Appendix G - Environmental Management Plan (EMP)

Compiled by:

Landscape Dynamics Environmental Consultants
PO Box 947
GROENKLOOF
Pretoria
0027

Contact Person Details:
Ms Annelize Grobler
agrobler@landscapedynamics.co.za
Tel 012 460 6043/ 082 566 4530
Fax 086 685 3822/ 012 346 2356

Applicant:

Eskom Holdings SOC Ltd
Mpumalanga Operating Unit : Land Development, Environmental Management
Contact Person Details:
Ms Angelina Shalang
Tel 012 421 3353 / 083 743 6713 / ShalanAR@eskom.co.za

GLOSSARY OF TERMS AND ABBREVIATIONS

ALIEN VEGETATION
Alien vegetation is defined as undesirable plant growth which includes, but is not limited to all declared category 1 and 2 listed invader species as set out in the 1983 Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien are those plant species that show the potential to occupy in number any area within the defined construction area and which are declared undesirable.

CONTRACTOR
A person or company appointed by Eskom to carry out stipulated activities.

EMERGENCY
An undesired event that results in a significant environmental impact and requires the notification of the relevant statutory body such as a local authority.

EMISSIONS
The release or discharge of a substance into the environment which generally refers to the release of gases or particulates into the air.

EMP
Environmental Management Plan. A detailed plan of action prepared to ensure that recommendations for preventing the negative environmental impacts (and where possible improving the environment) are implemented during the life-cycle of a project.

ENVIRONMENT
In terms of the National Environmental Management Act 107 of 1998 (NEMA), "environment" means the surroundings within which humans exist and which are made up of:
(i) the land, water and atmosphere of the earth;
(ii) micro-organisms, plant and animal life;
(iii) any part or combination of (i) of (ii) and the interrelationships among and between them; and
(iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

ENVIRONMENTAL AUTHORISATION
An environmental authorisation or record of decision is a written statement from the National Department of Environmental Affairs (DEA) that records its approval of a planned undertaking to improve, upgrade or rehabilitate a development and the conditions of approval which may include mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.

ENVIRONMENTAL CONTROL OFFICER
A suitably qualified individual who on a regular basis monitors on behalf of Eskom the project compliance with conditions of the Environmental Authorisation (Record of Decision), environmental legislation and recommendations of this Environmental Management Plan.

ENVIRONMENTAL IMPACT
A change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's activities, products or services.

ESKOM'S PROJECT MANAGER
The Eskom appointed person who acts as the manager of the project on behalf of Eskom.

INCIDENT
An undesired event which may result in a significant environmental Impact but can be managed through internal response.

CONSTRUCTION MANAGER
The Eskom appointed person who acts as Construction Manager and is responsible for managing the construction process on site.

1. INTRODUCTION

The construction and operation of electrical infrastructure can result in negative impacts on the environment. It is therefore important to develop and implement mitigation measures to ensure that environmental damage is minimised. For the mitigation measures to be effectively implemented, proper planning and communication is essential throughout the project, specifically during the construction phase. An Environmental Management Plan is a detailed plan of action prepared to ensure that recommendations for preventing the negative environmental impacts (and where possible improving the environment) are implemented during the life-cycle of a project. The appointed contractor has to understand the requirements of the Environmental Management Plan (EMP) and where possible initiate environmental best practices in liaison with Eskom. This EMP is divided into three sections: Planning and Design Phase, Construction Phase and Operational Phase.

2. OVERVIEW OF THE PROJECT

Eskom Mpumalanga Operating Unit, Land Development appointed Landscape Dynamics Environmental Consultants to develop an EMP for the construction of Eskom Amandla-Kwaggafontein Amendment Project.

2.1 The scope of work

The proposed project consists of the following:

- The establishment of a 132kV feeder bay at Amandla substation
- The building of a 30km 132kv Kingbird line from Amandla substation to Kwaggafontein
- The establishment of a 132kV feeder bay at Kwaggafontein substation.

2.2 Locality of project

The Project Area stretches from the Amandla Substation next to Road 573 in the north-east and the Kwaggafontein Substation near the town with the same name further to the south-west. The Eskom Project Area stretches along the Pretoria/Marble Hall road (Road 573) (also generally known as the 'Moloto Road') and crosses parts of the Mpumalanga and Limpopo Provinces of South Africa.

2.3 Property descriptions

Province	Mpumalanga Province
District Municipality	Nkangala District Municipality.
Local Municipality	Thembisile Hani Local Municipality
Farm name and number	Kwaggafontein 216-JR; Mathys Zyn 19-JR and Mathys Zyn 671-JR; Houtenbek-194-JR; Klipplaatdrift 193-JR

Province	Limpopo Province
District Municipality	Sekhukhune District Municipality.
Local Municipality	Elias Motsoaledi Local Municipality
Farm name and number	Kwaggafontein 216-JR; Mathys Zyn 19-JR and Mathys Zyn 671-JR; Houtenbek-194-JR; Klipplaatdrift 193-JR; Zoetmelksfrontein 36 and Walkraal 35

2.4 Co-ordinates

Route Alternative 1 (24,6 km) proposed for authorisation in the Final Basic Assessment report dated October 2014 – a 1km wide corridor was investigated but a servitude of 31m would be registered.

• Starting point of the activity (Amandla Substation)	29° 4' 32.03" E	25° 11' 34.98" S
• Additional point of the activity	29° 1' 3.904"E	25° 14' 1.812"S
• End Point of Activity (Kwaggafontein Substation)	28° 57' 10.95" E	25° 18' 18.98" S

'Preferred Route Alignment - 250m coordinates (24.60 km)

ID	X	Y
Kwaggafontein Substation1	28°57' 11.97" E	25°18' 17.83" S
2	28°57' 18.40" E	25°18' 12.19" S
3	28°57' 25.30" E	25°18' 7.56" S
4	28°57' 34.16" E	25°18' 8.34" S
5	28°57' 43.01" E	25°18' 9.53" S
6	28°57' 51.82" E	25°18' 9.16" S
7	28°58' 0.61" E	25°18' 7.71" S
8	28°58' 9.41" E	25°18' 6.26" S
9	28°58' 16.74" E	25°18' 2.27" S
10	28°58' 18.97" E	25°17' 54.54" S
11	28°58' 20.67" E	25°17' 46.57" S
12	28°58' 22.38" E	25°17' 38.59" S
13	28°58' 24.09" E	25°17' 30.62" S
14	28°58' 25.79" E	25°17' 22.64" S
15	28°58' 27.50" E	25°17' 14.67" S
16	28°58' 32.70" E	25°17' 8.70" S
17	28°58' 39.88" E	25°17' 3.86" S
18	28°58' 47.06" E	25°16' 59.02" S
19	28°58' 54.23" E	25°16' 54.18" S
20	28°59' 0.25" E	25°16' 48.38" S
21	28°59' 4.86" E	25°16' 41.42" S
22	28°59' 10.13" E	25°16' 34.88" S
23	28°59' 15.74" E	25°16' 28.56" S
24	28°59' 21.35" E	25°16' 22.24" S
25	28°59' 26.97" E	25°16' 15.92" S
26	28°59' 32.58" E	25°16' 9.60" S
27	28°59' 38.19" E	25°16' 3.27" S

28	28°59' 45.86" E	25°15' 59.45" S
29	28°59' 54.10" E	25°15' 56.31" S
30	29°0' 2.34" E	25°15' 53.17" S
31	29°0' 10.58" E	25°15' 50.03" S
32	29°0' 17.42" E	25°15' 44.83" S
33	29°0' 24.17" E	25°15' 39.51" S
34	29°0' 30.92" E	25°15' 34.19" S
35	29°0' 37.67" E	25°15' 28.86" S
36	29°0' 44.42" E	25°15' 23.54" S
37	29°0' 51.17" E	25°15' 18.22" S
38	29°0' 57.92" E	25°15' 12.90" S
39	29°1' 4.67" E	25°15' 7.58" S
40	29°1' 11.42" E	25°15' 2.25" S
41	29°1' 19.72" E	25°14' 59.82" S
42	29°1' 27.79" E	25°14' 57.52" S
43	29°1' 24.98" E	25°14' 50.22" S
44	29°1' 20.94" E	25°14' 42.98" S
45	29°1' 16.89" E	25°14' 35.73" S
46	29°1' 12.85" E	25°14' 28.49" S
47	29°1' 8.81" E	25°14' 21.24" S
48	29°1' 6.68" E	25°14' 13.38" S
49	29°1' 4.80" E	25°14' 5.44" S
50	29°1' 2.92" E	25°13' 57.50" S
51	29°1' 1.04" E	25°13' 49.55" S
52	29°0' 59.02" E	25°13' 41.65" S
53	29°0' 55.91" E	25°13' 34.03" S
54	29°0' 52.79" E	25°13' 26.42" S
55	29°0' 49.68" E	25°13' 18.80" S
56	29°0' 46.56" E	25°13' 11.19" S
57	29°0' 43.45" E	25°13' 3.58" S
58	29°0' 40.33" E	25°12' 55.96" S
59	29°0' 37.21" E	25°12' 48.35" S
60	29°0' 34.10" E	25°12' 40.73" S
61	29°0' 30.98" E	25°12' 33.12" S
62	29°0' 27.87" E	25°12' 25.51" S
63	29°0' 29.94" E	25°12' 18.41" S
64	29°0' 34.80" E	25°12' 11.59" S
65	29°0' 37.09" E	25°12' 3.78" S
66	29°0' 39.07" E	25°11' 55.86" S
67	29°0' 41.05" E	25°11' 47.94" S
68	29°0' 49.05" E	25°11' 45.80" S
69	29°0' 57.36" E	25°11' 48.78" S
70	29°1' 5.66" E	25°11' 51.76" S
71	29°1' 13.97" E	25°11' 54.74" S

