

ENVIRONMENTAL IMPACT ASSESSMENT  
DRAFT BASIC ASSESSMENT REPORT

ESKOM GOEDETROUW AND KETTING SUBSTATIONS AND 132KV LINES  
PROJECT  
DATE 2 NOVEMBER 2015

Appendix G  
Environmental Management Plan (EMP)

Compiled by:  
Texture Environmental Consultants  
PO Box 36593  
MENLOPARK  
Pretoria  
0102

Contact Person Details:  
Ria Pretorius  
Tel 082 568 6344  
Fax 086 675 4026  
Email: [ria@peopletexture.co.za](mailto:ria@peopletexture.co.za)

Applicant:  
Platinum Group Metals RSA (Pty) Ltd

Contact Person Details:  
TDx Power  
Hilgard Nel  
P.O. Box 72494,  
Lynwood Ridge, South Africa, 0040  
Tel: 012 841 4311/ 082 781 1083  
Fax: 012 349 2958  
Email: [hilgard@tdxpower.co.za](mailto:hilgard@tdxpower.co.za)

## GLOSSARY OF TERMS

### ALIEN VEGETATION

Alien vegetation is defined as undesirable plant growth (usually of foreign origin) 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.

### CONSTRUCTION MANAGER

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

### CONTRACTOR

A person or company appointed by the applicant 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:

the land, water and atmosphere of the earth;

micro-organisms, plant and animal life;

any part or combination of (i) of (ii) and the interrelationships among and between them; and

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 the applicant the project compliance with conditions of the Environmental Authorisation (Record of Decision), environmental legislation and recommendations of this Environmental Management Programme.

### ENVIRONMENTAL IMPACT

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

#### INCIDENT

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

#### SEMP

Strategic Environmental Management Plan. A SEMP (a sustainability framework) is developed to provide a strategic objective, priority action and environmental indicator for managing the environment.

## ACRONYMS

CSIR	-	Council for Scientific and Industrial Research
DEA	-	Department of Environmental Affairs
DMR	-	Department of Mineral Resources
DSOE	-	Desired State of the Environment
DWAS	-	Department of Water Affairs and Sanitation
ECF	-	Environmental Constraints Framework
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
GIS	-	Geographic Information System
IDP	-	Integrated Development Plan
I&AP	-	Interested and/or affected parties
MASL	-	Meters above sea level
NBA	-	National Biodiversity Assessment
NEMA	-	National Environmental Management Act
PAES	-	Protected Areas Expansion Strategy
HRA	-	National Heritage Resources Act
NWA	-	National Water Act
PPP	-	Public participation process
SAHRA	-	South African Heritage Resources Agency
SANBI	-	South African National Biodiversity Institute
SDF	-	Spatial Development Framework
SDI	-	Spatial Development Initiative
SEA	-	Strategic Environmental Assessment
SEMP	-	Strategic Environmental Management Plan
WUL	-	Water Use Licence
WULA	-	Water Use Licence Application

# TABLE OF CONTENTS

<b>GLOSSARY OF TERMS</b>	<b>2</b>
<b>ACRONYMS</b>	<b>4</b>
<b>TABLE OF CONTENTS</b>	<b>5</b>
<b>INTRODUCTION</b>	<b>7</b>
OVERVIEW OF THE PROJECT	7
ENVIRONMENTAL AUTHORISATION	7
LOCALITY OF PROJECT	8
SCOPE OF THE PROJECT	10
PROPERTY DESCRIPTIONS	10
CO-ORDINATES	15
PURPOSE OF THE EMP	15
<b>STRUCTURE OF THE ENVIRONMENTAL MANAGEMENT PLAN</b>	<b>17</b>
<b>PLANNING AND DESIGN PHASE</b>	<b>18</b>
IDENTIFICATION AND MANAGEMENT OF ENVIRONMENTALLY SENSITIVE AREAS	18
ENGINEERING SERVICES	23
FINAL DESIGN	23
LEGISLATIVE AND OTHER REQUIREMENTS	23
PROTECTED TREES	24
WATER USE LICENCES (WUL)	25
TENDER STAGE	25
CONTRACT AWARD	25
<b>CONSTRUCTION PHASE</b>	<b>26</b>
MAIN ACTIVITIES DURING CONSTRUCTION PHASE	26
PEGGING OF THE CONSTRUCTION SITE	26
EXCAVATION	26
CONCRETE MIXING, POURING AND FOUNDATION CREATION	27
TOWER ASSEMBLY	27
TOWER ERECTION	27
CONDUCTOR STRINGING AND REGULATION	28
REHABILITATION OF THE DISTURBED AREAS	28
<b>ROLES, RESPONSIBILITIES AND REPORTING</b>	<b>28</b>
APPLICANT	28
CONTRACTOR ROLES AND RESPONSIBILITIES	29
SUB-CONTRACTOR MANAGEMENT	30
ENVIRONMENTAL CONTROL OFFICER	30
ENVIRONMENTAL DOCUMENTATION AND RECORD KEEPING	30
APPOINTMENT OF ENVIRONMENTAL CONTROL OFFICER (ECO)	31
APPOINTMENT OF ENVIRONMENTAL CONTROL OFFICER	32
ENVIRONMENTAL INDUCTION	33

<b>DEVELOPMENT OF METHOD STATEMENTS</b>	<b>33</b>
<b>METHOD STATEMENT</b>	<b>33</b>
<b>SITE ESTABLISHMENT</b>	<b>36</b>
<b>ABLUTION FACILITIES</b>	<b>36</b>
<b>MATERIAL STORAGE AREAS AND WORKSHOP AREAS</b>	<b>37</b>
<b>ACCESS ROADS AND ACCESS CONTROL</b>	<b>37</b>
<b>GATE INSTALLATION</b>	<b>38</b>
<b>EARTHWORKS AND LAYERWORKS</b>	<b>38</b>
QUARRIES AND BORROW PITS	38
EXCAVATION, HAULING AND PLACEMENT	38
STOCKPILES	38
<b>WASTE MANAGEMENT</b>	<b>39</b>
<b>HAZARDOUS SUBSTANCES</b>	<b>39</b>
SPILLAGES	40
<b>WATER USE AND STORM WATER MANAGEMENT</b>	<b>41</b>
<b>BATCHING PLANT/MIXING OF CEMENT</b>	<b>41</b>
<b>SIGNAGE ON SITE</b>	<b>42</b>
<b>LANDOWNER/COMMUNITY LIAISON</b>	<b>42</b>
<b>FIRE PREVENTION</b>	<b>43</b>
<b>DUST CONTROL</b>	<b>43</b>
<b>NOISE POLLUTION</b>	<b>44</b>
<b>EMERGENCY PREPAREDNESS</b>	<b>44</b>
<b>ENVIRONMENTAL INCIDENT MANAGEMENT</b>	<b>44</b>
<b>MEASURES TO PROTECT HYDROLOGICAL FEATURES</b>	<b>44</b>
<b>PLANT RESCUE AND PROTECTION PLAN</b>	<b>45</b>
<b>VEGETATION MANAGEMENT</b>	<b>46</b>
<b>ALIEN INVASIVE MANAGEMENT PLAN</b>	<b>46</b>
<b>FAUNA</b>	<b>47</b>
<b>AVI-FAUNA</b>	<b>47</b>
<b>SOIL EROSION</b>	<b>47</b>
<b>HERITAGE RESOURCES</b>	<b>48</b>
<b>PALAEONTOLOGY</b>	<b>49</b>
<b>ENVIRONMENTAL MONITORING AND REPORTING</b>	<b>50</b>
<b>TRAFFIC MANAGEMENT PLAN</b>	<b>50</b>
<b>OPERATIONAL PHASE</b>	<b>51</b>
<b>RE-VEGETATION AND HABITAT REHABILITATION PLAN</b>	<b>51</b>
<b>SOIL EROSION</b>	<b>51</b>
<b>AVIFAUNA</b>	<b>51</b>
<b>DECOMMISSIONING</b>	<b>52</b>
<b>CONCLUSION</b>	<b>52</b>
<b>REFERENCES</b>	<b>53</b>

