▪ How construction activities can impact on the environment ▪ What can be done to mitigate against such impacts ▪ Awareness of emergency and spills response provisions ▪ Social responsibility during construction e.g. being considerate to local residents ▪ Specific mitigation measures stipulated	

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	CONSTRUCTION	MC, ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	in the EMPr and EA. 3. Environmental awareness training for all construction staff must be undertaken by the ELO prior to construction starting. 4. The ECO must undertake training of the contractor and other main contractors (training of other staff is the responsibility of the ELO). 5. Project manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. 6. It is the Contractor's responsibility to provide the site foreman with no less than 1 hour's environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff. 7. Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary. 8. Use should be made of environmental awareness posters on site. 9. The need for a "clean site" policy also needs to be explained to the workers. 10. Staff operating equipment (such as cranes, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks. 11. No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the Contractor and certified competent by the Project Manager. 12. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control	

IMPACT	ENVIRONMENTAL EDUCATION AND TRAINING This section deals with the environmental training of construction employees.	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC, ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	and identification of archaeological artefacts must be undertaken by the ELO. 13. Staff must be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training. **Monitoring of environmental training** 14. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed. If necessary, the ECO and / or a translator should be called to the site to further explain aspects of environmental or social behaviour that are unclear. Toolbox talks are recommended.	

2.3.4 Soils and Geology

General guidelines for management of soils are provided in **Annexure B**.

Table 11: Soils and Geology

IMPACT	SOILS AND GEOLOGY This section deals with soils and geology and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**General** 1. Minimise disturbance of natural vegetation on the sites. 2. Access routes must ideally be planned on areas less susceptible to erosion/ destabilization/	

IMPACT	SOILS AND GEOLOGY **This section deals with soils and geology and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	compaction or appropriate action must be taken to minimise impact, e.g. planning of new access routes along contour lines and minimizing of cutting and filling operations. 3. Rehabilitate soil and vegetation. 4. Implement effective erosion control measures. 5. The ECO shall ensure that all agreements reached with the Landowner are fulfilled, and that such areas be rehabilitated once construction is completed. Should any claim be instituted against Eskom, due to the actions of the Contractor at a batching plant site, Eskom shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation. Use of berms and drainage channels to direct water away from the construction areas where necessary. **Topsoil** 6. The contractor should, prior to the commencement of earthworks determine the average depth of topsoil, and agree on this with the ECO. Due to the length of the line, this will have to be undertaken in a number of locations due to the likely variability of soils along the route. 7. The full depth of topsoil should be stripped from areas affected by construction (substation site and tower positions) and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. 8. At any tower sites where conventional foundations are installed, the Contractor shall	

IMPACT	SOILS AND GEOLOGY **This section deals with soils and geology and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	remove the topsoil separately and store it for later use during rehabilitation of such tower sites. During backfilling operations, the Contractor shall take care not to dump the topsoil in the bottom of the foundation and then put spoil on top of that. **Soil Stripping** 9. No soil stripping must take place on areas within the site that the contractor does not require for construction works or areas of retained vegetation. 10. Subsoil and overburden in all construction and lay down areas should be stockpiled separately to be returned for backfilling in the correct soil horizon order. 11. Construction vehicles must only be allowed to utilize existing tracks or pre-planned access routes. 12. Preserve topsoil separate from the subsoils. **Soil Stockpiles** 13. Stockpiles should not be situated such that they obstruct natural water pathways. 14. Stockpiles should not exceed 2m in height unless otherwise permitted by the Engineer. 15. If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or geofabric, depending on the duration of the project. Stockpiles may further be protected by the construction of berms or low brick walls around their bases. 16. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. 17. Where contamination of soil is expected,	

IMPACT	SOILS AND GEOLOGY **This section deals with soils and geology and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	analysis must be done prior to disposal of soil to determine the appropriate disposal route. Proof from an approved waste disposal site where contaminated soils are dumped if and when a spillage / leakage occur should be attained and given to the project manager. **Fuel storage** 18. Topsoil and subsoil to be protected from contamination. This should be monitored on a monthly basis by a visual inspection of diesel/oil spillage and pollution prevention facilities. 19. Fuel and material storage must be away from stockpiles. 20. 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. 21. Use and or storage of materials, fuel and chemicals which could potentially leak into the ground must be controlled. 22. The Contractor (monitored by the ECO and ELO) should be responsible for ensuring that potentially harmful materials are properly stored in a dry, secure, ventilated environment, with concrete or sealed flooring and a means of preventing unauthorised entry. 23. Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility.	

IMPACT	SOILS AND GEOLOGY **This section deals with soils and geology and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	24. An oil holding dam must be installed or the existing one expanded to accommodate for the potential leakage events. **Concrete mixing** 25. The concrete batching plant must be contained within a bunded area. 26. Concrete mixing must only take place within designated areas. 27. Ready mixed concrete must be utilised where possible. 28. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Run-off from the batch plant must not be allowed to enter the storm water system. **Washing** 29. No vehicles transporting concrete to the site may be washed on site. **Earthworks** 30. Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be re-spread over landscaped areas. 31. If earthworks are required then storm water control and wind screening should be undertaken to prevent soil erosion.	

2.3.5 Erosion Control

Table 12: Erosion Control

IMPACT	EROSION CONTROL This section deals with erosion and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion, if any. 2. Other erosion control measures that can be implemented are as follows: ▪ Brush packing with cleared vegetation ▪ Mulch or chip packing ▪ Planting of vegetation ▪ Hydroseeding / hand sowing 3. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 4. All erosion control mechanisms need to be regularly maintained. 5. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 6. Retention of vegetation where possible to avoid soil erosion 7. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 8. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses. 9. No impediment to the natural water flow other than approved erosion control works is permitted. 10. To prevent stormwater damage, the increase in stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. A drainage plan	

IMPACT	EROSION CONTROL This section deals with erosion and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	must be submitted to the Engineer for approval and must include the location and design criteria of any temporary stream crossings. 11. Implement site drainage and landscaping, to prevent surface ponding, where subsequent ingress into foundations has the potential to cause destabilisation over time. 12. Convey all runoff away from the substation and off the site. 13. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion. 14. No new access roads to be construction through drainage lines and wetlands. Only existing roads must be used. **Run-off** 15. Culverts should be constructed under roadways that cross the natural flow of water in order to prevent damming. 16. Oil traps should be installed to remove the bulk of the oil from the water, which water can then be used on haul roads for dust suppression or as wash down water in the wash bays.	
SITE SPECIFIC MITIGATION MEASURES		
MITIGATION / METHOD STATEMENT	17. Interact with impacted landowners to discuss where they would ideally like to see the power lines situated on their property to have the least impact on their farming practices, the negotiation phase should form part of the final survey / line route selection. 18. Attempt to place towers on the edge of existing agricultural areas and span active agricultural fields as far as possible. Following existing roads and utilising the edge of road servitudes is highly	

IMPACT	EROSION CONTROL **This section deals with erosion and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ECO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	recommended due to the existing impacts associated with these areas. 19. Ensure adequate compensation is paid to land owners where necessary. 20. Employ a low impact routing to avoid / skirt high value agricultural land (e.g. irrigated areas) and important agricultural infrastructure. 21. Employ erosion control: Clearing activities should be kept to a minimum. In the unlikely event that heavy rains are expected, activities should be put on hold to reduce the risk of erosion. If additional earthworks are required, any steep or large embankments that are expected to be exposed during the 'rainy' months should be armoured with fascine like structures. 22. If earth works are required then storm water control and wind screening should be undertaken to prevent soil erosion.	

2.3.6 Water Use and Quality

Table 13: Water Use and Quality

IMPACT	WATER USE AND QUALITY **This section deals with water use and quality and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ECO**
MITIGATION / METHOD STATEMENT	**Water Use** 1. Develop a sustainable water supply management plan to minimize the impact to natural systems by managing water use, avoiding depletion of aquifers and minimizing impacts to water users.	Engineer

IMPACT	WATER USE AND QUALITY **This section deals with water use and quality and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ECO**
	2. No water must be abstracted from a natural water body unless authorised under a General Authorisation under the National Water Act, or unless authorised by the Department of Water Affairs through a water use licence if such a licence is required. 3. Water must be reused, recycled or treated where possible. 4. Water saving measures must be implemented. 5. Consultation with key stakeholders to understand any conflicting water use demands and the communities' dependency on water resources and conservation requirements within the area. **Water Quality** 6. Discharge to surface water should not result in contaminant concentrations in excess of DWA standards. 7. Efficient oil and grease traps or sumps should be installed and maintained at refuelling facilities, workshops, fuel storage depots, and containment areas and spill kits should be available with emergency response plans. **Stormwater** 8. The site must be managed in order to prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids and silt or chemical pollutants. 9. Silt fences should be used to prevent any soil entering the stormwater drains. 10. Temporary cut off drains and berms may be required to capture stormwater and promote infiltration. 11. Promote a water saving mind set with construction workers in order to ensure less water wastage.	