72	29°1' 22.28" E	25°11' 57.72" S
73	29°1' 30.66" E	25°12' 0.43" S
74	29°1' 39.51" E	25°12' 1.53" S
75	29°1' 48.36" E	25°12' 2.64" S
76	29°1' 57.21" E	25°12' 3.74" S
77	29°2' 6.05" E	25°12' 4.85" S
78	29°2' 14.90" E	25°12' 5.95" S
79	29°2' 23.75" E	25°12' 7.06" S
80	29°2' 32.59" E	25°12' 8.16" S
81	29°2' 41.44" E	25°12' 9.27" S
82	29°2' 50.29" E	25°12' 10.37" S
83	29°2' 59.13" E	25°12' 11.48" S
84	29°3' 7.98" E	25°12' 12.58" S
85	29°3' 16.83" E	25°12' 13.68" S
86	29°3' 25.68" E	25°12' 14.79" S
87	29°3' 34.52" E	25°12' 15.89" S
88	29°3' 43.23" E	25°12' 16.39" S
89	29°3' 50.88" E	25°12' 12.20" S
90	29°3' 59.25" E	25°12' 10.81" S
91	29°4' 8.15" E	25°12' 11.48" S
92	29°4' 17.05" E	25°12' 12.15" S
93	29°4' 25.95" E	25°12' 12.82" S
94	29°4' 35.31" E	25°12' 13.53" S
95	29°4' 36.51" E	25°12' 5.92" S
96	29°4' 37.77" E	25°11' 57.88" S
97	29°4' 39.03" E	25°11' 49.84" S
98	29°4' 40.30" E	25°11' 41.80" S
Amandla Substation 99	29°4' 37.13" E	25°11' 36.96" S

3. PURPOSE OF THE EMP

The objective of the Environmental Management Plan (EMP) is to minimise destruction of the environment resulting from the project activities. Eskom must take reasonable measures to protect the environment and minimise environmental impacts as required by the Duty of Care stated in section 28 of NEMA. Eskom as the holder of Environmental Authorisation must also ensure that contractors conducting work on its behalf comply with environmental requirements. The contractor has to ensure that construction activities do not deviate from conditions stipulated in the Environmental Authorisation, EMP and the requirements of applicable environmental legislation.

During all the phases of the project, proper monitoring, auditing and corrective actions have to be implemented. The following principles have to form the basis of the construction and operational phases:

- Prevent or minimise pollution and degradation of the environment.
- Implement a risk-averse and cautious approach.

- Prevent or minimise waste, reuse or recycle waste where possible and dispose of waste in a responsible manner.
- Anticipate and prevent negative impacts on the environment. Where impacts cannot be prevented, minimisation and mitigation measures to be implemented.
- Prevent, minimise or remedy the disturbance of ecosystems and loss of biodiversity.

4. SCOPE OF THE EMP

The EMP outlines the negative impacts as well as mitigation measures associated with powerline construction and operation. The aspects of construction and operation which may lead to significant environmental impacts have been identified and mitigation measures have been determined.

5. STRUCTURE OF THE ENVIRONMENTAL MANAGEMENT PLAN

The EMP provides mitigation and management measures for the following phases of the project:

- Planning and Design Phase

All relevant environmental legislation pertaining to the project is listed during this phase.
The Contractor and the client have to comply with the legislation during all phases of the project. This list is not exhaustive and is intended only to serve as a guideline to the Contractor.

- Construction Phase

This section of the EMP provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required within the construction phase are specified. These specifications form part of the construction contract and the Contractor is therefore required to comply with the specifications in the construction contract to the satisfaction of the Project Manager and Environmental Control Officer.

- Operation and Maintenance Phase

This section of the EMP provides management principles for the operation and maintenance phase of the project. Environmental actions, procedures and responsibilities as required by Eskom within the operation and maintenance phase are specified.

The EMP is a dynamic document which is updated as required on a continuous basis. Any amendments to the EMP have to be submitted for approval prior to implementation to both the Environmental Control Officer (ECO) and Project Manager.

6. PLANNING and DESIGN PHASE

6.1 Technical Information of the project

For the 132kV line from the existing Amandla Dx Substation to the existing Kwaggafontein Substation the required servitude width is 31m. Construction of the line is limited to the width of the servitude which has been negotiated and agreed to with various property owners.

6.2 Technical parameters

- Tower height: 24m (Average)
- Tower spacing: 220m (Average)
- Conductor attachment height: 18m Average)
- Conductor type : Chikadee
- Minimum ground clearance: 9m.

6.3 Tower Design

There are different types of towers. The following types of towers are proposed for this project:

- Self-supporting intermediate structure
- Stayed intermediate angle structure
- Stayed angle strain structure
- Guyed intermediate suspension structure

The Contractor at all times must provide the correct equipment for construction purposes to ensure that construction proceeds without unnecessary damage to the environment.

6.4 Final Design

- The engineering drawings must adhere to any site-specific mitigation measures supplied by the geotechnical engineer for the project to accommodate the geotechnical and earth-scientific constraints in terms of founding and construction methods, construction materials, excavation, etc.
- The final design of the powerline must accommodate all requirements of landowners as communicated by them during the Public Participation Process (contained in Appendix D of the option document and signed by the affected landowner).
- The final design of the powerline must accommodate the requirements determined by the ecologist Wynand Vlok (Tel 082 200 5312). The ecological assessments are included in Appendix D1(a), 1(b) and 1(c) of the BA Report.
- The final design of the powerline must accommodate the site-specific measures in terms of bird impact as identified by the bird impact specialist, Chris van Rooyen, (Tel 082 454 9570) - The bird impact assessments are included in Appendix D2(a) and 2(b) of the BA Report.

6.5 Legislative and Other Requirements

The contractor must identify and implement applicable sections of at least the following environmental legislation:

- Minerals and Petroleum Resources Development Act 28 of 2002;
- National Heritage Resources Act 25 of 1999;
- National Environmental Management Air Quality Act 39 of 2004;
- National Water Act 36 of 1998;
- National Environmental Management Act 107 of 1998;
- National Veld and Forest Fire Act 101 of 1998;
- National Forests Act 84 of 1998;
- National Roads Act 7 of 1998;
- Occupational Health and Safety Act 85 of 1993 including the Major Hazard Installation Regulations promulgated thereunder;

- Conservation of Agricultural Resources Act 43 of 1983;
- National Building Regulations and Building Standards Act 103 of 1977;
- Health Act 63 of 1977;
- Hazardous Substances Act 15 of 1973;
- Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947;
- National Environmental Management: Biodiversity Act 10 of 2004;
- National Environmental Management: Waste Act 59 of 2008;
- National Environmental Management: Protected Areas Act 57 of 2003.

Environmental authorisation

An application for environmental authorisation has been submitted to the National Department of Environmental Affairs (DEA) in terms of the National Environmental Management Act 107 of 1998 (NEMA) and the Environmental Impact Assessment Regulations published in terms of section 24(5) of the Act in GNR 543/2010 - GNR 546/2010 of 18 June.