## INTRODUCTION

Waterberg JV Resources (Pty) Ltd (the applicant) appointed **Texture Environmental Consultants** as the independent environmental assessment practitioner (EAP) to undertake the Environmental Impact Assessment (EIA) for a proposed bulk electricity supply project. The EIA will conform to the National Environmental Management Act 107 of 1998 and to the Environmental Impact Assessment Regulations published in GN R982/2014 - R985/2014 of 8 December 2014.

Texture Environmental Consultants needs to develop an EMP for the construction of the bulk electricity supply infrastructure.

### Overview of the Project

The Waterberg JV Resources project is a mining project, which is being developed by Waterberg JV Resources (Pty) Ltd, a subsidiary of Platinum Group Metals RSA Pty Ltd. ("PTM"). The project aims to develop a platinum group metals mine and processing complex on the project site on the Northern Limb of the Bushveld Complex in the Limpopo Province, South Africa. The Waterberg JV Resources project is currently in the pre-feasibility stage.

Bulk electricity supply infrastructure is needed to supply the above-mentioned mining project on the farms Goedetrouw 366 LR and Ketting 368 LR. This infrastructure will comprise 4 x 132 kV overhead power lines from the existing Eskom Borutho Main Transmission Station (MTS) to the Goedetrouw and Ketting properties; 2 x 132 kV Eskom substations on the mine site; and 2 x "Main Consumer" 33/11 kV substations on the mine site.

The bulk electricity supply infrastructure will be developed and constructed by Waterberg JV Resources (Pty) Ltd, on behalf of Eskom, who will ultimately take over the ownership of the infrastructure and operate and maintain it.

### 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, 2014 for the following listed activities:

Listed activity	Description of project activity
<u>GN R983/2014 Activity 11</u> The development of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts	The construction of 4 x 132kV overhead power lines of approximately 80km long from the existing Eskom Borutho Main Transmission Station (MTS) to 2 x new 132kV Eskom substations.
<u>GN R983/2014 Activity 27</u> The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.	The construction of 2 x 132kV new Eskom substations on the Waterberg JV Resources project mine site, each measuring approximately 150 m x 150 m.
<u>GN R983/2014 Activity 28</u> Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur outside an urban area, where the total land to be developed is bigger than 1 hectares.	The construction of 2 x 132kV new Eskom substations, Ketting and Goedetrouw, on the Waterberg JV Resources project mine site each measuring approximately 150 m x 150 m. Subsistence farming was practised in the past on both Ketting and Goedetrouw.

## Locality of project

Four 132kV overhead lines will be constructed from the existing Eskom Borutho Main Transmission Station (MTS) to the two 132kV Eskom substations which shall be constructed on the Waterberg JV Resources project mining site.

Borutho MTS is a 400/132kV Eskom transmission substation located approximately 31 km north of Mokopane in the Limpopo Province. The substation is currently under construction and it is expected that it will be completed in 2016.

The Waterberg JV Resources site comprises various properties over which PTM owns the prospecting rights. The mining complex and the on-site bulk electricity infrastructure will be located on the farms Goedetrouw 366 LR and Ketting 368 LR. The farms Goedetrouw and Ketting are located about 80 km northwest of Polokwane.

The project is in the Mogalakwena, Aganang and Blouberg Local Municipalities in the Limpopo Province.

*Figure 1: Study area location*



## Eskom Goedetrouw & Ketting Substations & 132kV Lines Project

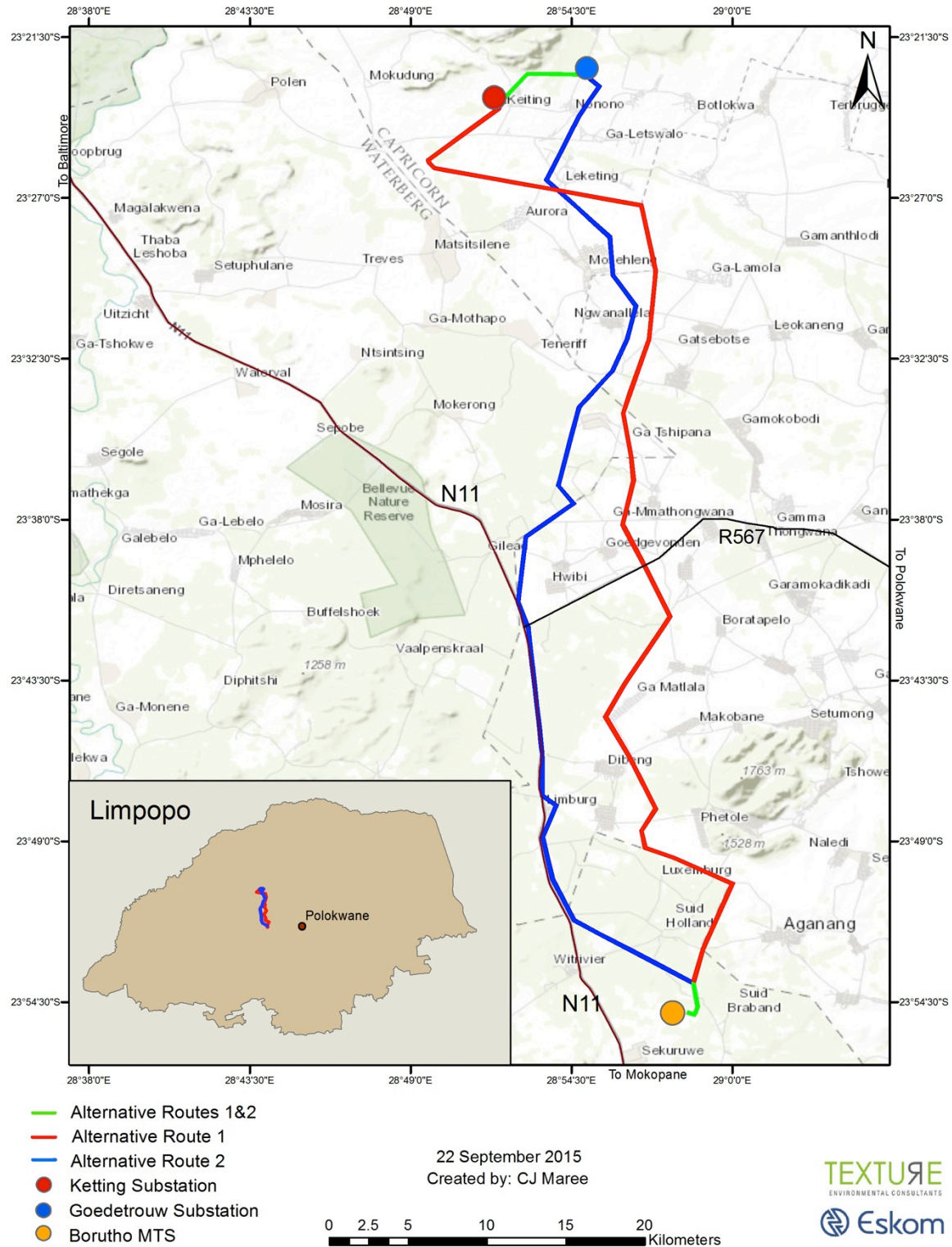


Figure 2: Study area location

## Scope of the project

The full scope of works includes the construction of:

1. 4 x 132kV overhead power lines of approximately 80km long from the existing Eskom Borutho Main Transmission Station (MTS) to the 2 x new Eskom substations, Goedetrouw and Ketting;
2. Goedetrouw 132kV Substation and Ketting 132kV Substation on the Waterberg JV Resources project mine site, each measuring approximately 150 m x 150 m;
3. 2 x indoor Main Consumer 33/11kV substations, each measuring about 50 m x 15 m on the mine site.