IMPACT	WATER USE AND QUALITY **This section deals with water use and quality and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ECO**
	12. New stormwater construction must be developed strictly according to specifications from engineers in order to ensure efficiency. 13. Hazardous substances must be stored at least 20m from any water bodies on site to avoid pollution. 14. The installation of the stormwater system must take place as soon as possible to attenuate stormwater from the construction phase as well as the operation phase. 15. Earth, stone and rubble is to be properly disposed of, or utilized on site so as not to obstruct natural water path ways over the site. i.e. these materials must not be placed in stormwater channels, drainage lines or rivers. 16. There should be a periodic checking of the site's drainage system to ensure that the water flow is unobstructed. 17. If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated runoff from the batch plant must not be allowed to get into the storm water system or nearby streams, rivers or erosion channels or dongas.	

2.3.7 Surface and Groundwater

Table 14: Surface and Groundwater

IMPACT	**SURFACE WATER AND GROUNDWATER** **This section deals with surface and groundwater and actions that need to be implemented during construction**	**RESPONSIBILITY**
PHASE	**CONSTRUCTION**	**ECO / Main Contractor**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction or related activities. 2. Municipal water (or another source approved by the ECO) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc. 3. Relevant departments and other emergency services should be contacted in order to deal with spillages and contamination of aquatic environments. 4. Ensure that stream flow can bypass construction site. 5. Ensure that contaminants are safely stored and away from construction site. 6. Disturbed surfaces must be kept to a minimum. All surfaces must be rehabilitated with indigenous vegetation, especially grass species, as soon as construction activities are complete. 7. Storm water management must be enforced by monitoring runoff levels. At the start of erosion, accelerated run-off must be diverted away from bare soil.	
SITE SPECIFIC MITIGATION MEASURES		

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Recommendations for vehicle and machinery degradation:** ▪ Water courses and associated buffer zones that are to be affected must be designated and impact must be limited ▪ A single access route or 'Right of Way' (RoW) is to be established where access is required into any water course and associated buffer zone ▪ Construction workers are only allowed RoW and not into any water course and associated buffer zone. The required construction areas are to be clearly demarcated and no access beyond these areas allowed. ▪ Vehicles and machinery are to be checked for oil, fuel or other fluid leaks before entering construction areas. ▪ No fuelling, re-fuelling, vehicle and machinery servicing or maintenance is to take place in the sensitive areas. ▪ No hazardous materials are to be stored or brought into the sensitive areas. Should a designated storage area be required, the storage area must be placed at the furthest location from the sensitive areas (at least 100m away). **Recommendations for human degradation of wetland and riparian habitat flora and fauna:** ▪ Human physical degradation of sensitive areas to be minimized ▪ No animals on site are to be hunted,	

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	captured, trapped, removed, killed or eaten ▪ No long drop toilets are allowed. Suitable temporary chemical sanitation facilities are to be provided. Temporary chemical sanitation facilities must be placed at least 100 meters from any water course where required. ▪ No water to be extracted unless a water use license or general authorization is granted for specific quantities ▪ A plant removal permit will be required where any other Red or Orange Data List vegetation species are identifies **Recommendations for degradation and removal of wetland soils and vegetation:** ▪ Relevant water use license and environmental authorization is to be obtained before any construction or removal of soils and vegetation in the wetlands and riparian habitats ▪ Where foundations for the proposed power line structures are to be placed in the wetlands, a 30cm topsoil layer is to be stripped and stockpiled for the post-construction rehabilitation process. ▪ All excavated topsoils should be stockpiled separately from subsoils so that it can be placed back in the correct order for rehabilitation purposes. ▪ Where the soils are excavated from the sensitive areas, it is preferable for them to	

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	be stockpiled adjacent to the excavation pit to limit vehicle and any other movement activities around the excavation areas. These soil stockpiles should be protected from wind and water erosion. ▪ Cement mixing is to take place over a bin lined surface or alternatively in the load bin of a vehicle to prevent the mixing of cement with the ground of the wetland. Preferably however, this should be done outside of the wetland and transported in. ▪ When stringing of the proposed power lines takes place through the wetland, it is to be undertaken by hand. Vehicles must not be used for this exercise in order to limit compaction impacts to the soils of the wetland and riparian habitats. ▪ The affected RoW areas in the wetlands must be re-instated with the wetland soil that was initially excavated. Additionally, the affected areas must be levelled, or appropriately sloped and scarified to loosen the soil and allow seeds contained in the natural seed bank to re-establish. ▪ Vegetation clearing should take place in a phased manner, only clearing the areas that will need to be constructed on immediately. ▪ Adequate structures must be in place (temporary or permanent where necessary) to deal with run-off and sediment volumes. The use of silt fencing	

IMPACT	SURFACE WATER AND GROUNDWATER This section deals with surface and groundwater and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ECO / Main Contractor
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	and potentially sandbags or hessian "sausage" nets can be used to prevent erosion in susceptible construction areas. All impacted areas must be adequately sloped to prevent the onset of erosion. **Recommendations for power line collision and electrocution (avi fauna):** ▪ It is critical that the stretches of power lines that are within any of the wetlands, riparian habitats or associated buffer zones are fitted with flight deviators or bird anti-collision devices (whichever is more appropriate) to prevent impacts to avi-fauna. The fitment of the devices or deviators must take place on the ground before stringing the power lines takes place. Sufficient insulation must also be fitted to the towers structures in the wetlands, watercourses or associated buffer zones to prevent electrocution.	

2.3.8 Waste Management

Table 15: Waste Management

IMPACT	WASTE MANAGEMENT **This section deals with waste management and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Litter management** 1. The contractor should take steps to ensure that littering by construction workers does not occur. 2. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. 3. The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at registered/licensed landfill. 4. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. 5. If possible and feasible, all waste generated on site must be separated into glass, plastic, paper, metal and wood and recycled. An independent contractor can be appointed to conduct this recycling. 6. In general, any litter must be cleared immediately. 7. Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. 8. Skip waste containers should be maintained on site. These should be kept covered and arrangements made for them to be collected regularly. 9. All waste must be removed from the site and transported to a landfill site promptly to ensure	

IMPACT	WASTE MANAGEMENT **This section deals with waste management and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	that it does not attract vermin or produce odours. 10. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management. 11. A certificate of disposal shall be obtained by the Contractor and kept on file, if relevant. 12. Under no circumstances may solid waste be burnt on site. 13. All waste must be removed promptly to ensure that it does not attract vermin or produce odours. 14. It is important that the contractors (and sub-contractors by implication) and workers must be informed of the facilities and procedures available for the disposal of waste. **Hazardous waste** 15. Any hazardous substances must be stored at least 20m from any of the water bodies on site. 16. All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site, where practical. Incineration may be used where relevant. 17. Contaminants must be stored safely to avoid spillage. 18. Machinery must be properly maintained to keep oil leaks in check. 19. All necessary precaution measures shall be taken to prevent soil or surface water pollution from hazardous materials used during construction and any spills shall immediately	

IMPACT	WASTE MANAGEMENT **This section deals with waste management and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	be cleaned up and all affected areas rehabilitated. **Sanitation** 20. Adequate sanitary facilities and ablutions must be provided for construction workers (1 toilet per every 15 workers). 21. Staff shall be sensitised to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed. 22. Ablution facilities shall be within 50m from workplaces and not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce (minimum requirement 1: 15 workers). Male and females must be accommodated separately where possible. 23. Toilets must be serviced regularly and the ECO must inspect toilets regularly. 24. Under no circumstances may open areas, neighbours fences or the surrounding bush be used as a toilet facility. 25. The construction of “Long Drop” toilets is forbidden. Toilets connected to the sewage treatment plant or chemical toilets are preferable. 26. Potable water must be provided for all construction staff. **Remedial actions** 27. Depending on the nature and extent of the spill, contaminated soil must be either excavated or	

IMPACT	WASTE MANAGEMENT **This section deals with waste management and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	treated on-site. 28. Excavation of contaminated soil must involve careful removal of soil using appropriate tools/machinery to storage containers until treated or disposed of at a licensed hazardous landfill site. 29. The ECO must determine the precise method of treatment for polluted soil. This could involve the application of soil absorbent materials as well as oil-digestive powders to the contaminated soil. 30. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent material. 31. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure. 32. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use. 33. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriate disposal.	