Listed activity as described in GN R.544, 545 and 546	Description of project activity
GN R. 544 Item 10 : The construction of facilities or infrastructure for the transmission and distribution of electricity outside urban areas or industrial complexes with a capacity of more than 33 but less than 275V.	Eskom has identified the need for a new 132kV distribution line between Kwaggafontein substation in Mpumalanga and Amanndla Substation in Limpopo. The proposed project consists of the following: • The establishment of a 132kV feeder bay at Kwaggafontein substation • The establishment of a 132kV feeder bay at Amandla substation • The building of a 30km 132kv Kingbird line from Amandla substation to Kwaggafontein
GN 544, June 2010, Activity 11 : The construction of: (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square metres in size; (ix) slipways exceeding 50 square metres in size; (x) buildings exceeding 50 square metres in size; or **(xi) infrastructure or structures covering 50 square metres or more** **where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse,** excluding where such construction will occur behind the development setback line.	Where the proposed power line crosses between the two impoundments (artificial wetlands) near Marothobol and Klipplaatdrif (approximate GPS position – S 25 12 47.4 E29 00 33.2) the pylons can be placed at least 150m from the small stream linking the two impoundment, without any impact of any of the systems (stream and impoundments). The power line will pass between the koppies (rocky outcrops) north of the R573. The proposed corridor will follow the existing pipeline servitude. It is suggested that the power line servitude should be to the east of the seasonal stream (tributary of the Meetsi-Madiba) and also to the east of the pipeline servitude. The existing servitude access can be used during construction and the pylons will not impede on the stream, its flow or the

	riparian vegetation associated with the water course therefore a WULA should not be required. Depending on the construction technique and foundations size required, an area of 50 square metres could potentially be affected. This will however be confirmed during the design phase of the project.

Listed below are some of the possible permits and licences that may be required:
Table 1: Environmental Permits and Licenses:

Activity	Applicable Legislation
Disturbing, cutting, pruning protected or indigenous vegetation; or any protected tree	National Forests Act (No 84 of 1998), National Environmental Management: Biodiversity Act, (No 10 of 2004) Provincial Ordinances
Taking water from a water resource	The National Water Act (No 36 of 1998)
Storing of water	The National Water Act (No 36 of 1998)
Impending or diverting the flow of water in a watercourse	The National Water Act (No 36 of 1998)
Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people	The National Water Act (No 36 of 1998)
Disposing of waste in a manner which may detrimentally impact on a water resource	The National Water Act (No 36 of 1998)
Use of treated wastewater	The National Water Act (Act No 36 of 1998)
To destroy, damage, deface, alter, remove or destruct any national and provincial heritage sites, archaelogical and palaeontological sites, burial grounds and graves and public monuments and memorials	National Heritage Resources Act (No 25 of 1999)
Sewage Disposal	National Environment Management Waste Act, (No 59 of 2008).
Fuel storage	Local By-laws, National Environmental Management Act (No 107 of 1998)
Ablution facilities/ chemical toilets	Local By-laws, Provincial standard By-laws
Operation of borrow pits	Mineral and Development Resources Development Act (No 28 of 2002).

The contractor must keep a permit matrix listing the type of permits and their validity periods. The permit matrix must be updated as and when required. The conditions prescribed in the permits must be adhered to.

Potential Water Use Licence Applications (WULA)

The National Water Act (Act 36 of 1998) (NWA) sees river crossings, floodplains or wetlands, where there is a need to erect pylons within the demarcated sensitive areas, as a Water Use that will either

need to be registered (General Authorisation) or a water use licence applied for (WULA), depending on the circumstances and impacts.
The proposed Routes do not require a General Authorisation registration (GA) or a Water Use Licence Application (WULA) if selected and if mitigating measures are implemented.

License protected trees

The Department of Agriculture, Forestry and Fisheries is the custodian of the National Forests Act (Act 84 of 1998) as amended, which amongst others provides special measures for the protection of certain forests and trees. In terms of section 7(1) no person may cut, disturb, damage, destroy or remove any indigenous tree in; or remove or receive any such tree from a Natural Forest except when a license to do such has been issued.
In terms of section 15(1), no person may-:
a) Cut, disturb, damage, destroy or remove any protected tree; or
b) Collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a license granted by the Minister.
Such trees may not be cleared without the necessary authorisation therefore the applicant is required to apply for a license.

For protected trees on the National list, permits have to be obtained from the relevant provincial office of the Department of Agriculture, Forestry and Fisheries (DAFF).

Protected trees potentially occurring in the study area

COMMON NAME	BOTANICAL NAME
Camel thorn	*Acacia erioloba*

Once the final corridor is negotiated, the trees in each sector (between pylons) will be counted and permit applications for cutting/trimming submitted. Once the permits are approved, the clearing of the servitude can commence.

6.6 Tender Stage

The EMP and Environmental Authorisation form part of the documentation issued at tender enquiry stage. Environmental tender evaluation has to be conducted to ensure that the tender submissions include, amongst others, financial and human resources for proper implementation of environmental requirements.

6.7 Contract Award

The contractor has to acknowledge receipt and understanding of the EMP and Environmental Authorisation. The EMP and Environmental Authorisation must form part of the Contract Award Documentation issued by the Client.

7. CONSTRUCTION PHASE

7.1 Main Activities During Construction Phase

- Pegging of the construction site

Relevant licences and permits have to be obtained before construction activities can commence in a specific area.

- Excavation

Excavation has to be done in such a way that the top soil layer is scrubbed and stored separately from the sub soil. The top layer soil normally contains seeds and useful rehabilitation material for use when the construction activity is completed. Employees who carry out the excavation activity have to be well informed of soil separation. To avoid animals from falling into the excavation, excavations of half a meter and more have to be barricaded properly.

- Concrete Mixing, Pouring and Foundation Creation

Concrete mixing must never be done on bare land. The land surface has be protected from the negative impact that may arise due to concrete mixing activities. Concrete pouring activity to be done in such a way that concrete spillages are avoided. If concrete spills occur, the affected areas must be rehabilitated immediately. Cleaning of concrete mixer chutes only to be done in such way that it does not cause pollution or concrete spillages on to the ground.

- Tower Assembly

This activity can be done with minimal environmental impact. There must be strict control to ensure that nuts and bolts and other material are not left lying on the ground after the completion of this activity.

- Tower Erection

In instances where paint is used, the employees must be made aware that paint is a hazardous substance and any unused paint containers must be disposed in hazardous waste bins.

- Conductor stringing and regulation

The winch and tensioner stations have to be in disturbed areas within the servitude where practical.

- Rehabilitation of the disturbed areas

A rehabilitation method statement has to be developed and signed off by the ECO. Where seeds are bought and used for rehabilitation, species endemic to the area have to be used. It is suggested that rehabilitation be done in phases, commencing with the section where construction activities are first completed rather than waiting for the last section to be completed. This will facilitate the signing off by landowner(s) while the contractor is still on site and where the landowner(s) are not satisfied, the contractor can rehabilitate the area while still on site.

7.2 Roles, Responsibilities and Reporting

7.2.1 Eskom

Eskom is the proponent of the project and therefore has the overall responsibility to ensure that the construction activities comply with requirements of the Environmental Authorisation, Environmental Legislation and any other applicable legislation. Eskom must have processes in place to ensure that at least the EMP and Environmental Authorisation are issued during tender enquiry. Eskom must periodically audit the contractors who work on their behalf to verify compliance with environmental specifications and must appoint an independant Environmental Control Officer (ECO) prior to commencement of construction (if stipulated in the Environmental Authorisation). DEA must be notified of such an appointment.
The SECO (Site Environmental Control Officer) (contact person: Mr Tebogo Chauke, Environmental Management, Eskom Mpumalanga Operating Unit (Tel 013 693 2714) and ECO must inspect the construction site on a regular basis (during pre-construction, construction and post-construction periods) to confirm the current state of the site and to ensure that the mitigation and rehabilitation measures as specified in the EMP are applied. These officers may make reasonable amendments to the EMP in co-operation with the contractor.

7.2.2 Contractor Roles and Responsibilities

The role of the contractor entails the implementation of Environmental Requirements during construction. Amongst others, the contractor must:

- Appoint and designate a person responsible for managing all requirements of the construction EMP and applicable environmental legislation.
- Implement the requirements of the EMP throughout the construction period.
- The Contractor's Project Manager has to assign the appropriate authority, accountability and responsibility to these personnel to carry out their duties.
- The Contractor is responsible for ensuring that subcontractors are aware of their environmental responsibilities while on site or during the provision of their services.
- The Contractor must ensure that all sub-contractors and other workers appointed by the Contractor comply with and implement the construction EMP during the duration of their specific contracts.
- The Contractor must be familiar with the contents of the EMP and be knowledgeable about the legislative requirements for the construction works, and ensure that work does not commence without the appropriate permits and licences being obtained or provided by the client.