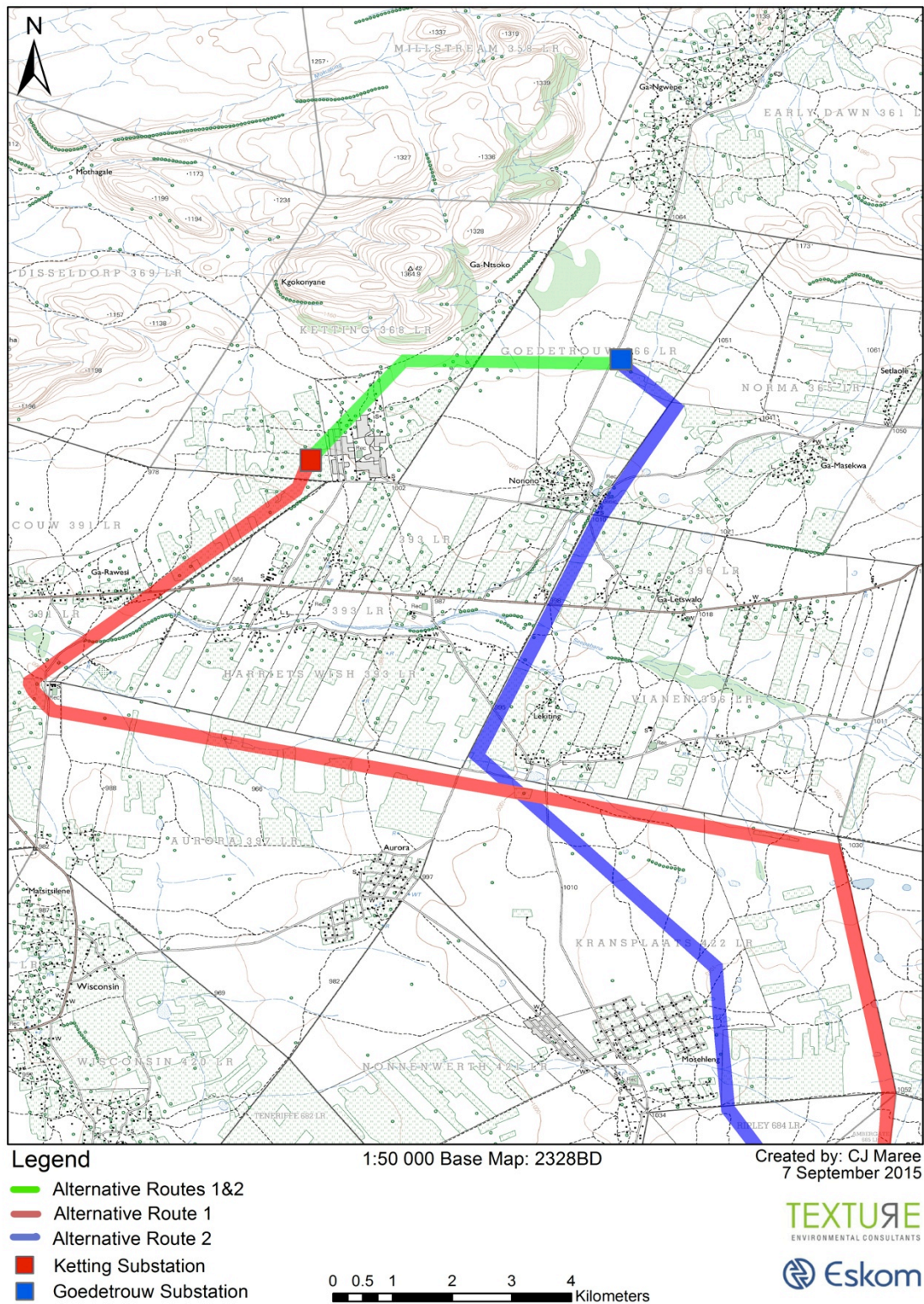
## Property Descriptions

The proposed alignment for Route Alternative 1 is on the farms Noord Braband 774 LR (Consolidated to the Remainder of Gilemberg 861 LR), Jupiter 717 LS, Matalas Location 591 LS, Goedgevonden 732 LR, Schoongelezen 695 LR, La Pucella 693 LS, Cromford 690 LR, Schaffhausen 689 LR, Ambergate 685 LR, Ripley 684 LR, Kransplaats 422 LR, Aurora 397 LR, Cracouw 391 LR, Ketting 368 LR, Goedetrouw 366 LR in the Mogalakwena, Aganang and Blouberg Local Municipalities in the Limpopo Province.