2.3.9 Biodiversity

Table 16: Biodiversity

IMPACT	**BIODIVERSITY (incl Avifauna)** **This section deals with flora and fauna actions that need to be implemented during construction**	**RESPONSIBILITY**
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Existing vegetation** 1. Vegetation removal must be limited to the construction corridor. 2. Vegetation clearing on tower sites must be kept to a minimum. 3. Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. 4. Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower. 5. Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. Dense vegetation under the line which could cause a fire hazard, particularly in the middle third of the span in the vicinity of the lowest point of the conductors, will be considered as a separate case. 6. Upon completion of the stringing operations and before handover, the servitude must be inspected and all vegetation interfering with the safe operation of the line shall be removed / cut down. 7. Vegetation to be removed as it becomes necessary rather than removal of all	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	vegetation throughout the site in one step. 8. Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected. 9. Tall trees within the servitude must be pruned/ trimmed. **Fauna occurring in the study area** 10. Use of appropriate construction techniques is critical. 11. Rehabilitation to be undertaken as soon as possible after construction has been completed. 12. No trapping or snaring to fauna on the construction site is allowed. 13. No faunal species must be harmed by maintenance staff during any routine maintenance at the development. 14. Pits and excavations must be regularly checked for animals that may have fallen in. 15. Excavations must be adequately cordoned off where practical to prevent animals from falling in should such excavations be left opened for a period of time. 16. Animals occurring on site must be left alone. The ECO must be consulted and before removing any animals obstructing construction activities. The ECO will provide assistance in their removal. **Demarcation of construction and laydown areas** 17. All plants not interfering with the construction shall be left undisturbed clearly marked and	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	ELO
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	indicated on the site plan. 18. The construction area must be well demarcated and no construction activities must be allowed outside of this demarcated footprint. 19. Vegetation removal must be phased in order to reduce impact of construction. 20. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 21. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. **Utilisation of resources** 22. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO. **Exotic vegetation** 23. All exotic vegetation must be removed from the site (if present). 24. Alien vegetation on the site will need to be controlled. 25. The contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion. 26. The spread of exotic species occurring	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	throughout the site should be controlled. Emergence of alien invasive species must be avoided. **Vegetation removal** 27. Larger established trees should be allowed to remain *in situ*. 28. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used. 29. The use of pesticides and herbicides on the site must be discouraged as these impact on important pollinator species of indigenous vegetation.	
SITE SPECIFIC MITIGATION		
MITIGATION / METHOD STATEMENT	**Loss of habitat for red data / general species** 30. Existing servitudes and roadways should be utilised as far as possible, thereby limiting the impact of establishing new service roads. 31. It is recommended that a conservation buffer zone be applied to all the surrounding suitable wetland habitat units. 32. Existing indigenous vegetation within the servitude of the power line must be retained where possible. 33. Movement of personnel and machinery to be limited to the areas designated for the established access roadways. 34. Indiscriminate damage of vegetation to be	

IMPACT	BIODIVERSITY (incl Avifauna) This section deals with flora and fauna actions that need to be implemented during construction	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	avoided. 35. No vegetation to be used for firewood. 36. Dumping or storage of topsoil must not be done on established vegetation, but should remain within designated areas 37. Workers and machinery to remain inside construction footprint. All labourers to be informed of disciplinary actions for the willful damage to plants. 38. Important habitat to avifaunal conservation within the area (i.e. wetland habitat) should be avoided. 39. Migratory routes have been identified along various routes. Sections of the lines that pass through these routes should be marked and the towers should be fitted with perching aversions fixtures. Routine surveys should be undertaken once construction is complete to identify any further avifaunal collision or electrocution hotspot areas. 40. A walk through survey is recommended and will assist in the identification of nesting activity within the area of various RDL species. 41. Refuse and wastes must be managed appropriately to avoid opportunism and potential dependency from various faunal species. 42. Avoid habitats units known to support high diversity of faunal species (rocky outcroppings, wetland and riparian areas) 43. Limit the construction and impact footprint	

2.3.10 Air Quality

Table 17: Air Quality

IMPACT	**AIR QUALITY** This table deals with mitigation measures to prevent air pollution	**RESPONSIBILITY**
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Dust control** 1. Wheel washing and damping down of un-surfaced and un-vegetated areas must occur in areas close to potential receptors of dust pollution. The ECO and ELO must identify these areas prior to construction starting in that particular area or prior to construction traffic needing to move along un-surfaced roads in certain areas. 2. Vegetation must be retained where possible in order to reduce dust travel. 3. Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to sensitive receptors such as landowners and neighbouring communities. 5. Dust generation must be kept to a minimum and suppressed on access roads and construction areas during dry periods. This can be accomplished by the regular application of water or a biodegradable soil stabilisation agent. 6. Speed limits on un-surfaced roads must not be exceeded. 7. Speed limits for construction vehicles must be clearly signposted and must be monitored by the ELO and ECO. 8. Any complaints or claims emanating from the	

IMPACT	AIR QUALITY This table deals with mitigation measures to prevent air pollution	RESPONSIBILITY
	lack of dust control shall be attended to immediately by the ELO under the supervision of the ECO.	

2.3.11 Noise and Vibrations

Table 18: Noise and Vibrations

IMPACT	NOISE **This section deals with noise and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. The construction phase must aim to adhere to the relevant noise regulations and limit noise to within standard working hours in order to reduce disturbance of dwellings in close proximity to the development. 2. Truck traffic should be routed away from noise sensitive areas, where possible. 3. Noise levels must be kept within acceptable limits as recommended by SANS 10103:2003. 4. Noisy operations should be combined so that they occur where possible at the same time. 5. Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas must not be allowed. 6. Construction workers to wear necessary ear protection gear. 7. Noisy activities should take place during normal working hours (06h00 to 22h00) Monday to Saturday. 8. Noise from labourers must be controlled. 9. Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order	

IMPACT	NOISE **This section deals with noise and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site. 10. The contractor must take measures to discourage labourers from loitering in the area and causing noise disturbance. Where possible labour shall be transported to and from the site by the contractor or his Sub-Contractors by the contractors own transport. 11. Apply regular and thorough maintenance schedules to equipment and processes. An increase in noise emission levels very often is a sign of the imminent mechanical failure of a machine. 12. Should blasting be required, the contractor will need to obtain a blasting permit. Moreover, the contractor must make the public aware of when blasting is to take place as well as the specific times of blasting. Blasting activities must take place at reasonable times and during daily working hours.	

2.3.12 Energy use

Table 19: Energy use

IMPACT	ENERGY USE **This section deals with energy use and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Energy saving lighting must be implemented across the board. 2. Minimal lighting, while maintaining health and safety regulations, must be kept on during the night operations. 3. Equipment not in use must be switched off and unplugged to save on unnecessary energy costs and carbon footprint.	

2.3.13 Employment

Table 20: Employment

IMPACT	EMPLOYMENT **This section deals with employment and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Labour** 1. The use of labour intensive construction measures should be used where appropriate. 2. Labour must be trained to benefit individuals beyond completion of the project. **Recruitment Plan** 3. All unskilled labourers should be drawn from	

IMPACT	EMPLOYMENT **This section deals with employment and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	the local market i.e. and where possible use should be made of local semi-skilled and skilled personnel. 4. Local suppliers to be used where possible. 5. Ensure adequate advertising in the project community areas, local papers for skilled labour. Adverts will be placed in each area where the public meetings were conducted. 6. Local community leaders as well as the Local Municipalities must be utilised to source labour. 7. The recruitment process must be equitable and transparent. A concerted effort will be made to guard against nepotism and/or any form of favouritism during the process. 8. The informal daily recruitment of workers at the construction camp must be avoided in order to prevent the congregation and loitering of job seekers at the construction camp. 9. The recruitment of skilled labour will follow standard advertising process in national newspapers and interview based selection. 10. Record of official complaints by employees to authorities must be kept i.e. Labour and Social Security (**Annexure A** for complaints record sheet).	
SITE SPECIFIC MITIGATION		
	11. A positive impact on production can be increased by prioritising the domestic (preferably local) production of goods and services. 12. A positive impact on employment can be increased through the use of labour	

IMPACT	EMPLOYMENT **This section deals with employment and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	intensive methods and by placing emphasis on local job creation.	