- Site-specific measures in terms of ecology as identified by the ecologist, Wynand Vlok (Tel 082 200 5312) must be included in the contract with the Contractor and implemented by the Contractor during the construction phase.
- Site-specific measures in terms of bird impact as identified by the bird impact specialist, Chris van Rooyen, (Tel 082 454 9570) must be included in the contract with the Contractor and implemented by the Contractor during the construction phase.
- The Contractor must prepare Method Statements, layout plans, drawings for related activities and submit these for approval or acceptance by the Client and/or the ECO.
- Undertake daily site inspections to monitor environmental performance and conformance with the Environmental Specifications;
- Notify the ECO and the Client in the event of any accident or deviations to Environmental Requirements and ensure that proper remedial action is taken;
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of and understand the Environmental Requirements for implementation on site;
- Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract;
- Undertake rehabilitation of all areas affected by construction activities to restore them to their original or satisfactory state;
- Rehabilitate all the areas disturbed by the construction activities;
- Ensure that daily risk assessments conducted on-site include environmental risks that may arise due to the daily construction activities being carried out;
- Keep construction records and reports related to environmental work, for instance, public complaints register, incident register, inspection reports, method statements, environmental induction records etc;
- Ensure that monthly SHE meetings include environmental topics for discussion or separate environmental monthly meetings are conducted where environmental issues can be discussed. Environmental performance must be tracked in these meetings;
- Audit the subcontractors to determine compliance against environmental requirements.

7.2.2.1 Sub-Contractor Management

It is the responsibility of the principal/main contractor to manage and monitor the activities of all the sub-contractors to ensure compliance with the EMP, Environmental Authorisation and applicable Environmental Legislation. The agreements between the principal contractor and subcontractor have to include environmental requirements implementation. The principal contractor has to monitor the activities of the sub-contractor during, amongst others, site inspections and audits.

7.2.3 Environmental Control Officer

Some of the roles and responsibilities of the Environmental Control Officer include the following:

- Signing off or acceptance of method statements for adequacy prior to work commencing.
- Monitoring construction activities performance to confirm that identified control measures are effective.
- Act as the main point of contact between the regulatory authorities and the project on environmental issues.
- Conduct inspections and audits as per environmental authorisation requirements.

- The key responsibility of the ECO is to monitor compliance with all the conditions stipulated in the Record of Decision/Environmental Authorisation (EA), environmental legislation and the recommendations of the EMP.
- The ECO must liaise with an appointed contractor's personnel responsible for environmental management and/or attend site meetings where applicable and inspect the construction site on a regular basis to ensure that the mitigation and rehabilitation measures are implemented.
- The ECO will remain employed until all rehabilitation measures are completed and the site is handed over by the contractor to Eskom for operation.
- Liaise with the landowners on any construction related complaints that might arise.

7.3 Environmental Documentation and Record Keeping

The following minimum documents and records have to be kept on sites:
- Copy of the Environmental Authorisation
- Project Specific Environmental Management Plan
- Aspects/Impacts register
- Incident registers and investigation reports
- Non-conformance register
- Public Complaints register
- Waste disposal register
- Hazardous Substances registers and MSDS (Material Safety Data Sheet) (where applicable)
- Licences and permits
- Records of audit reports and audit findings close out (where applicable)
- Records of site inspections conducted
- Appointment letters and Curriculum Vitae of the contractor's environmental officer or SHE officer who is responsible for the implementation of the environmental requirements for that project
- Environmental Management System Certificate (if certified). If not, an environmental management system manual and or procedures
- List of all hazardous substances to be used on site and their material safety data sheets
- Proof of training (certificates) of persons performing activities that can have significant impact on the environment (eg application of herbicides)

7.4 Appointment of Environmental Control Officer (ECO)

An independant ECO must be appointed well in advance to introduce the project to the landowners and to ensure that all landowner agreements are drafted and signed prior to construction commencing. The Department of Environmental Affairs must be notified of such appointment. The notification has to include ECO details as required by the Environmental Authorisation (an example of the notification is included on the next page).

Appointment of an Environmental Control Officer (ECO)
Details of persons responsible for implementation of the EMP

The following undertaking must be filled out and signed by the applicant and forwarded to the Department of Environmental Affairs (DEA) prior to commencement of construction:

AGREEMENT & UNDERTAKING OF THE APPLICANT

I hereby confirm and state that I am aware of the contents of the Environmental Management Plan and the conditions of the Environmental Authorisation (EA) and shall comply with all legislation pertaining to the nature of the work to be done and all things accidental thereto.

Signed on behalf of: _____

Date: _____

Place: _____

Signature: _____

Full Name: _____

Physical Address: _____

Postal Address: _____

Office Telephone Number: _____

Email address: _____

AGREEMENT & UNDERTAKING OF THE ECO

The following details of the Environmental Control Officer (ECO) must be filled out, signed and forwarded to DEA prior to construction:

Company Name: _____

Contact Person(s): _____

Physical Address: _____

Postal Address: _____

Office Telephone Number: _____

Cellular phone Number: _____

Fax Number: _____

Email address: _____

7.5 Environmental Induction

- The Contractor's environmental officers or responsible person must conduct environmental induction to all the personnel on site.

- The induction has to include amongst others, the requirements of this EMP. Where possible, the induction has to be conducted in a language that the general employees can understand or measures have to be taken to ensure that all the employees understand what is required of them to reduce environmental impact and ensure compliance.
- Records of environmental induction have to be kept and the induction content has to be kept and updated when necessary. Visitor's induction has to be conducted for any visitor to the construction site.

7.6 Development of Method Statements

- Method Statements are required for every significant construction activity undertaken on site.
- The method statements have to be developed prior to any activities taking place. Employees and sub-contractors undertaking a task governed by a method statement must be trained on that particular method statement and have to read and/or understand their obligations prior to commencing work.
- Regular monitoring, inspecting and auditing against compliance with Method Statements must be conducted.
- Non-conformances identified must be actioned and closed out.
- The contractor environmental officer or responsible person must develop method statements for activities that will be carried out.
- The method statements have to at least indicate the activity to be conducted, resources to be used, how the activity will be conducted, and possible environmental impact and mitigation measures.
- The requirements of the EMP, Environmental Authorisation and relevant Environmental Legislation must be considered when developing the method statement.
- Activities can only commence after the Method Statement has been accepted by the Environmental Control Officer and approved by the Site Manager or Project Manager.

7.7 Site Establishment

- The Contractor has to identify an environmental less sensitive area suitable for site establishment. This includes areas which will be used for material layout, offices, camps etc.
- No area for a campsite or temporary storage site should be selected where it would be necessary to cut down any trees or clear any shrub land whatsoever, not even alien species, as oftentimes contractors do not have the expertise to distinguish between alien and indigenous species.
- Any selected temporary site (accommodation or storage) preferably needs to be within the 100m powerline corridor.
- During the finalisation on the power line route, placement of structures near all streams must be confirmed to ensure the integrity of the habitat is not compromised.
- Place structures at least a 75m from all drainage lines and small streams and at least 120m from any riverbank.
- Camp site, storage facilities and other necessary temporary structures to preferably be erected within the confines of open, unused, old lands.
- The locations must be negotiated with the relevant landowner(s) and specifications of the landowner(s) must be adhered to.
- Plan campsites an appropriate distance from any facility where it can cause a nuisance.
- Encourage the construction contractor to employ local people as far as is reasonably practical and encourage the contractor to transport them daily to and from site. This will reduce solid and liquid waste production and water demand at the site camps.

- If at all viable, accommodation for the construction workers to be rented in the nearest town. Sewage disposal will therefore be through the Municipality's main sewer line. If accommodation in a construction camp is unavoidable, then the measures as stipulated in the EMP must be adhered to.
- Contractors have to develop a comprehensive site camp management plan. This has to apply even in the case of the limited accommodation camps discussed above.
- The sites have to be properly demarcated and fenced.
- Legible signage indicating the project details should be placed on site.
- Site Establishment layout map has to be submitted to the ECO together with the method statement for acceptance.
- Prior to site establishment, Eskom and the Contractor have to determine whether rezoning is required in terms of local by laws in the area and ensure that the size of the area intended to be used is either authorised or does not fall within the regulated limits as per EIA regulations.
- Designated eating and smoking areas have to be identified. Where possible, smoking has to be prohibited. If not, smoking areas have to be located in places where there is less risk of fire.
- Cigarette butt containers have to be placed next to the designated smoking areas. This is to avoid littering that may occur on site. A fire extinguisher or fire beaters must be placed next to the smoking areas.
- Potable water that complies with SANS Standards must be provided for drinking and cleansing purposes.