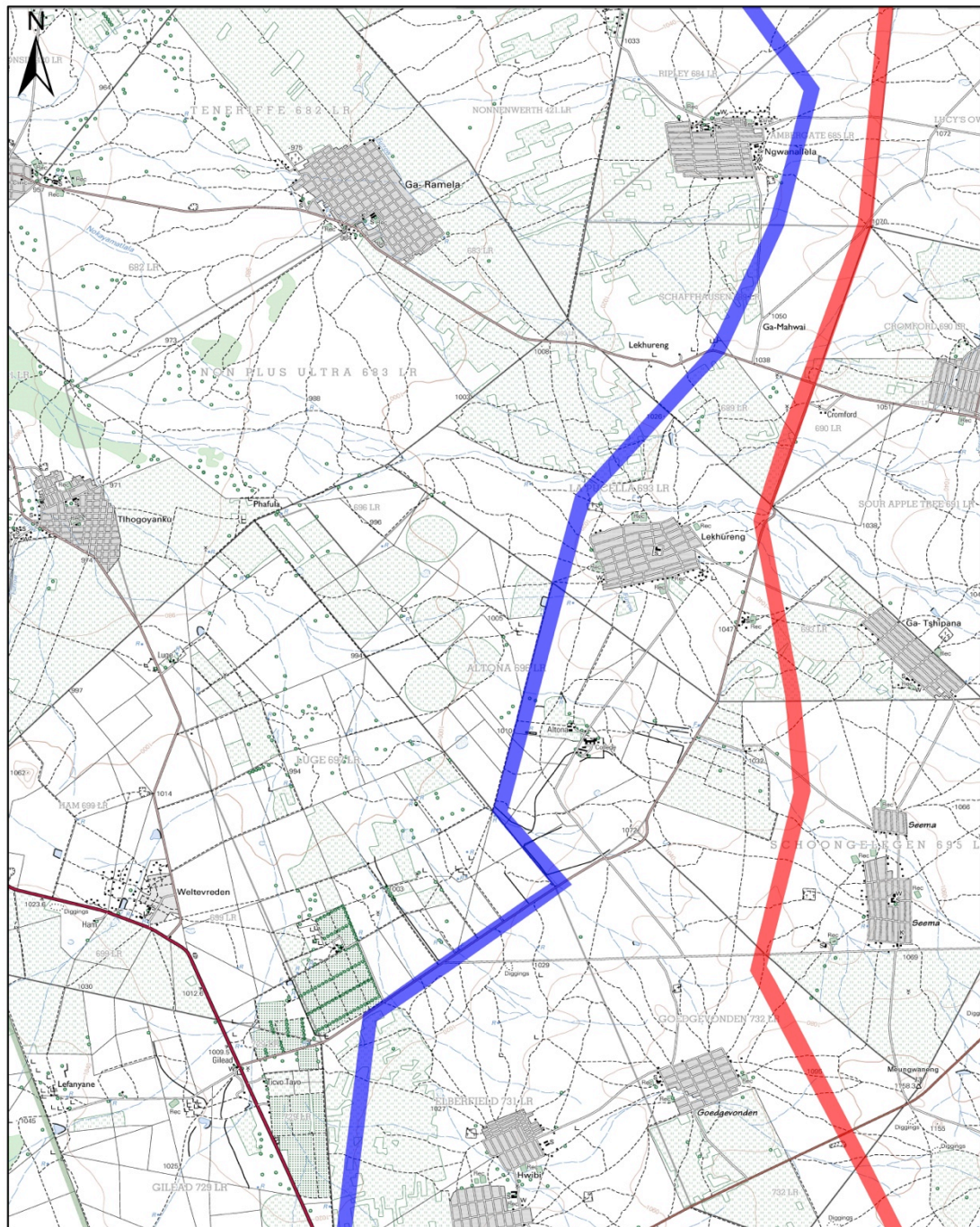
The proposed alignment for Route Alternative 2 is on the farms Noord Braband 774 LR (Consolidated to Gilemberg 861 LR), Zuid Holland 773 LR (Consolidated to Gilemberg 861 LR), Noord Holland 775 LR, Lumberg 769 LR (Consolidated to Gilemberg 861 LR), Stirum 767 LR (Consolidated to Gilemberg 861 LR), Matalas 591 LS, Swerwerskraal 736 LR, Chlun 735 LR (Consolidated to Gilemberg 861 LR), Tweespalk 733 LR (Consolidated to, Gilemberg 861 LR), Elberfield 731 LR, Schoongelezen 695 LR, Altona 696 LR, La Pucella 693 LS, Schaffhausen 689 LR, Ambergate 685 LR, Ripley 684 LR, Kransplaats 422 LR, Vianen 396 LR, Norma 365 LR, Goedetrouw 366 LR, Ketting 368 LR in the Mogalakwena, Aganang and Blouberg Local Municipalities in the Limpopo Province.

The proposed project is set out in the Location Maps below.

## Routes Overview - Map 1 of 4



## Routes Overview - Map 2 of 4



1:50 000 Base Map: 2328DB

Created by: CJ Maree  
7 September 2015

### Legend

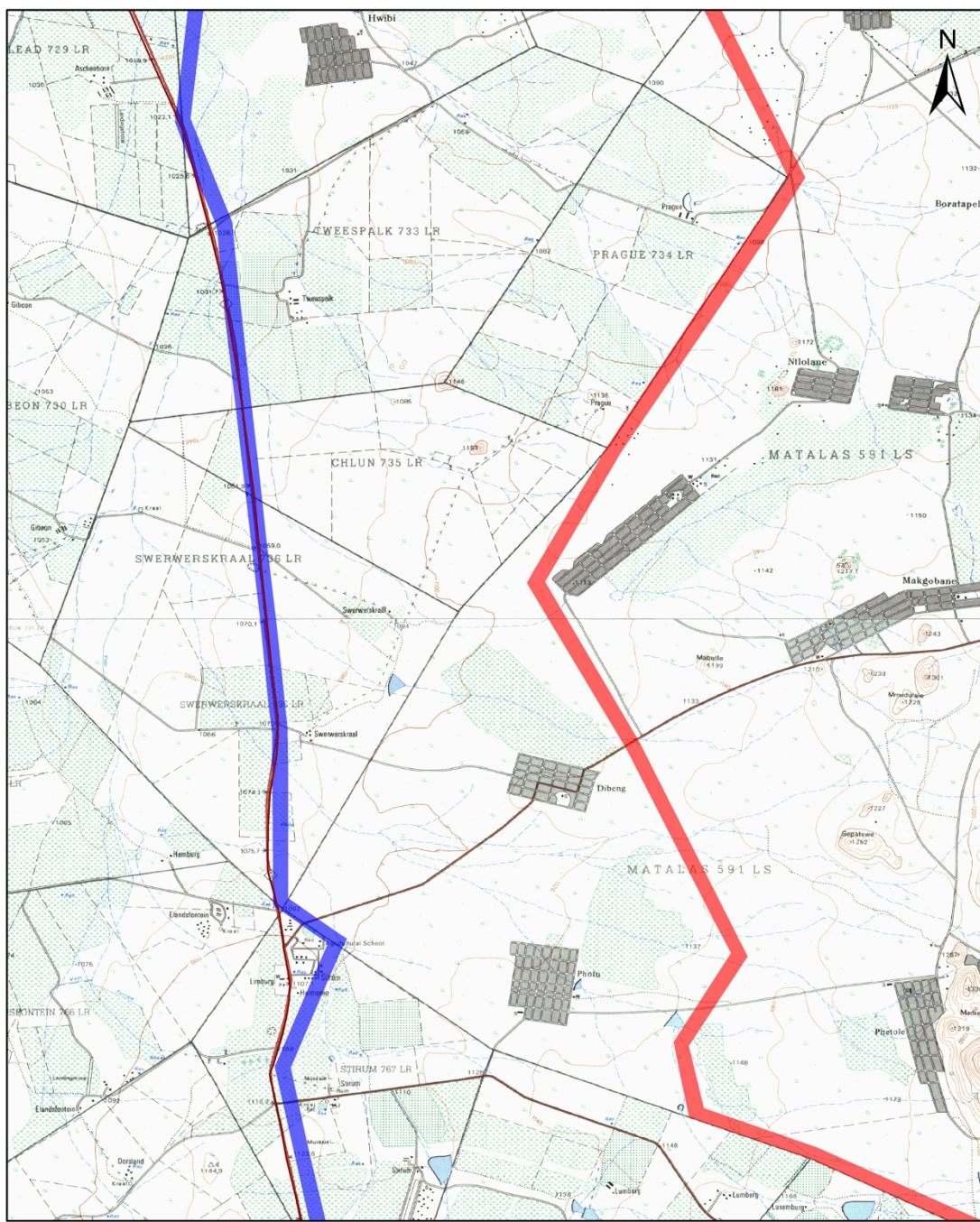
- Alternative Routes 1&2
- Alternative Route 1
- Alternative Route 2