2.3.14 Occupational Health and Safety

Table 21: Occupational Health and Safety

IMPACT	HEALTH AND SAFETY **This section deals with health and safety and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ SAFETY OFFICER**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Worker safety** 1. Safety measures for work procedures must be implemented. 2. First aid kits must be available and accessible on site. 3. A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up by the Contractor and approved by the ECO to ensure worker safety. 4. Workers should be thoroughly trained in using potentially dangerous equipment. 5. Contractors must ensure that all equipment is maintained in a safe operating condition. 6. A safety officer must be appointed. 7. A record of health and safety incidents must be kept on site. 8. Any health and safety incidents must be reported to the Project Manager	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	immediately. 9. First aid facilities must be available on site at all times and a number of employees trained to carry out first aid procedures. 10. Workers have the right to refuse work in unsafe conditions. 11. The Contractor must take all the necessary precautions against the spreading of disease such as measles, foot and mouth, etc. especially under livestock. 12. A record must be kept of drugs administered to construction staff or precautions taken and the time and dates when this was done. This can then be used as evidence in court should any claims be instituted against Eskom or the Contractor. 13. The contractor must ensure that all construction workers are well educated about HIV/ AIDS and the risks surrounding this disease. The location of the local clinic where more information and counselling is offered must be indicated to workers. 14. Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers / local residents. **Worker facilities** 15. Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness. 16. Fires are not to be allowed outside controlled areas.	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	17. Ablution facilities must be well maintained. **Hazardous substances** 18. Working areas should be provided with adequate ventilation and dust/fume extraction systems to ensure that inhalation exposure levels for potentially corrosive, oxidizing, reactive or siliceous substances are maintained and managed at safe levels. 19. Eye wash and emergency shower systems should be provided in areas where there exists the possibility of chemical containment of workers and the need for rapid treatment. **Electrical Safety and isolation** 20. Use of electrical safety devices on all final distribution circuits and appropriate testing schedules applied to such safety systems. 21. All sources of hazardous energy or hazardous substances should have written procedures for isolation, identifying how the system, plant or equipment can be made and kept safe. **Physical Hazards** 22. Geotechnical safety - All structures must be planned, designed and operated such that the geotechnical risks are appropriately managed. **Machine and Equipment** 23. Use must be made of contrast colouring on	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	equipment/machinery including the provision of reflective markings to enhance visibility. 24. Use must be made of moving equipment/machinery equipped with improved operator sight lines. 25. Workers must be issued with high visibility clothing. 26. Use must be made of reflective markings on structures, traffic junctions, and other areas with a potential for accidents. 27. Safety barriers must be installed in high risk locations. **Fitness for work** 28. Shift management systems must minimize risk of fatigue. Establish alcohol and other drug policy for the operation. **Travel and remote site health** 29. Develop programs to prevent both chronic and acute illnesses through appropriate sanitation and vector control systems. 30. Food preparation areas should be provided with adequate washing facilities. 31. Where food is prepared, food preparation storage and disposal should be reviewed regularly and monitored to minimise risk of illness. **Protective gear** 32. Personal Protective Equipment (PPE) must be made available to all construction staff and must be compulsory. Hard hats and	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	safety shoes must be worn at all times and other PPE worn were necessary i.e. dust masks, ear plugs etc. 33. No person is to enter the site without the necessary PPE. **Site safety** 34. The construction camp must remain fenced for the entire construction period. 35. Potentially hazardous areas are to be demarcated and clearly marked. 36. Adequate warning signs of hazardous working areas must be in place. 37. Emergency numbers for local police and fire department etc must be placed in a prominent area. 38. Fire fighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank. 39. Suitable conspicuous warning signs in English and all other applicable languages must be placed at all entrances to the site. 40. All speed limits must be adhered to. **Construction equipment safety** 41. All equipment used for construction must be in good working order with up to date maintenance records. **Hazardous Material Storage** 42. Staff that will be handling hazardous	

IMPACT	HEALTH AND SAFETY **This section deals with health and safety and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ SAFETY OFFICER**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	materials must be trained to do so. 43. Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. 44. All 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. These areas should be roofed to avoid contamination of stormwater. 45. Material Safety Data Sheets (MSDS) which contain the necessary information pertaining to a specific hazardous substance must be present for all hazardous materials stored on the site. **Procedure in the event of a petrochemical spill** 46. A spill kit needs to be kept on site to address any unforeseen spillages. 47. The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, Contractor or ECO. 48. The problem must be assessed and the necessary actions required will be undertaken. 49. The immediate response must be to contain the spill. 50. The source of the spill must be identified, controlled, treated or removed wherever possible.	

IMPACT	HEALTH AND SAFETY This section deals with health and safety and actions that need to be implemented during construction	RESPONSIBILITY
PHASE	CONSTRUCTION	MC/ SAFETY OFFICER
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	Fire management 51. Fire fighting equipment should be present on site at all times. 52. All construction staff must be trained in fire hazard control and fire fighting techniques. 53. All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. 54. No open fires will be allowed on site. 55. Smoking may only be conducted in demarcated areas. 56. Contact should be made with the local Fire Protection Agency (FPA) if one exists. **Safety of surrounding residents** 57. All I&AP's should be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are: ▪ Earthworks / earthmoving machinery on steep slopes above houses / infrastructure; ▪ Risk to residence along haulage roads / access routes. **Emergency evacuation plan** 58. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	

IMPACT	HEALTH AND SAFETY **This section deals with health and safety and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC/ SAFETY OFFICER**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	59. All permanent staff must undergo safety training. **Maintenance** 60. The corridor and surrounding areas are to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept.	

2.3.15 Security

Table 22: Security

IMPACT	SECURITY **This section deals with security and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC /SAFETY OFFICER**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. A security company should be employed to guard the construction site and monitor access. This company should also be utilised for the operation phase. 2. Labour should be transported to and from the site to discourage loitering in adjacent areas and possible increase in crime or disturbance. 3. Unsocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling and prostitution on site shall be prohibited. Any persons found to be	

IMPACT	SECURITY **This section deals with security and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC /SAFETY OFFICER**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	engaged in such activities should receive disciplinary or criminal action taken against them. 4. Only pre-approved staff must be permitted to stay within the staff accommodation which will be provided. 5. The site shall be fenced, where necessary to prevent any loss or injury to persons during the construction phase. 6. During periods of temporary site closure, the site should be secured to ensure no access to the site. This applies to the construction camp as well. 7. No alcohol / drugs to be present on site. 8. No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel). 9. No harvesting of firewood from the site or from the business property adjacent to it without prior consent from the ECO. 10. Construction staff are to make use of the facilities provided for them, as opposed to ad-hoc alternatives (e.g. fires for cooking, the use of surrounding bush as a toilet facility are forbidden). 11. Trespassing on private / commercial properties adjoining the site is forbidden. 12. All employees must undergo the necessary safety training and wear the necessary protective clothing. 13. The ELO must timeously inform affected landowners where construction is to occur of the onset of the construction process.	

IMPACT	SECURITY **This section deals with security and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC /SAFETY OFFICER**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	14. Driving under the influence of alcohol is prohibited. 15. The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site.	

2.3.16 Social Environment

Table 23: Social Environment

IMPACT	SOCIAL ENVIRONMENT **This section deals with social environment and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. All contact with the affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. 2. The successful completion of the project depends a lot on the good relations with the landowners. The Contractor's Environmental Liaison Officer will thus be the liaison officer for the entire contract. 3. The ELO shall be available to investigate all problems arising on the work sites concerning the landowners. 4. All negotiations (if required) for any reason shall be conducted between the ECO the landowners and the Contractor (ELO) with the ECO present.	

IMPACT	SOCIAL ENVIRONMENT **This section deals with social environment and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	5. No verbal agreements shall be made. All agreements shall be recorded properly and all parties shall co-sign the documentation. 6. The landowners shall always be kept informed by the ELO about any changes to the construction programme should they be affected. 7. The contact numbers of the ELO and the Eskom ECO shall be made available to the landowners. This will ensure open channels of communication and prompt response to queries and claims. 8. A complaints register should be kept on site (A complaints record sheet is provided in annexure A). Details of complaints should be incorporated into the audits as part of the monitoring process. This should be in carbon copy format, with numbered pages. Any missing pages must be accounted for by the Contractor. 9. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site. 10. All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect. 11. Care must be taken not to damage irrigation equipment, lines, channels and crops, as	

IMPACT	SOCIAL ENVIRONMENT **This section deals with social environment and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**MC / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	this could lead to major claims being instituted against Eskom and the Contractor. 12. A policy on Contractor Health and Safety for the duration of the construction work on site, must apply, and be monitored. 13. A proper security strategy must be in place for site specific crimes.	