7.8 Ablution Facilities

- Adequate ablution facilities, toilets and change rooms must be provided on site in terms of the National Building Regulations and Building Standards Act.
- All drainage pipes from ablution facilities, toilets, hand wash basins, sinks, showers, etc must be connected either to the municipal sewer system or septic tanks and french drains. The septic tanks and french drains must be approved by the Department of Water Affairs
- If mobile chemical toilets are used, the contents thereof must be disposed of regularly at an approved sewage treatment facility, permission for which must be obtained from the relevant local municipality.
- Toilets to be provided with a ratio of one for every 15 workers.
- These portable toilets to be administered and serviced by a certified, registered company only.
- Proof that the toilets are being serviced to be kept on site.
- Proof of sewage disposal and quantities disposed to be kept. The sewage/contents of the chemical toilets to be disposed at a licenced sewage treatment facility.
- Chemical toilets must be easily accessible by the employees but have to be placed away from natural water resources.
- The chemical toilets not to be placed within 200m of any watercourses.
- Portable toilets must be secured to prevent them from being blown over in windy conditions.
- Regular inspections to be done to ensure high hygiene standards. Employees to be sensitised to use these toilets at all times.
- No use of the veld to be allowed as this results in pollution and landowner complaints and claims.

7.9 Material Storage Areas and workshop areas

- Laydown areas for material storage must comply with rezoning requirements of the local municipality.
- Material and equipment must be stored in areas demarcated for storing such items. Drip trays must be placed underneath stationery machinery.

- Maintenance of machinery to be done off site where practical; if that is impossible, maintenance to be done at an area demarcated for workshop. Such an area should not be permeable.
- During servicing of vehicles or equipment, a suitable drip tray to be used to prevent spills.
- Drip trays always have to be intact, without holes, not damaged or flattened. This will ensure adequate containment of spills.
- The drip trays to be emptied daily. Inspections to be conducted regularly to identify and clean oil spillages that may have occurred.
- Oil from the machinery never to be drained on to the surface, but to be placed in containers that close properly to avoid spillage.
- Oil spill kits always to be placed at accessible areas next to the workshop. The contents of the oil spill kits has to be sufficient to clean areas contaminated with oil spills should they occur.
- Heavy vehicles/machinery in the construction site to be inspected daily. An inspection check sheet to include all the applicable environmental parameters relating to pollution prevention. All oil leaking vehicles to be maintained.
- Stacking and Storage areas will be clearly demarcated with proper signage. Firebreaks will be created around all storage areas.
- Storage and handling of fuels to a capacity of less that 80 000 litres, lubricants, paint, tar, bitumen binders and other chemicals must be done in especially demarcated impervious and bunded areas.
- The material laydown area to be properly fenced and access control to be implemented.

7.10 Access Roads and Access Control

- Identification and planning of access routes to be used must be done in conjunction with the Contractor, Eskom and the Landowner.
- All agreements reached to be documented in writing and no verbal agreements to be made.
- The condition of existing roads to be used shall be documented with photographs where practical.
- Care should be taken to minimise the impact that may be caused by heavy vehicles.
- When using private roads, speed limits have to be determined and adhered to at all time.
- Dust creation to be minimised and mitigated, especially in instances where such can cause nuisance.
- Private access roads always have to be properly maintained if required or as per agreement with the landowner(s).
- Where new access roads are created, scrubbing and vegetation destruction to be avoided or minimised.
- Access roads to be clearly marked, markers must show the direction of travel to which the road leads.
- All construction vehicle drivers to be inducted on the importance of conforming to the identified roads.
- “No Entry” signs to be placed in areas where the use of such roads is prohibited.
- Water diversion berms have to be installed from the commencement of the contract. These berms to be maintained at all times and be repaired at the end of the contract.
- Where slopes are steep, the outflow of the berms installed have to be suitably stone pitched to prevent erosion from starting at the base of the berm. Any other suitable alternative method can be used to prevent erosion from occurring.
- Access to the camp sites and layout areas and construction site to be controlled. Visitors have to be inducted prior to accessing the construction site.

7.11 Gate Installation

- Installation of servitude gates to be carried out as per Eskom procedure.

- The areas where the gates will be installed to be agreed upon with the landowners. The contractor is referred to the Fencing Act, Act no 31 of 1963.
- Game gates to be installed where necessary. All gates will be fitted with locks and be kept locked at all times during the construction phase.
- Gates will only be left open on request of the Landowner if he accepts responsibility for such gates in writing.
- Once the Contractor have left site, the gates must be fitted with Eskom locks. Such gates shall be clearly marked for identification. Claims arising from gates left open will be investigated and appropriate measures be taken to avoid repeat incidents and unnecessary claims from landowners.

7.12 Earthworks and Layerworks

This section includes all construction activities that involve the mining of all materials and their subsequent placement, treatment or batching. The Contractor has to take cognisance of the requirements set out below.

7.12.1 Quarries and borrow pits

The Contractor's attention is drawn to the requirement of the Department of Mineral Resources, that before entry into any quarry or borrow pit, a mining permit application must be made and a EMP for the establishment, operation and closure of the quarry or borrow pit has to be approved by the Department. It is the responsibility of the Contractor to ensure that he is in possession of the approved EMP or a copy therof, prior to entry into the quarry or borrow pit. The conditions imposed by the relevant EMP are legally binding on the Contractor and may be more extensive and explicit than the requirements of this specification. In the event of any conflict occurring between the requirements of the specific EMP and these specifications the former shall apply.

7.12.2 Excavation, hauling and placement

The Contractor has to provide the engineer with detailed plans of his intended construction processes prior to commencing with any cut or fill or layer. The plans have to detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention has to be given to the impact that such activities will have on any adjacent built environment. The Contractor has to demonstrate his "good housekeeping" particularly with respect to closure at the end of each day to ensure that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity.

7.12.3 Stockpiles

The Contractor has to plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported directly to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material have to be indicated and demarcated on the site plan submitted in writing to the engineer for his approval, with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.
The areas chosen must have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care to be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor at all times has to ensure that they are:

- Positioned and sloped to create the least visual impact;
- Constructed and maintained so as to avoid erosion of the material and contamination
- of surrounding environment; and
- Kept free from all alien/undesirable vegetation.

After the stockpiled material has been removed, the site has to be re-instated to its original condition. No foreign material generated/deposited during construction to remain on site. Areas affected by stockpiling to be landscaped, top soiled, grassed and maintained at the Contractor's cost until clearance from the engineer and the relevant National Authority is received.

7.13 Measures to Protect Hydrological Features

- Only existing, proper watercourse crossings may be used during construction and maintenance phases of the project.
- No roads may be cut through riverbanks, stream banks or drainage line banks, as this may lead to siltation of watercourses and downstream dams.
- Existing drifts and bridges may be used if the Landowner gives his consent. Such structures have to then be thoroughly examined for strength and durability before they are used.
- In instances where new river crossings have to be created, permission from the relevant Authority to be sought prior to creating such crossings. Any work or access near or in a permanent drainage system may trigger permit requirements in terms of the National Water Act 36 of 1998.
- Should the need arise for the construction of a new watercourse crossing then a WULA process will have to be followed and approval will have to be obtained from the Department of Water Affairs.
- New drifts and bridges only to be constructed with the approval of Eskom and the relevant Landowner and at the discretion of the ECO.
- All structures constructed for access purposes to be properly designed and drawings of such structures to be available for record purposes.
- No construction material should remain after construction within watercourses or associated floodplains and riparian vegetation.
- All construction material and related equipment and materials, including all forms of waste resulting in any related activity, to be completely removed within 2 weeks of completion of construction.
- No temporary storage structures allowed within 100m of watercourse embankments.
- All activities to be avoided within the main channels of streams, rivers and drainage lines. Under no circumstances, even with a valid WULA.
- Remain out of main channel of watercourses to limit impact on natural habitats.
- During the finalisation on the power line route, placement of structures near all streams must be confirmed to ensure the integrity of the habitat is not compromised.
- Place pylons at least 75m from all drainage lines and small streams and at least 120m from any riverbank.

7.14 Identification and Management of Environmental Sensitive Areas

- Sensitive areas such as heritage sites, wetlands, nesting areas of protected bird species etc have to be identified in the early stages of the project.
- Such areas to be clearly marked as no-go areas and environmental induction has to emphasise the importance of complying with these requirements. (The environmental sensitivity map(s) indicates sensitive environmental areas and features identified in the activity area. (Sensitivity map(s) included in Appendix A of the BAR).
- No authorised construction or activities within demarcated sensitive areas as per sensitivity maps.
- Any activities identified within unauthorised sensitive areas to be halted immediately and reported
- No construction related activities outside of the construction area of the powerline or substation site.
- Any construction related activities identified outside of the construction area to be halted immediately and reported.