0 0.5 1 2 3 4 Kilometers

**TEXTURE**  
ENVIRONMENTAL CONSULTANTS

**Eskom**

## Routes Overview - Map 3 of 4



1:50 000 Base Maps: 2328DB, 2328DD

Created by: CJ Maree  
7 September 2015

### Legend

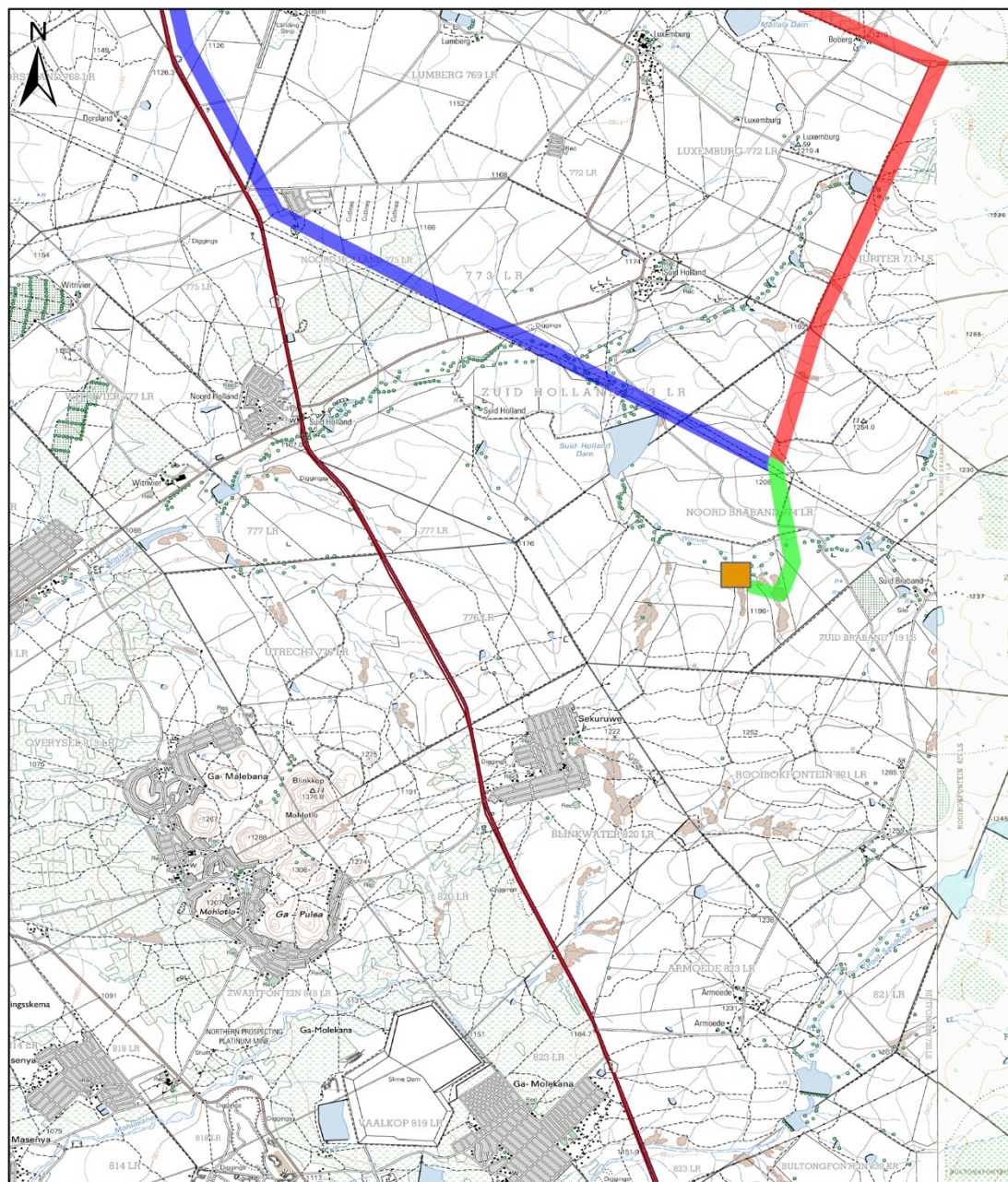
- Alternative Routes 1&2
- Alternative Route 1
- Alternative Route 2

0 0.5 1 2 3 4  
Kilometers

**TEXTURE**  
ENVIRONMENTAL CONSULTANTS

**Eskom**

## Routes Overview - Map 4 of 4



1:50 000 Base Map: 2328DD, 2329CC

Created by: CJ Maree  
7 September 2015

### Legend

- Alternative Routes 1&2
- Alternative Route 1
- Alternative Route 2
- Borutho MTS

0 0.5 1 2 3 4  
Kilometers

**TEXTURE**  
ENVIRONMENTAL CONSULTANTS

**Eskom**

## Co-ordinates

### Goedetrouw Substation and Ketting Substation

Co-ordinates of the 4 corners of the current preferred site positions for the two substations

<b>Alternative S1 (preferred alternative)</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)
Goedetrouw substation 4 corners	23°22'43.75"S	28°54'54.74"E
Goedetrouw substation	23°22'47.05"S	28°54'53.33"E
Goedetrouw substation	23°22'48.48"S	28°54'57.51"E
Goedetrouw substation	23°22'45.20"S	28°54'58.87"E
<b>Alternative S1 (preferred alternative)</b>		
Description	Lat (DDMMSS)	Long (DDMMSS)
Ketting substation 4 corners	23°23'38.60"S	28°52'9.96"E
Ketting substation	23°23'39.62"S	28°52'6.55"E
Ketting substation	23°23'43.27"S	28°52'7.68"E
Ketting substation	23°23'42.22"S	28°52'11.27"E

### The four 132kV lines from Borutho MTS to the Goedetrouw Substation and to the Ketting Substation

Alternative:	Latitude (S):	Longitude (E):
<b>Alternative Route S1 (Preferred) red route</b>		
• Starting point of the activity	23°54'51.85"S	28°58'29.07"E
• Middle/Additional point of the activity	23°38'8.31"S	28°56'15.29"E
• End point of the activity	23°22'46.25"S	28°54'56.34"E
<b>Alternative Route S2 blue route</b>		
• Starting point of the activity	23°54'51.85"S	28°58'29.07"E
• Middle/Additional point of the activity	23°38'3.30"S	28°53'42.03"E
• End point of the activity	23°23'40.70"S	28°52'8.04"E

## Purpose of the EMP

The developer/EAP has an obligation to conduct a project specific Environmental Impact Assessment (EIA) and to abide by a site specific Environmental Management Plan (EMP).

The construction and operation of electrical infrastructure can result in negative impacts on the environment. The developer 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. Waterberg JV Resources (Pty) Ltd 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 and measures 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 (rehabilitate) the disturbance of ecosystems and loss of biodiversity.

The overall desired outcome of the EMP is that the future electrical infrastructure project will contribute significantly to the goal of sustainable development of the region and Province, while at the same time limiting additional impact 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 Waterberg JV Resources (Pty) Ltd. This EMP is divided into three sections: Planning and Design Phase, Construction Phase and Operational Phase.

## STRUCTURE OF THE ENVIRONMENTAL MANAGEMENT PLAN

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

### 1. Planning and Design Phase

All relevant environmental legislation pertaining to the project is listed during this phase.

The Contractor and the applicant 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 for the Contractor.

### 2. 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 should 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.

### 3. 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 Waterberg JV Resources (Pty) Ltd within the operation and maintenance phase are specified. The EMP is a dynamic document which is updated as required on a continuous basis.

## PLANNING and DESIGN PHASE

### Identification and Management of Environmentally Sensitive Areas

Sensitive areas such as heritage sites, rivers, streams, wetlands, nesting areas of protected bird species, rocky ridges, rocky outcrops (koppies), etc. have to be identified in the early stages of the project.