2.3.17 Community Engagement

Table 24: Community Engagement

IMPACT	COMMUNITY ENGAGEMENT **This section deals with surrounding community and actions that need to be implemented during construction**	RESPONSIBILITY
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION	1. A communication guideline to be drafted and agreed upon with authority representatives and affected communities. 2. Open and transparent community engagement to be followed as culturally appropriate. 3. Records (written) to be kept of all community engagements (e.g. complaints, resolutions, etc)	

2.3.18 Visual Impact

Table 25: Visual Impact

IMPACT	**VISUAL** **This section deals with visual issues and actions that need to be implemented during construction**	**RESPONSIBILITY**
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**General** 1. Construction activities must not occur at night and lighting should only be erected where absolutely necessary. 2. Construction camps and equipment storage facilities are to be shielded with shade netting. 3. Construction traffic must not deviate from designated routes or access roads. 4. Construction areas are to be kept clean and tidy. 5. Measures must be taken to suppress dust arising from construction activities. 6. Labour being transported to the site must take cognisance of litter and waste concerns. 7. Equipment being transported to the site must be covered with tarpaulins. 8. Topsoil stockpiles must be well managed and seeded when possible if not utilised within three months. 9. It is recommended that equipment be stored discreetly so as not to increase visual impacts. 10. Construction must be conducted in the shortest possible time in order to reduce visual impacts. 11. Align the power line as far away from sensitive receptors locations 12. Align the power line to run parallel to existing power lines of equal or greater magnitude	

	13. Avoid crossing areas of higher elevation especially ridges, koppies or hills 14. Avoid areas of natural wooded vegetation where possible	
SITE SPECIFIC MITIGATION		**MC**
MITIGATION / METHOD STATEMENT	15. Carefully plan to reduce the construction period. 16. Locate construction camp and storage areas in zones of low visibility i.e. behind tall trees or in lower lying areas. 17. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 18. Maintain a neat construction site by removing rubble and waste materials regularly. 19. Make use of existing gravel access roads where possible. 20. Align the power line as far away from sensitive receptor locations as possible. 21. Align the power line to run parallel to existing power lines and/or infrastructure. 22. Avoid crossing areas of higher elevation, especially ridges, koppies or hills. 23. Avoid areas of natural wooded vegetation where possible. 24. Locate the substation as far away from sensitive receptor locations as possible.	

2.3.19 Heritage and Cultural Resources

Table 26: Heritage and Cultural Resources

IMPACT	**HERITAGE AND CULTURAL RESOURCES** **This section deals with heritage and cultural issues as well as actions that need to be implemented during construction**	**RESPONSIBILITY**
PHASE	**CONSTRUCTION**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		

MITIGATION / METHOD STATEMENT	1. A responsible archaeologist must be appointed to inspect the operational areas of the site in order to identify any significant material being unearthed, and to make the correct judgment on actions to be taken. 2. A permit in terms of section 34 of the National Heritage Resources Act 1999 (Act 25 of 1999) must be obtained, if any archaeological resources, such as built structures older than 60 years, sites of cultural significance associated with oral histories, burial grounds or graves and cultural landscapes, are discovered during the construction phase of the project and which will be damaged, destroyed, altered, or disturbed as a result of the project. 3. A destruction permit will be required under the Section 34 of the NHRA (if applicable). 4. An archaeologist must immediately be appointed should any artefacts be unearthed during construction. 5. Should substantial fossils be uncovered they should be left *in situ,* safeguarded by the Environmental Control Officer and reported to SAHRA and a professional palaeontologist. 6. A poster reminding workers of the possibility of finding archaeological sites, should be kept on site. 7. An archaeological monitoring and feedback strategy must be developed to ensure effective monitoring of the site and to provide feedback reports to the client and SAHRA.	
SITE SPECIFIC MITIGATION		
	8. Two burial sites are located within the study corridors. It is possible that further sites might be found in the corridors that have not been identified by the initial study. A walk-down of the final alignment and pylon placement is recommended.	

	9. Cemeteries, farmsteads, Iron age and stone age sites should be avoided as far as possible. Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed. 10. Conserve burial sites. The choice of 4B will avoid the large cemetery site. Specific placement of pylons and marking of burial site to avoid damage.	

2.4 Operation Phase

2.4.1 Construction Site Decommissioning

Table 27: Construction Site Decommissioning

IMPACT	CONSTRUCTION SITE DECOMMISSIONING This section deals with the demolishing of the construction camp and the actions that need to be implemented	RESPONSIBILITY
PHASE	**OPERATION**	**Main contractor / Developer / ECO / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Removal of equipment** 1. All structures comprising the construction camp are to be removed from site. 2. The area that previously housed the construction camp is to be checked for spills of substances such as oil etc, and these shall be remediated. 3. All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and regressed using the guidelines set out in the re-vegetation that forms part of this document. **Temporary services** 4. The Contractor must arrange the cancellation of all temporary services. 5. A copy of all weigh-bridge certificates from waste disposed are to be presented to the ECO. 6. Temporary roads must be closed and access across these, blocked. 7. All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. **Associated infrastructure**	

IMPACT	CONSTRUCTION SITE DECOMMISSIONING This section deals with the demolishing of the construction camp and the actions that need to be implemented	RESPONSIBILITY
PHASE	**OPERATION**	**Main contractor / Developer / ECO / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	8. Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the Engineer. 9. All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. 10. All rubble is to be removed from the site to an approved disposal site as approved by the Engineer. Burying of rubble on site is prohibited. 11. The site is to be cleared of all litter. 12. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 13. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. 14. All residual stockpiles must be removed to spoil or spread on site as directed by the Engineer. 15. All leftover building materials must be returned to the depot or removed from the site. 16. The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management.	

IMPACT	CONSTRUCTION SITE DECOMMISSIONING **This section deals with the demolishing of the construction camp and the actions that need to be implemented**	RESPONSIBILITY
PHASE	**OPERATION**	**Main contractor / Developer / ECO / ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	Rehabilitation plan 17. Rehabilitate and re-vegetate cleared areas with indigenous plant species.	

2.4.2 Rehabilitation and Maintenance

Table 28: Rehabilitation and Maintenance

IMPACT	REHABILITATION **This section deals with the issues relating to rehabilitation after construction**	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Rehabilitation** 1. All damaged areas shall be rehabilitated upon completion of the contract 2. A mixture of vegetation seed can be used provided the mixture is carefully selected to ensure the following: ▪ Annual and perennial species are chosen. ▪ Pioneer species are included. ▪ All the species shall not be edible. ▪ Species chosen will grow in the area under natural conditions. ▪ Root systems must have a binding effect on the soil. ▪ The final product should not cause an ecological imbalance in the area. 3. To get the best results in a specific area, it	

IMPACT	REHABILITATION This section deals with the issues relating to rehabilitation after construction	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	is advisable to consult with a vegetation specialist. Seed distributors can also give valuable advice as to the mixtures and amount of seed necessary to seed a certain area. 4. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 5. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses typical of the representative botanical unit. 6. Rehabilitation must take place in a phased approach as soon as possible. 7. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 8. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 9. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. **Maintenance** 10. The servitude needs to be monitored on a monthly basis for the first year to identify the emergence of alien species and any erosion concerns.	

2.4.3 Operation and Maintenance

Table 29: Operation and Maintenance

IMPACT	**OPERATION AND MAINTENANCE** **This section deals with the potential impacts that could result from the operation and maintenance of the line and substation.**	**RESPONSIBILITY**
PHASE	**OPERATION**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Maintenance** 1. All applicable standards, legislation, policies and procedures must be adhered to during operation. 2. Regular ground inspection of the servitude must take place to monitor their status. 3. Landowner conditions for accessing the servitude must be adhered to, and all gates must be kept open / closed subject to landowner requirements. 4. Only authorised Eskom personnel must access the servitude and properties that are required to be traversed in order to access the servitude 5. No new roads to be constructed through wetlands and drainage lines. **Public awareness** 6. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.	