7.15 Waste Management

- An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate.
- Any solid waste shall be disposed of at a landfill licensed in terms of section 20(b) of the National Environment Management Waste Act, 2008 (Act 59 of 2008).
- Waste must be separated at source, according to waste type. For instance, general waste to be separated from hazardous waste.
- All waste to be disposed in licensed landfill site which is permitted to handle such waste. Proof of waste disposal of uncontaminated waste and safe disposal certificate for hazardous waste must be kept on site.
- The contractor to provide proper waste receptacles with lids. The waste bins to be monitored so as not to overflow.
- The bins to be clearly labelled or colour coding can be used to ensure separation and proper management of waste.
- These containers need to close securely to avoid items (eg paper and plastic) from being blown into the veld, or being pushed over and rummaged through by wild animals.
- Under no circumstances may solid waste be burned on site unless in a licenced incinerator.
- The contractor has to put effort in waste recycling initiatives. Improper disposal of waste must be avoided as it can lead to legal contraventions. Littering on site is not allowed.
- Waste types generated must be identified, and the handling and disposal of such waste to be clearly indicated.
- Service providers who are responsible for removing waste on site, waste such as hazardous waste, sewage, chemical toilets, used oil etc to provide the contractor with route plan of the roads used from site to the disposal facility, emergency preparedness procedure, proof that the vehicle drivers are trained on emergency preparedness, copy of permits/licence of the waste facility that will be receiving the waste. The vehicles used to be inspected by the contractor to verify if they comply with the requirements of the National Road Traffic Act.

7.16 Plant Rescue and Protection Plan

- No plants are to be removed unnecessary. During the digging of holes, all topsoil (top 30cm) to be placed on one side and used again as the final soil layer when holes are closed up after construction, preferably in the same holes or immediate vicinity where it originated from.

- Remove any bulbous plants (orchids, lilies, etc) found growing directly in the area where the pylon is to be erected.
- Immediately replant any lifted bulbs nearby, or in a similar habitat.
- Any lifted bulbs to be handled with care to avoid physical damage, which could lead to them dying or reduce their changes of successfully re-establishing on the new site.
- After construction (within two weeks) a mix of local, indigenous grass seeds to be sowed on disturbed, bare soils.
- Use longest possible spans between pylons to limited number of pylons. That is, to limit the actual physical footprint on the ground leading to disturbance.
- All protected trees to be identified, if present.
- Valid tree permit to be obtained if protected trees are identified within construction area.

7.17 Vegetation Management

- Vegetation clearing to be kept to a minimum, and only to be done when it is absolutely necessary to do so.
- The removal of all commercial planted trees has to be negotiated with the Landowner before such vegetation is removed.
- All trees and vegetation cleared from the site to be cut into manageable lengths and neatly stacked. These can then be disposed, given away to the local communities or used in any other way that does not pose risk to environmental management.
- Cleared vegetation cannot be left lying along the servitude or construction site. Big trees to be cut manually and care to be taken not to cause major damage to the environment.
- No vegetation clearing in the form of de-stumping, scalping or uprooting to be allowed on river banks and stream banks outside of the construction area.
- Certain plant species are protected and/or endangered in terms of the National Forest Act, the National Environmental Management: Biodiversity Act and Provincial Ordinances. Special care to be taken not to damage or remove any such species unless a permit has been obtained from the relevant Authority to do so.
- Plants not interfering with the construction activities have to be left undisturbed. Collection of medicinal plants is prohibited.
- Use longest possible spans between pylons to limited number of pylons. That is, to limit the actual physical footprint on the ground leading to disturbance.
- The protected trees identified and applications for trimming, cutting and removal must be acquired before the clearing of the construction site can commence. Communication regarding protected species that will not to be removed but are close enough to the construction activities has to be made so that this vegetation is not tampered with.
- The use of herbicides will only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent.
- Application has to be under the direct supervision of a licenced applicator. Herbicides to be handled and managed in the same way as hazardous substances.
- The possibility of leaching into the surrounding environment always has to be avoided and only environmentally friendly herbicides to be used.
- A herbicide register indicating the incoming and outgoing substances/quantities must be maintained.

The contractor responsible for vegetation clearance has at least to comply with the following requirements:

- The contractor or subcontractor used must have knowledge to identify protected species

- The contractor must also be able to identify declared weeds and alien species that can be totally eradicated.
- The contractor must be in possession of a valid herbicide applicators licence, in instances where herbicides will be applied.

7.18 Alien Invasive Management Plan

- Removal of alien invasive species or other vegetation and follow-up procedures must be in accordance with the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983).
- No weeds to grow around newly erected pylons.
- No weeds to grow in disturbed (rehabilitated) soils
- No herbicides to be used on aliens. Aliens to be removed mechanically.
- Ensure that all activities adhere to the Eskom Guidelines for Herbicide use TRR/S91/032.
- Ensure that contractors and practitioners adhere to Eskom Guidelines for Herbicide use.
- Cleared alien vegetation must not be dumped on adjacent intact vegetation during clearing, but should be temporarily stored in a demarcated area.

7.19 Hazardous Substances

- All hazardous substances transported to and from the site to be transported with care.
- Hazardous substances to be placed in an impermeable area, which is properly bunded.
- A register of all hazardous substances to be kept and updated. Flammables and non-flammable substances to be stored separately.
- Flammable substances to be stored where there is enough ventilation. Access to all containers / storage facilities to be controlled.
- Hazardous substance containers to be clearly labelled.
- The labelled side not to be obscured.
- Drip trays to be placed underneath the containers of hazardous substances as a precautionary measure to prevent leaks onto the surface.
- Containers in which hazardous substances are decanted to be properly labelled to avoid unintended use.
- Areas to be monitored for spills and any spills will be contained, cleaned and rehabilitated immediately. Any leaking containers to be removed from Storage areas.
- Proper signage depicting “No smoking”, "No flames", etc to be displayed on the flammable substance storage areas.
- Material Safety Data Sheets to be placed at the hazardous substance storage areas as well as at the point of use. Employees using these substances have to be trained on the MSDS and on the relevant method statements.
- Where possible, refuelling of machinery and vehicles to be done at filling stations. In instances where this is not possible, fuel tanks to be erected as per the requirements of the local municipality if any.
- Refuelling at these storage tanks to be done at a concrete refuelling pad or protected surface and a spill collection tray must always be used to avoid spills to contaminate the refuelling surface underneath.
- A flammable substance storage certificate must be obtained from the local municipality, depending on the quantities to be stored and or the requirements of the local municipality.
- Storage and handling of fuels to a capacity of less that 80 000 litres, lubricants, paint, tar, bitumen binders and other chemicals must be done in especially demarcated impervious and bunded areas.
- The fuel storage areas to be located away from streams, rivers and wetlands. Fuel storage tanks to be adequately secured.

- Bund walls must be constructed to contain 110% of the contents should a spillage occur. The bund walls should not be permeable.
- Clear signage must be displayed at the fuel tanks. This has to include prohibition signs and storage capacities of the fuel tanks. MSDS to be placed at an easily accessible area next to the fuel storage tanks.
- Oil spill kits to be placed at the areas where there is a high risk of fuel spillages. The contractor employees must be trained on how to use the oil spill clean kits. Fire extinguishers must be placed at the areas with the risk of fire.
- Certain of the contractor employees must be trained on how to use the fire extinguishers.
- A register of all the fire extinguishers available on site to be maintained. The fire extinguishers have to be regularly inspected and serviced.

7.20 Spillages

- Streams, rivers and dams have to be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, wash water, organic materials and bituminous products.
- In the event of a spillage during the construction phase, Eskom is responsibile for spill treatment and Eskom is liable to arrange for competent assistance to clear the affected area.
- Eskom has to compile and maintain environmental emergency procedures, to ensure that there will be an appropriate rapid response to unexpected or accidental environmental related incidents throughout the life cycle of the project.
- The individual responsible for, or who discovers a hazardous waste spill must report the incident to the Engineer.
- The Engineer has to assess the situation in consultation with the SECO and act as required in all cases, the immediate response will be to contain the spill. The exact treatment of polluted soil/water has to be determined by die Engineer in consultation with the SECO. Areas cleared of hazardous waste have to be re-vegetated.
- If water downstream of the spill is polluted and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice must be sought for appropriate treatment and remedial procedures to be followed. The costs of containment and rehabilitation will be for Eskom's account, including the costs of specialist input.

During an emergency situation, the following will apply

- No person to be allowed to approach a spill unless he/she is equipped with the personal protective clothing.
- The risk involved to be assessed before anyone approaches the scene of the incident with the emergency response plan.
- A written report has to be forwarded to the relevant environmental authority within 24 hours of the incident.
- Any known or discovered spillage of toxic substances into a stream or river has to be followed by immediate monitoring of the receiving streams and rivers.