Such areas to be clearly marked as high sensitive areas or no-go zones and environmental induction has to emphasise the importance of complying with these requirements. The environmental sensitivity maps indicate sensitive environmental areas and features identified in the activity area.

Natural features, which are considered sensitive and need to be avoided during planning as much as possible are:

- Watercourses (rivers, streams, drainage lines, wetlands, pans)
- Riparian zones
- Rocky outcrops (koppies)
- Rocky ridges

### Ecological sensitivity of the study area

The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components. The highest calculated sensitivity unit of the two categories is taken to represent the sensitivity of that ecological unit, whether it is floristic or faunal in nature.

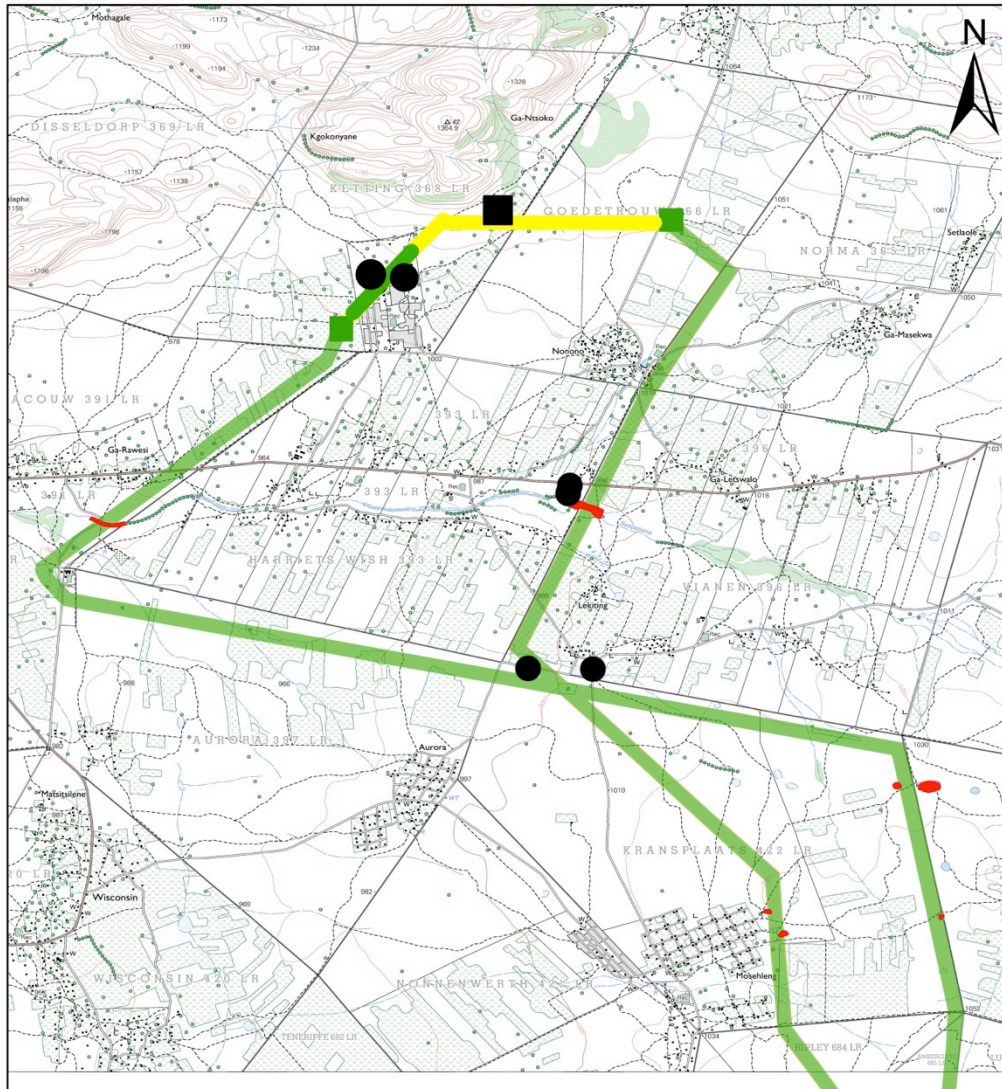
According to the analyses of floristic, faunal and overall ecological criteria there are no high sensitivity areas or habitats. In other words, there are no 'No-Go' areas within the study area. These include the powerline servitudes and substations.

Even though the sensitivities of the watercourses in the study area were only calculated to be Medium / High, the sensitivities have been raised to High. This is simply a mitigating measure to protect watercourses. Watercourses are always viewed as sensitive, even if degraded, and need to be approached as such in terms of development.

As far as the preferred powerlines servitude and proposed substation sites are concerned, there is no 'fatal flaw' and the project may go ahead. There are no 'No-Go' areas within the study site.

The maps below highlight the ecological sensitivities on the natural environment of the study area.

## Sensitivity - Map 1 of 4



1:50 000 Base Map: 2328BD

Created by: CJ Maree  
15 September 2015

### Legend

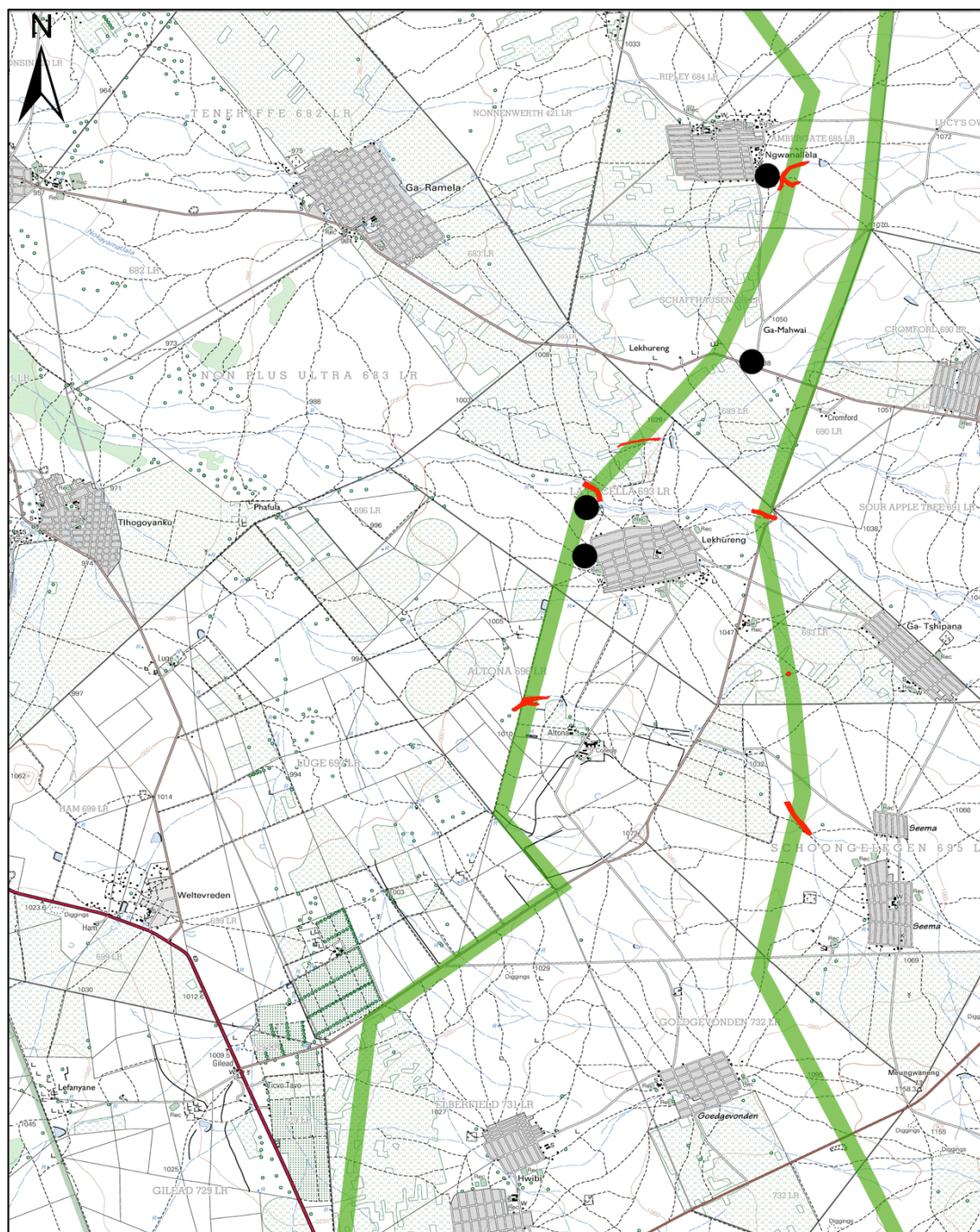
- Low Sensitivity
- Medium Sensitivity
- High Sensitivity
- Heritage - Graves
- Heritage - Iron Age