2.4.4 Air Quality

Table 30: Air Quality

IMPACT	AIR POLLUTION **This section deals with the issues relating to air pollution during operation**	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Dust management** 1. Any dirt roads utilised to access the sites must be regularly maintained to ensure that dust levels are controlled. **Litter management** 2. Remove unwanted materials and litter on a regular basis to avoid potential odours.	

2.4.5 Biodiversity

Table 31: Biodiversity

IMPACT	BIODIVERSITY (FAUNA AND FLORA) **This section details with the issues relating to biodiversity during operation**	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Vegetation** 1. Indigenous vegetation must be maintained and all exotics removed as they appear and disposed of appropriately. 2. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 3. Vegetative re-establishment shall, as far as possible, make use of indigenous or locally occurring plant varieties within the	

IMPACT	BIODIVERSITY (FAUNA AND FLORA) This section details with the issues relating to biodiversity during operation	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	servitude. 4. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas during and following rehabilitation. 5. No streams, wetlands or riparian areas outside of agreed access routes must be traversed as part of operational work unless emergency access to the servitude in the areas is required. 6. Herbicides to clear emergent bushy vegetation under the lines must not be used; instead vegetation control must be through mechanical means. No herbicides must be used within 150m of any surface water feature. **Other fauna** 7. No faunal species must harmed by maintenance staff during any routine maintenance at the development.	
SITE SPECIFIC MITIGATION		
MITIGATION / METHOD STATEMENT	**Birds Collisions and Electrocutions** 11. Maintenance crews to monitor for bird collisions and to mitigate for this impact within areas identified as hotspot collision areas not previously identified during the pre-construction and construction phase. 12. Routine surveys should be undertaken once construction has been completed in order to identify any further collision hotspot areas. The sections of line within these areas should also be marked. The walk-through survey will also enable the identification of nesting activity within the	

IMPACT	BIODIVERSITY (FAUNA AND FLORA) This section details with the issues relating to biodiversity during operation	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
	area of various RDL species.	

2.4.6 Surface Water

IMPACT	SURFACE WATER This section deals with the issues relating to surface water during operation	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Site Access** 1. It is crucial that existing roads are used so that damage is limited. Where new service roads are required in the watercourses and the necessary environmental authorisations and water use licences are obtained, these roads must be limited in extent (i.e. go directly to the desired tower) and will need to be maintained for erosion. **Erosion control** 2. Where erosion begins to take place, this must be dealt with immediately to prevent severe erosion damage to the wetlands. Should severe erosion occur, a rehabilitation plan will be required and Input from a suitably qualified wetland or aquatic specialist must be obtained.	

2.4.7 Health and Safety

Table 32: Health and Safety

IMPACT	HEALTH AND SAFETY This section deals with the issues relating to health and safety during operation	RESPONSIBILITY
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	**Emergency evacuation plan** 1. Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency. **Maintenance** 2. The servitude is to be regularly maintained. A maintenance schedule must be drawn up and records of all maintenance kept. **Fire safety** 3. Firefighting equipment in the form of fire hydrants or fire extinguishers must be available on the substation site. These must be regularly maintained by an appropriate company. **Storage and handling of hazardous waste** 4. A spill kit needs to be kept on site to address any unforeseen spillages. 5. Transport of all hazardous substances must be in accordance with the relevant legislation.	

2.4.8 Visual Impact

Table 33: Visual Impact

IMPACT	**VISUAL IMPACT** **This section deals with the issues relating to visual impacts during operation**	**RESPONSIBILITY**
PHASE	**OPERATION**	**Developer**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	***Maintenance and lighting*** 1. High standards of maintenance and management of the landscaping should be carried out in accordance with the best possible practice to ensure that the landscaping ensures that the power line blends in with the current visual environment, by enhancing natural features such as trees and vegetation as much as possible. 2. The servitude and surrounds must be kept clean, tidy and well maintained to reduce negative visual impacts. 3. Rehabilitation of surrounding areas must take place with indigenous species. 4. Surrounding roads must be well maintained. 5. Regular maintenance of the associated infrastructure must be undertaken.	

2.5 Decommissioning phase

Mitigation measures implemented during construction with regards to the construction camp and equipment will remain the same for the decommissioning phase when a construction camp will need to be established again.

2.5.1 On-going Stakeholder involvement

This is the process that is recommended if the substations sites are decommissioned.

Table 34: On-going Stakeholder involvement

IMPACT	**ONGOING STAKEHOLDER INVOLVEMENT** **This section relates to the stakeholder involvement that needs occur during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Community to be notified, as culturally appropriate, timeously of the planned decommissioning, e.g.: • Proposed decommissioning start date; and • Process to be followed. 2. Recommend that a meeting with community leader(s) be held before decommissioning commence to inform them: • What activities will take place during the decommissioning phase. • How these activities will impact upon the communities and/or their properties. • Regarding the timeframes of scheduled activities 3. Regular interaction between Eskom and community leader(s) during the decommissioning phase 4. A reporting office / channel to be established should community members experience	

	problems with contractors / sub-contractors during the decommissioning phase. 5. A register to be kept of problems reported by community members and the steps taken to address / resolve it.	

2.5.2 Community health and safety

Table 35: Community health and safety

IMPACT	**COMMUNITY HEALTH AND SAFETY** **This section deals with the issues relating to health and safety during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Demarcated routes to be established to ensure the safety of communities, especially in terms of road safety and communities to be informed of these demarcated routes. 2. Where dust is generated by trucks passing on gravel roads, dust mitigation to be enforced. 3. Excavated areas to be fenced off and regularly inspected to ensure that humans and animals do not have access to the site. 4. Any infrastructure that would not be decommissioned, must be appropriately locked and/or fenced off to ensure that it does not pose any danger to the community.	

2.5.3 Waste Management

Table 36: Waste Management

IMPACT	WASTE MANAGEMENT This section deals with the issues relating to waste management during decommissioning	RESPONSIBILITY
PHASE	**DECOMMISSIONING**	**ELO**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. All contaminated soils to be removed from the property and to be disposed of as hazardous waste.	

2.5.4 Surface and Groundwater

Table 37: Surface and Groundwater

IMPACT	SURFACE AND GROUNDWATER This section deals with the issues relating to surface and groundwater during decommissioning	RESPONSIBILITY
PHASE	**DECOMMISSIONING**	**ESKOM**
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Remove of any historically contaminated soil as hazardous waste. 2. Removal of all substances which can result in groundwater (or surface water) contamination. 3. Re-vegetation of exposed soil surfaces to ensure no erosion in these areas. 4. No new access roads through wetlands and rivers. 5. A site-specific post-construction wetland rehabilitation plan compiled by a suitably qualified wetland specialist will be required to rehabilitate and monitor the affected wetlands where construction impacts have been caused.	

2.5.5 Biodiversity

Table 38: Biodiversity

IMPACT	BIODIVERSITY **This section deals with the issues relating to biodiversity during decommissioning**	RESPONSIBILITY
PHASE	**DECOMMISSIONING**	
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Rehabilitation of exposed surfaces with indigenous species, preferably large trees. 2. Adherence to surface and groundwater mitigation measures to prevent secondary impacts on biodiversity. 3. Prevent expansion of the current footprint(s). 4. Retain large trees to keep nesting and roosting habitat.	
SITE SPECIFIC MITIGATION		
	Loss of habitat for red data / general species 5. Maintain footprint strictly during decommissioning. 6. Existing access roads must be used. 7. All infrastructure must be removed from the site. 8. A rehabilitation plan must be compiled by a qualified ecologist. 9. Re-vegetation of affected areas must be made a priority to avoid erosion. 10. Suitable storm water / wind controls must be put in place until rehabilitation is complete. 11. Constant removal of alien invasive species in and around plant. **Weed Control** 12. The contractor should be responsible for implementing a programme of weed control 13. The spread of exotic species occurring throughout the site should be controlled. 14. All exotic vegetation must be removed from	

	the site (if present).	

2.5.6 Air Quality

Table 39: Air Pollution

IMPACT	**AIR POLLUTION** **This section deals with the issues relating to air quality during decommissioning**	**RESPONSIBILITY**
PHASE	**DECOMMISSIONING**	
ENVIRONMENTAL MANAGEMENT PROGRAMME		
MITIGATION / METHOD STATEMENT	1. Damping down exposed surfaces regularly to reduce dust emissions. 2. Maintain equipment to reduce exhaust emissions.	