7.21 Water Use and Storm Water Management

- The use of water from natural resources, whether surface or groundwater, without the required permits is not allowed.
- The contractor has to determine whether a water use licence or a General Authorisation is required for the abstraction of water used for construction purposes or office related use prior to the commencement of such abstraction. Such permits to be obtained and kept on site.

- In all cases, abstraction of water for construction purposes requires a permit from the Department of Water Affairs unless pre-existing rights are purchased from landowners.
- Conditions listed in the permits have to be complied with and proof of such compliance has to be kept on site and be made available to the Authority if so required. Records of water abstraction have to be kept on site as well as records of water used for dust suppression.
- No water from streams, vleis or farm dams to be used for drinking or cooking purposes. It is important that the management or contractors ensure that staff/workers are supplied regularly with adequate clean drinking and cooking water.
- The water used to supply the site with potable water to be delivered to the site in applicable water tankers.
- Water diversion berms have to be built immediately after creating new roads.
- Water outlets have to be made at intervals where berms are installed and suitably stone pitched if required.
- Berms cannot be created close to identified wetland areas, and the contractor has to ensure that no construction material or waste flows into wetland areas.
- The storm water discharge points must be inspected regularly especially during the rainy season.
- Where these are damaged, they have to be repaired to avoid soil erosion.
- A storm water management method statement must be developed and approved for use.
- Erosion protection and sediment traps have to be placed at storm water outfalls from the camp where appropriate.

7.22 Batching Plant/Mixing of cement

- Batching Plant to be located in disturbed areas or areas with low environmental sensitivity. Such areas to be situated away from identified wetland, streams and rivers.
- Mixing of cement, concrete, paints, solvents, sealants and adhesive must be done in specified areas on concrete aprons or on protected plastic linings to contain spillage or overflows onto soil to avoid contamination to underground water and environmental damage.
- No batching activities to occur on unprotected ground. Care should be taken to ensure that effluent from concrete batch plants does not cause surface or ground pollution.
- The design of a batching plant facility has to be approved by the ECO prior to establishment of such a facility.
- All wastewater and runoff from batching areas have to be controlled.
- Contaminated wash-water resulting from cleaning activities of equipment and flushing of mixers to be done in a way that does not cause pollution.
- Unused cement bags must be stored in such a way as not to be affected by rain or runoff.
- Waste concrete and cement sludge to be removed off the site of the batching plant daily and disposed off appropriately as and when required.
- Methods to prevent excessive dust pollution from spreading during the batching activities have to be investigated and implemented.
- In instances where ready mixed concrete is sourced, the concrete mixer vehicles have to be equipped with tools that can be used in case of an emergency such as concrete spillages. The concrete mixer vehicle drivers to be trained on the applicable emergency preparedness method statements or procedures. The cleaning of concrete mixer vehicle chutes in a manner that will contaminate the environment is not allowed.

7.23 Signage on site

- No-Go Areas have to be identified prior to activity commencement at any locality. For instance, areas of heritage importance, nesting areas for sensitive birds, wetlands, protected trees which the

project activities can impact on, etc have to be identified in advance and proper signage indicating such areas as No-Go Areas have to be placed.
- The No-Go Areas register must be developed and updated as necessary and these areas have to form part of the induction content. Further signage to be placed at all the campsites, material laydown areas, and batch plants (if established outside the main office areas).
- The plastic warning/danger tape cannot be used to demarcate No-Go areas in the field as this will pose danger of ingestion by animals should littering occur.

7.24 Landowner/community Liaison

- The ECO and contractor representative or land liaison officer have to liaise with landowners and the affected community before construction activities commence.
- The applicable Emergency telephone numbers should always be available on site. The relevant contact person is Mr Tebogo Chauke, Environmental Management, Eskom Mpumalanga Operating Operating Unit (Tel 013 693 2714).
- A copy of this EMP has to be submitted to relevant landowners if they request it. They can assist Eskom in assuring that the contractor adheres to rules as stipulated and that mitigation and rehabilitation measures are applied.
- The community has to be informed of the commencement date of construction as well as the phases in which the construction will take place.
- Access roads and any other land uses such as camp sites and laydown material areas to be agreed upon with the landowner(s).
- Landowner(s) to be informed of the type of activities that will take place in their properties.
- The construction activities have to be properly planned to cater for disruptions that might be caused by rain and very wet conditions.
- The Contractor must adhere to conditions stipulated in the landowner's agreement documents and any other special conditions that have been agreed to with the landowner and signed off by the parties involved.
- Servitude gates on the line route have to be installed before construction activities are undertaken or as per agreement with landowners.
- Where existing roads are in a bad state of repair, such roads' condition has to be documented before the roads are used for construction purposes.
- If necessary some repairs have to be done to prevent damage to equipment and plant.
- All manmade structures to be protected against damage at all times and any damage to be rectified immediately.
- The contractor has to conduct regular site inspections and good control over the construction process during the construction period.
- The contractor must ensure that the landowners are satisfied with rehabilitation work and must ensure that the landowners sign off release documentation as required.

7.25 Fire Prevention

- To minimise the risk of veld fires, no open fires are allowed on site, except under strictly controlled conditions.
- The statutory requirements of provincial ordinances, municipal by-laws and the National Veld and Forest Fire Act 101 of 1998 have to be complied with. Cooking fires can only be made in controlled designated areas that are assessed prior to use.
- Fire fighting equipment to be placed at strategic areas relevant to the points where cooking fires are allowed.

- Contractor employees to be trained on fire fighting and fire emergency drills have to be done to determine readiness in case of emergency.
- The contractor has to take all reasonable and appropriate steps to avoid increasing the risk. Daily Risk Assessments and or Toolbox Talks also to indicate the importance of abiding by the rules of not making open fires.
- A firebreak has to be created in high risk areas such as camp sites and material storage areas.
- Fire Risk Management is dealt with under a procedure titled "Distribution Fire Risk Management", reference SCSASAAJ6. Grass fires are dealt with in this procedure stating that vegetation and equipment must be maintained. A specific procedure deals with fire risk management for substations where the chipped stone needs to be maintained to prevent vegetation growth.

7.26 Dust Control

- Appropriate dust suppression techniques must be implemented on all exposed surfaces to minimise and control airborne dust. Such measures must be include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas. The introduction of speed limits to be looked into as a way of minimising dust in dusty access roads
- Construction activities have to be conducted in such a way that dust is minimised. The neighbouring property owners have to be informed of any blasting activities which may affect them due to dust generation.

7.27 Noise Pollution

- Construction activities will mostly occur during the day.
- In instances where work has to continue during the night and where noise may cause a nuisance to the neighbouring property owners, the contractor has to inform the property owners in advance.

7.28 Emergency Preparedness

- The contractor has to identify all possible emergency situations that might occur during construction activities.
- The emergencies identified have to include environmental related emergencies.
- Clear lines of communication to be established and communicated to employees for use should such emergencies occur.
- Emergency contact details for the different potential emergencies to be displayed in several strategic areas.
- Emergency drills to be done; the contractor must establish the frequency at which the drills must be done.
- Emergency drill report must be developed and filed and areas of improvement must be identified and improved upon.
- The contractor must determine whether the emergency telephone numbers displayed are correct and operational. Actions to be taken in the event of different types of emergencies to be made clear to employees.

7.29 Environmental Incident Management

- Environmental incidents to be prevented. In instances where they occur, the reporting requirements as per the related environmental legislation and or the client's procedural requirements to be adhered to.

- Areas contaminated by incidents have to be rehabilitated. Recording of incidents to be done as per procedure requirements.
- The contractor has to aim at preventing or and reducing incident occurrence on site.

7.30 Fauna

- A search has to be conducted to identify habitats such as nests and breeding sites of sensitive protected fauna.
- Construction activities must be planned carefully so as not to unnecessarily disturb game and any other animal species, as this may lead to fatalities which may result in claims from the Landowners.
- The Contractor will under no circumstances interfere with livestock without the consent of the landowner. This includes the moving of livestock where they interfere with construction activities.
- If the Contractors workforce obtain any livestock for consumption purposes, they must be in possession of a written note from the Landowner.
- Where applicable, the hunting season also has to be considered in the construction activities planning. This can be agreed with the landowner.

7.31 Avi-fauna

- The breeding sites of raptors and other wild bird species have to be taken into consideration during the planning of the construction programme.
- If any new sites or nests of raptors and other wild bird species which were not known or noted before are found during the construction process, each site has to be assessed for merit and the necessary precautions taken to ensure the least disturbance.
- Bird guards and diverters have to be installed according to the recommendations of the avian specialist.