0 0.5 1 2 3 4 Km

**TEXTURE**  
ENVIRONMENTAL CONSULTANTS

**Eskom**

## Sensitivity - Map 2 of 4



### Legend

- Low Sensitivity
- Medium Sensitivity
- High Sensitivity
- Heritage - Graves
- Heritage - Iron Age

1:50 000 Base Map: 2328DB

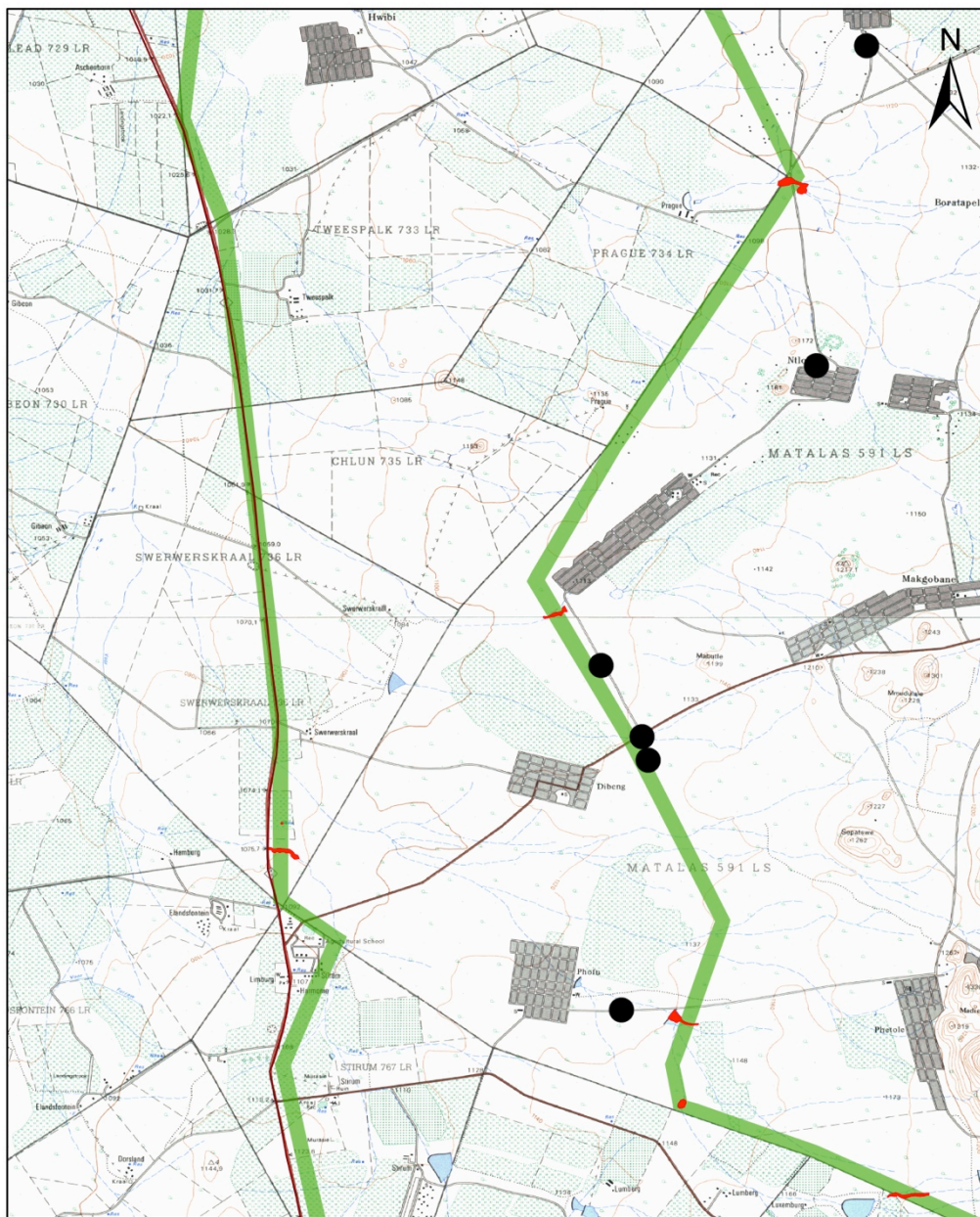
Created by: CJ Maree  
15 September 2015