3 MANAGEMENT PLANS REQUESTED BY DEA

3.1 Alien Invasive Management Plan

Table 40: Alien Invasive Management Plan

ALIEN INVASIVE MANAGEMENT PROGRAMME	
MITIGATION MEASURES	1. Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. 2. Alien vegetation and the spread of exotic species on the site will need to be controlled. 3. The contractor should be responsible for implementing a programme of weed control (particularly in areas where soil has been disturbed); and grassing of any remaining stockpiles to prevent weed invasion. 4. Herbicide use shall only be allowed according to contract specifications. The application shall be according to set specifications and under supervision of a qualified technician. The possibility of leaching into the surrounding environment shall be properly investigated and only environmentally friendly herbicides shall be used. 5. The use of pesticides and herbicides on the site must be discouraged as these can impact on important pollinator species of indigenous vegetation. 6. Six monthly checks of the area should take place for the emergence of invader species. 7. Mitigation measures mentioned for the construction phase above must be implemented for any maintenance of the development that may be undertaken during the operation phase. 8. Correct rehabilitation with locally indigenous species. 9. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided. 10. Constant maintenance of the area to ensure re-colonisation of floral species. 11. Regular removal of alien species which may jeopardise the proliferation of indigenous species.

3.2 Plant Rescue Protection Plan

Table 41: Plant Rescue Protection Plan

PLANT RESCUE PROTECTION PLAN	
MITIGATION MEASURES	1. Vegetation removal must be limited to the wind farm construction site 2. Vegetation to be removed as it becomes necessary rather than removal of all vegetation throughout the site in one step 3. Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected. 4. No vegetation to be used for firewood. 5. Gathering of firewood, fruit, muti plants, or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the ECO. 6. Only vegetation within the study area must be removed. 7. Vegetation removal must be phased in order to reduce impact of construction. 8. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas. 9. All natural areas impacted during construction must be rehabilitated with locally indigenous plant species. 10. A buffer zone should be established in areas where construction will not take place to ensure that construction activities do not extend into these areas. 11. Construction areas must be well demarcated and these areas strictly adhered to. 12. The use of pesticides and herbicides in the study area must be discouraged as these impacts on important pollinator species of indigenous vegetation. 13. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora. 14. The grid access power line must span rocky areas in order to avoid transformation in these areas. 15. Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.

3.3 Re-Vegetation and Habitat Rehabilitation Plan

Table 42: Re-Vegetation and Habitat Rehabilitation Plan

RE-VEGETATION AND HABITAT REHABILITATION PLAN	
MITIGATION MEASURES	1. Re-vegetation should aim to accelerate the natural succession processes so that the plant community develops in the desired way, i.e. promote rapid vegetation establishment 2. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses. 3. All damaged areas shall be rehabilitated upon completion of the contract 4. Re-vegetation of the disturbed site is aimed at approximating as near as possible the natural vegetative conditions prevailing prior to construction. 5. All natural areas impacted during construction must be rehabilitated with locally indigenous species typical of the representative botanical unit. 6. Rehabilitation must take place in a phased approach as soon as possible. 7. Rehabilitation process must make use of species indigenous to the area. Seeds from surrounding seed banks can be used for re-seeding. 8. Rehabilitation must be executed in such a manner that surface run-off will not cause erosion of disturbed areas. 9. Planting of indigenous tree species in areas not to be cultivated or built on must be encouraged. 10. Habitat destruction should be limited to what is absolutely necessary for the construction of the infrastructure, including the construction of new roads. In this respect, the recommendations from the Ecological Specialist Study should be applied strictly. Personnel should be adequately briefed on the need to restrict habitat destruction, and must be restricted to the actual construction area. 11. Monitoring programme to ensure that rehabilitation efforts are successful to ensure that risks such as erosion, spread of exotic species and the edge effect are avoided.

3.4 Open Space Management Plan

Table 43: Open Space Management Plan

OPEN SPACE MANAGEMENT PLAN	
MITIGATION MEASURES	1. A buffer zone should be established in areas where construction will not take place to ensure that construction activities do not extend into these areas. 2. Vehicle movement should be restricted to authorised access roads 3. Before construction begins, all areas to be developed must be clearly demarcated with fencing or orange construction barrier where applicable. 4. All Construction Camps are to be fenced off in such a manner that unlawful entry is prevented and access is controlled. Signage shall be erected at all access points in compliance with all applicable occupational health and safety requirements. All access points to the Construction Camp should be controlled by a guard or otherwise monitored, to prevent unlawful access. 5. The contractor and ECO must ensure compliance with conditions described in the EA. 6. Records of compliance/ non-compliance with the conditions of the authorisation must be kept and be available on request. 7. Records of all environmental incidents must be maintained and a copy of these records be made available to provincial department on request throughout the project execution. 8. Site establishment shall take place in an orderly manner and all required amenities shall be installed at camp sites before the main workforce move onto site. 9. All construction equipment must be stored within this construction camp. 10. An area for the storage of hazardous materials must be established that conforms to the relevant safety requirements and that provides for spillage prevention and containment 11. The Contractor must provide sufficient ablution facilities, in the form of portable / VIP toilets, at the Construction Camps, and shall conform to all relevant health and safety standards and codes. No pit latrines, French drain systems or soak away systems shall be allowed and toilets may not be situated within 100 meters of any surface water body or 1:100 year flood line. A sufficient number of toilets shall be provided to accommodate the number of personnel working in the area. 12. The Contractor shall inform all site staff to make use of supplied

	ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed. 13. No fires will be allowed and the Contractor must make alternative arrangements for heating. LP Gas may be used, provided that all required safety measures are in place. The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter. 14. Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artefacts. 15. Project manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks. 16. Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training. 17. Staff must be trained in the hazards and required precautionary measures for dealing with these substances

3.5 Erosion Management Plan

Table 44: Erosion Management Plan

EROSION MANAGMENT PLAN	
MITIGATION MEASURES	1. To prevent erosion, material stockpiled for long periods (2 weeks) should be retained in a bermed area. 2. Areas which are not to be constructed on within two months must not be cleared to reduce erosion risks. 3. The area to be cleared must be clearly demarcated and this footprint strictly maintained. 4. Spoil that is removed from the site must be removed to an approved spoil site or a licensed landfill site. 5. The necessary silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. 6. Wind screening and stormwater control should be undertaken to prevent soil loss from the site. 7. The use of silt fences and sand bags must be implemented in areas that are susceptible to erosion.

	8. Other erosion control measures that can be implemented are as follows: 9. Brush packing with cleared vegetation 10. Mulch or chip packing 11. Planting of vegetation 12. Hydroseeding / hand sowing 13. Sensitive areas need to be identified prior to construction so that the necessary precautions can be implemented. 14. All erosion control mechanisms need to be regularly maintained. 15. Seeding of topsoil and subsoil stockpiles to prevent wind and water erosion of soil surfaces. 16. Retention of vegetation where possible to avoid soil erosion 17. Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 18. Re-vegetation of disturbed surfaces should occur immediately after construction activities are completed. This should be done through seeding with indigenous grasses. 19. No impediment to the natural water flow other than approved erosion control works is permitted. 20. To prevent stormwater damage, the increase in stormwater run-off resulting from construction activities must be estimated and the drainage system assessed accordingly. \ 21. Stockpiles not used in three (3) months after stripping must be seeded to prevent dust and erosion.