Habitat destruction

- Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable. It is important to ensure that the construction Environmental Management Plan incorporates guidelines as to how best to minimize this impact.

Mitigation for electrocution

- It is highly recommended that the steel monopole design be used and that this incorporates the standard bird perch. If this is the case then most raptors and birds of high electrocution risk will perch well above the conductors and out of harm's way. In addition it is critical that all clearances between live and earth components are greater than 1.8 meters. If this is the case then the impact of bird electrocution will be very minimal.
- The poles should be fitted with bird perching brackets (D-DT 7347) on top of the poles to draw birds, particularly vultures, away from the potentially risky insulators.

Mitigation for collisions

- There is likely to be significant movement of waterbirds up and down the Harts River. That section of line should be marked with Bird Flight Diverters on the earth wire of the line, five metres apart, alternating black and white. Appendix B of the Bird Impact Report indicates the section of line where BFDs should be fitted. Appendix C indicates the type of BFD that is recommended.

7.32 Soil Erosion

Construction activities have to be well managed to prevent erosion and the following is relevant:

- Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions to be avoided.

- Trees or existing grass strata outside of the construction corridor not to be removed as they will reduce the destructive force of water which can cause erosion.
- Indigenous vegetation that does not interfere with the construction activities, to be left undisturbed.
- All cleared areas must be ripped and rehabilitated after construction. The top 200mm layer of topsoil must be removed and stockpiled in small heaps and replaced on the construction areas once the activities have been completed. The affected areas have to be replanted with a grass mixture indigenous to the area.
- The eradication of any alien vegetation to be followed by replacement with indigenous vegetation as soon as possible to ensure quick and sufficient coverage of exposed soil.
- No roads may be cut through riverbanks, stream banks or drainage line banks, as this may lead to erosion and siltation of watercourses and downstream dams.
- Only existing, proper watercourse crossings may be used during construction and maintenance phases.
- Crossing of dongas and existing eroded areas have to be thoroughly planned prior to the commencement of construction and movement of construction and delivery vehicles.
- Water diversion berms have to be installed at donga crossings to ensure run-off water on the servitude does not run into dongas and cause an erosion hazard, nor resulting in increased or further erosion.
- Suitable erosion containment structures have to be constructed at donga crossings where required and viable.
- Specialists have to properly design all structures and drawings to be available for reference purposes.
- No unplanned/improperly planned cutting of donga embankments is allowed as this leads to erosion and degradation of the natural environment.
- No unnecessary roads or vehicle tracks or driving of vehicles through the veld as this leads to increased denuding of the covered soils which leads to increased erosion potential.
- No disturbance to sand roads due to construction activities.
- No disturbance to watercourse embankments outside of project area.
- No erosion to be visible to watercourse embankments.

7.33 Management of Heritage Resources

- Heritage sites identified during the impact assessment have to be clearly marked on the profiles. Such areas to be marked as no go areas.
- For this project, no heritage sites were identified within the demarcated zones of the powerline corridors.
- Artefacts are not be removed under any circumstances.
- Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted.
- Permits have to be obtained from the South African Heritage Resources Association (SAHRA) in instances where the proposed activity affects any world heritage sites or if any sites are to be destroyed or altered.
- If any evidence of archaeological sites or remains (eg remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, marine shell and charcoal/ash concentrations), unmarked human burials, fossils or other categories of heritage resources are found during the proposed activities, construction activities have to be halted immediately.
- Eskom to be notified of the archaeological finds as soon as possible.

- SAHRA APM Unit (Philip Hine/Colette Scheermeyer 021 462 4502) must be alerted immediately and a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contacted as soon as possible to inspect the findings.
- If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation might be necessary.

7.34 Environmental Monitoring and Reporting

- Environmental monitoring at the least, has to be done in terms of the requirements of the Environmental Authorisation. A monitoring checklist has to be developed in terms of the EMP, Environmental Authorisation, environmental permits, licence conditions, method statements and any other applicable legislative requirements. Any deviations identified have to be rectified.
- Repeat audit findings to be avoided. Apart from external audits, internal audits must be conducted on the implementation of environmental requirements.
- The contractor environmental officer has to report on the performance of the construction activities to contractor management.
- Environmental parameters such non-conformances, audit findings, environmental legal contraventions and environmental incidents have at least to be monitored.
- The contractor has to set environmental objectives and targets for various levels within the construction team. The objectives and targets have to be instilled in all employees.

7.35 Traffic Management Plan

- Property owners that would be affected by the distribution line construction should be consulted prior to the construction phase with regards to the construction schedules, transportation corridors, construction of additional access roads and construction methods to be used.
- Eskom should keep the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads are very costly, impact on the residents' daily living and movement patterns, and create a potential for erosion.
- Rehabilitation of new access roads for construction vehicles should be undertaken as soon as the construction process allows.
- There should be strict adherence to speed limits when using local roads and when travelling through residential areas.
- Access Corridors and access points for heavy construction vehicles should be indicated to warn motorists of the movement of these vehicles.
- Limit the movement of construction vehicles to off-peak periods (where possible).
- Limit the movement of construction vehicles in areas where sensitive receptors are situated e.g. schools and pedestrians.
- Construction hours will be restricted to specific periods, which exclude Sundays and public holidays.
- All complaints received with regards to poor conduct of Eskom personnel, malfunction of or damage to Eskom structures; etc. will be investigated by Eskom in co-operation with all the relevant stakeholders.
- The existing complaints structure must be revised by Eskom and be updated on a regular basis and communicated with all the affected landowners to ensure effective response and service supply.
- A list of all names, telephone numbers and addresses of the relevant Eskom employees, contractors and all affected landowners must be compiled and regularly updated and distributed to everyone to ensure sufficient communication channels in case of emergency and where access is required for maintenance purposes.

7.36 Agricultural lands

- Contact and/or disturbance of domestic animals (cattle) to be avoided at all times.
- All holes dug for pylons, etc. to be fenced (secured) if left open over night. Domestic and wild animals are susceptible to falling into open holes.
- No open fires allowed.
- All equipment and supplies to be properly stored in a secure enclosure to avoid contact with domestic animals.
- All excess supplies, equipment, temporary facilities, rubbish to be totally removed immediately after completion of project (within two weeks).
- No rubbish to be burnt or buried in agricultural lands.
- No mounds of unused soils, etc. to be left.
- No facilities to be erected within 100m of any watering points for domestic animals such as cattle, sheep or goats.

8. OPERATIONAL PHASE

8.1 Re-vegetation and Habitat Rehabilitation Plan

- The topsoil removed during excavations must be put to one side for re-use in the same holes or immediate area.
- Where necessary a suitable mixture of local, indigenous grass seed to be used to re-seed damaged areas.
- Badly damaged areas have to be fenced in to enhance rehabilitation.
- After rehabilitation fencing to be removed.
- Under no circumstances may alien grass seed or any alien or non-local plant species be used for rehabilitation.
- Roads to be upgraded before construction if, due to their condition, they will not be able to handle the traffic load.
- No-use roads have to be clearly marked.
- Existing road infrastructure to be used as far as possible.
- Rehabilitation of roads to start within two weeks after construction.
- No mounds of topsoil or other soil types to be left after construction.
- Rehabilitation to start within two weeks after construction.
- All waste material (construction, effluent, litter from workers, etc) to be removed on a weekly basis and only by official, registered companies.
- All waste to be removed to official municipal waste disposal sites. Under no circumstances may any waste (including cooking waste) be dumped in the veld.
- Removal of all remaining waste to commence immediately (same day) after construction is completed.
- Rehabilitated and re-vegetated areas to be inspected every month until fully established. Any ‘failed’ areas to be re-assessed and rehabilitated until fully established and settle.
- Any visible erosion to be immediately attended to and corrected.

8.2 Soil Erosion

- Areas around all foundation slabs, pylons and any other construction structures to be checked before and after the summer rainy season for signs of soil erosion due to stormwater run-off. Such sites have to be modified and rehabilitated to prevent ongoing erosion.
- These sites have to be monitored more closely than other sites that show no or minimal signs of erosion.
- The services of Eskom Engineers have to be sought once eroded areas have been identified.
- Anti-erosion mechanisms to be implemented on all gradients with a high risk of erosion.
- No inspection or other vehicles to drive through any watercourses, except where there are existing bridges, farm roads and other crossovers.

9 DECOMMISSIONING

If the powerline reaches a decommissioning phase, a decommissioning EMP has to be compiled.

Conclusion

To ensure implementation of this EMP, proper works planning is critical. Continual environmental awareness conducted on the work force can instil an environmental consciousness which is required amongst all employees. The principle of monitoring and continual improvement has to be one of the core principles implemented by the construction management.

****