3.6 Traffic Management Plan

Table 45: Traffic Management Plan

TRAFFIC MANAGMENT PLAN	
MITIGATION MEASURES	1. All vehicles used during the transport of materials and in the construction activities are required to be roadworthy per the National Road Traffic Act (NRTA) and display all pertinent certificates as required. 2. For any vehicles that operate under an exemption permit, a roadworthy certificate may not be required; however the exemption permit will require that the vehicle is fit for operation on public roadways. 3. All vehicles travelling to and from the site shall adhere to all laws imposed by the law enforcement agencies, and shall comply with any

	requests made by the law enforcement officials. 4. A designated transport coordination manager should be appointed to oversee and manage the traffic safety officers. Additionally, the designated transport coordination manager should inform and keep up-to-date the interested and affected parties of all the activities taking place that may have a direct impact on them. 5. A traffic safety officer shall be nominated to make all the necessary arrangements to maintain the required traffic measures for the duration of the project as outlined in the "Standard Specifications for Road and Bridge Works for State Road Authorities,"1998 edition. The safety officer shall liaise daily with the transportation coordination manager to keep them apprised of the state of all the traffic arrangements. 6. All construction vehicles that are entering the site shall also be available via radio or telephone communication to the transport coordination manager. So that in the event of an emergency, all vehicles can be accounted for. 7. All vehicles shall comply with the posted speed limits on public roads as well as the speed limits within the development. It is recommended that once the construction traffic encounters the gravel section of the R34, that the speed be limited to 50km/h. For additional speed limits that are imposed on the construction traffic, refer to the South African Road Traffic Signs Manual (SARTSM), Volume 2, June 1999 for the restrictions. 8. All construction traffic shall comply with the legal load requirements as outlined in the National Road Traffic Act and National Road Traffic Regulations. 9. Construction traffic entering the site along public roads should be limited to times when peak hour traffic can be avoided. The peak traffic occurs during 7h00 to 8h30, and 16h00 to 17h30. Construction traffic can also be restricted further to avoid travelling on public holidays, long weekends, or at night. 10. The South African Road Traffic Signs Manual (SARTSM), Volume 2, June 1999 is to be used for all traffic during the construction activities of the proposed project. 11. Signage will be required on the R34 before the proposed access point for the construction area to warn the public of the activities. 12. During periods of high construction traffic entering and exiting the site, it is recommended that flagmen help direct the traffic. This will enable the safe movement of construction and public traffic at the entrance and reduce the number of potential conflicts.

3.7 Storm Water Management Plan

Table 46: Storm Water Management Plan

STORM WATER MANAGMENT PLAN	
MITIGATION MEASURES	1. Stormwater management of the substation should include stormwater channels and chutes so as to minimize erosion at the substation site. 2. Where terraces are required for the substation, additional earth channels above each terrace are proposed to avoid stormwater running down slopes causing possible erosion. 3. Energy dissipaters at the drainage exit points of the substation are recommended to reduce any possible chances of erosion. 4. It is recommended that suitably sized grass lined earth channels are positioned within the proposed road reserves where accidental oil spills and/or stormwater will be attenuated in order to deposit any transported sediments and reduce the flow velocities. 5. The access roads should be graded and shaped with a crossfall towards the high side of the road reserve, allowing stormwater to flow into graded channels adjacent and parallel to each road, and gravitate towards the natural drainage lines i.e. rivers & streams. 6. Low level causeways should be constructed to reduce any erosion to the roads where required.

4 CONCLUSION

The environmental and social impacts of the project were spread through the project phases. There were both positive and some negative project impacts identified through the BA. The following section briefly describes some of the major impacts and the proposed mitigation measures within each of the project phases.

4.1 Pre-Construction Phase

The first site activities before mobilization of equipment will be a survey, required for final design of the power line and substation. Walk downs by the faunal, floral, avifaunal, heritage and surface water specialists should be undertaken, and be used to inform the final tower locations prior to the finalisation of tower positions. The avifaunal walk down should identify the spans that will require mitigation devices to be installed, if required. In addition, a floral walk down should be undertaken in the flowering season once the tower positions have been pegged in order to identify any affected RDL floral species should be removed and rescued. Further detailed geotechnical investigations should be undertaken at the substation location prior to construction.

There could be negative impacts on land associated with the construction of camps (temporary loss) and storage of construction materials especially if such construction is carried out on agriculturally productive land. Expectations of improvement in livelihood among locals must be addressed through public participation. Construction contracts will include environmental monitoring and management procedures and requirements. These must be in place prior to the commencement of any construction activities.

4.2 Construction Phase

This phase of the activity will have both positive and negative impacts. The positive impacts are some employment opportunities offered to the construction workers and any other labourer who will be hired to provide their services during the construction phase. The negative impacts may include wastes generated, accidents, health and safety, air, dust and noise pollution, vegetation clearance, soil erosion, socio-environmental issues, loss of trees, and compaction of soil. Most of the negative impacts are minor and temporary. To mitigating negative impacts, the contractor shall ensure that all staff have adequate protective clothing and are adequately trained. The whole range of mitigation measures are however, outlined in the EMPr in this regard.

4.3 Operational Phase

The proposed project will have minimal negative effects which mainly relate to loss of aesthetic value and habitat as well as nuisance to affected landowners.

4.4 Decommissioning Phase

As with any project, the facilities used in this project will have a lifespan after which they may no longer be cost effective to continue with operation or may degrade and become inoperable. At that time, the project would be decommissioned, and the existing equipment removed and most likely replaced. The mitigation measures highlighted in the construction phase will once again become applicable as the construction of new infrastructure would essentially be associated with similar activities and would likely result in similar impacts.

The disposal of materials from the decommissioned plant is not viewed as high risk. Much of the material would be recyclable (steel structures) or inert (insulators, concrete foundations, etc.). A proportion of these materials would however, need to be disposed of at a formal waste disposal or recycling centre. Alternatively, recyclable steel will be sent to Eskom and recycled for further materials.

Based on the above information, it is unlikely that the project will have many adverse social and environmental impacts. Most adverse impacts will be of a temporary nature during the construction phase and can be managed to acceptable levels with implementation of the recommended mitigation measures for the project such that the overall benefits from the project will greatly outweigh the few adverse impacts. All the negative impacts will either be moderate or lesser in rating and could be easily mitigated. Generally, the proposed power line and substation will result in appreciable benefits to the people in the project area of influence and bring opportunities for development in the area.

Annexure A

ENVIRONMENTAL INCIDENTS

LOG Environmental Incident Log

ENVIRONMENTAL INCIDENT LOG				
Date	**Env. Condition**	**Comments** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**

COMPLAINTS RECORD SHEET

Complaints Record Sheet

COMPLAINTS RECORD SHEET	File Ref: Page …. of ….	DATE: ……
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
ECO: _____ Date: _____		
NOTES BY ECO:		
ECO: _____ Date: _____ Site Manager: _____ Date: _____		

Annexure B

MANAGEMENT OF SOILS: GUIDELINES

Topsoil

Source of topsoil

- Topsoil shall be stripped from all areas that are to be utilised during the construction period and where permanent structures and access is required. These areas will include temporary and permanent access roads, construction camps, and lay down areas. Topsoil shall be stripped after clearing of woody vegetation and before excavation or construction commences.
- The topsoil is regarded as the top 300mm of the soil profile irrespective of the fertility appearance, structure, agricultural potential, fertility and composition of the soil.

Topsoil stripping

- Soil shall be stripped to a minimum depth of 150mm and maximum depth of 300mm or to the depth of bedrock where soil is shallower than 300mm. Herbaceous vegetation, overlying grass and other fine organic matter shall not be removed from the stripped soil.
- No topsoil which has been stripped shall be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.
- Topsoil shall preferably be stripped when it is in a dry condition in order to prevent compaction.

Topsoil stockpiling

- The Consulting Engineer or Environmental Control Officer shall stockpile stripped topsoil in areas, which have been approved. Soil stockpiles may take the form of windows.
- To prevent erosion, material stockpiled for long periods (2 weeks) should be retained in a bermed area.
- Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the sit, and must not be positioned within stormwater channels or areas of ponding.
- Topsoil stripped from different soil zones shall be stockpiled separately and clearly identified as such. Under no circumstances shall topsoil obtained from different soil zones be mixed.
- Soil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.
- No vehicles shall be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles shall be clearly demarcated in order to prevent vehicle access and for later identification when required.
- Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.

- After topsoil removal has been completed, the Contractor shall apply soil conservation measures to the stockpiles where and as directed by the Consulting Engineer or Environmental Control Officer. This may include the use of erosion control fabric or grass seeding.

Topsoil replacement

- Topsoil shall be replaced to a minimum depth of 75mm over all areas where it has been stripped and over disused borrow pits, after construction in those areas has ceased. Topsoil placement shall follow as soon as construction in an area has ceased.
- All areas onto which topsoil is to be spread shall be graded to the approximate original landform with maximum slopes of 1:25 and shall be ripped prior to topsoil placement. The entire area shall be ripped parallel to the contours to a minimum depth of 300mm.
- Topsoil shall be placed in the same soil zone from which it had been stripped. However, if there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil may be brought from other soil zones at the approval of the Consulting Engineer or Environmental Control Officer.
- Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum specified depth, the Contractor shall obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material shall be determined by means of soil analyse, which are acceptable to the Consulting Engineer or Environmental Control Officer.
- No vehicles shall be allowed access onto or through topsoil after it has been reinstated.
- After topsoil reinstatement is complete, cleared and stockpiled vegetative matter shall be spread randomly by hand over the top soiled area. The vegetative material must be replaced on the areas from where it has been removed.

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