0 0.5 1 2 3 4 Km

**TEXTURE**  
ENVIRONMENTAL CONSULTANTS

**Eskom**

## Sensitivity - Map 3 of 4



1:50 000 Base Maps: 2328DB, 2328DD

Created by: CJ Maree  
15 September 2015

### Legend

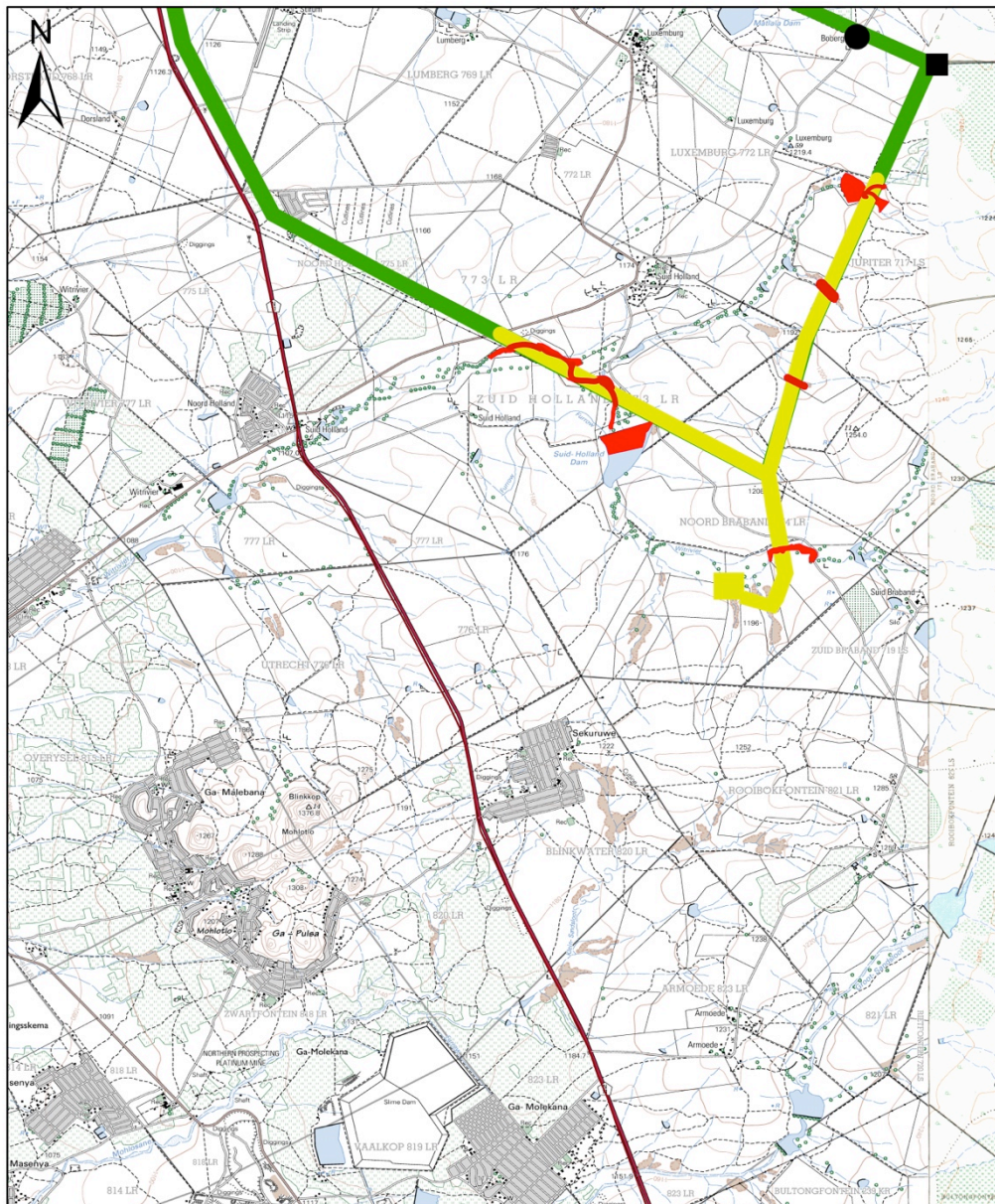
- Low Sensitivity
- Medium Sensitivity
- High Sensitivity
- Heritage - Graves
- Heritage - Iron Age

0 0.5 1 2 3 4 Km

**TEXTURE**  
ENVIRONMENTAL CONSULTANTS

**Eskom**

## Sensitivity - Map 4 of 4



1:50 000 Base Map: 2328DD, 2329CC

Created by: CJ Maree  
15 September 2015

### Legend

- Low Sensitivity
- Medium Sensitivity
- High Sensitivity
- Heritage - Graves
- Heritage - Iron Age

0 0.5 1 2 3 4 Km

**TEXTURE**  
ENVIRONMENTAL CONSULTANTS

**Eskom**

## Engineering services

This infrastructure development does not require services such as water, sewage, and electricity. Therefore an Engineering Services Report is not required to be submitted as part of the EIA. Proof of agreement between the applicant and service providers with regard to the provision of these services like water, electricity and sewage should not be required by Department of Environmental Affairs.

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 that cannot be recycled shall be disposed of at an appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008). A letter of agreement between the developer and the Permit Holder of the waste disposal site to be kept on site.

## 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.

## Legislative and Other Requirements

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

National Environmental Management Act (Act No 107 of 1998) – NEMA EIA Regulations of 2014  
National Heritage Resources Act, 1999 (Act No 25 of 1999)  
All provisions of the Occupational Health and Safety Act, 1993 (Act No 85 of 1993)  
All provisions of the National Water Act, 1998 (Act No 36 of 1998)  
National Environmental Management: Biodiversity Act, 2004 (Act No 10 of 2004)  
National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003) (NEM:PAA).  
National Environmental Management: Waste Act (Act 59 of 2008) (NEM:WA)  
National Environmental Management Air Quality Act 39 of 2004 (NEM:AQA)  
Minerals and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) administered by Department of Mineral Resources  
Minerals and Petroleum Resources Development Amendment Act, 2008 (Act No 49 of 2008)  
National Forests Act (Act No 84 of 1998)  
Protected species – provincial ordinances  
Conservation of Agricultural Resources Act (Act No 43 of 1983)  
National Veld and Forest Fire Act (Act No 101 of 1998)  
Soil Conservation Act, 1969 (Act No 76 of 1969)  
Civil Aviation Technical Standards (CATS)  
National Roads Act 7 of 1998  
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

Listed below are some of the possible permits and licences that may be required:

*Table 2: 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)
Impeding 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, archaeological and palaeontological sites, burial grounds and graves and public monuments and memorials	National Heritage Resources Act (No 25 of 1999)
Sewage Disposal	National Environmental Management Act (Act No 107 of 1998)
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 Petroleum 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.

Eskom has a number of guidelines and procedures, such as bush-clearing, that also need to be taken into consideration by contractors.

### Protected Trees

If any protected trees are encountered that need to be removed or de-limbed, then the relevant permits need to be obtained from the relevant government departments.

The National List of protected trees as well as relevant provincial lists must be checked. For protected trees on the National list, permits should be obtained from the relevant provincial office of the Department of Agriculture, Forestry and Fisheries (DAFF). For protected trees on the provincial list (specific to each province), permits should be obtained from the relevant provincial nature conservation departments. In some areas it is possible that the permits need to be obtained from the same department. These departments and permit sections tend to fall under different governing bodies for the different provinces. However, it is important that a botanist first be commissioned to verify or determine if protected trees do really occur in the development area, what they are and to gps the exact location of each tree.

National list and permits take pre-eminence over provincial. In other words, if application is done for a permit on a national level for a listed species, then do not have to apply for the same species on a provincial level.

Most of the large trees standing in the northern and central sections of the study area are marula trees, which is a protected tree in South Africa and the Limpopo Province. The Shepherd's tree, which is also a protected tree, can be found scattered sparsely throughout the region, including the study area. It will be possible to avoid most of these trees during the construction phase of the powerlines. However, a final walk-down will be required to

mark specific trees in the way and a tree permit will need to be obtained from the Limpopo Province before any of these trees may be removed, transplanted or trimmed.

There are a few marula trees in the vicinity of the proposed Ketting and Goedetrouw Substations. The footprint of the proposed substations is small, each covering an area of approximately 50m by 50m. It is therefore easy to place the substations in such a manner as to avoid the need to remove or impact on any marula trees. Marula trees in the area are not found in clumps or groves, but scattered sparsely through the veld.

A tree permit/s will be required for transplanting / removing / trimming of marula trees within the powerline servitudes. A final walkdown will be required once initial pole and substation positions have been determined to fine-tune positions to mark marula trees impacted.

#### Water Use Licences (WUL)

A WULA must go through the DWAS. Although the focus is rivers / streams and wetlands the basic process applies to all WULAs. In the majority of cases substations and powerlines trigger Section 21 (c) & (i) water uses, as defined by the NWA (36 of 1998). No activities within the affected watercourses may take place until a WUL is granted. An application does not automatically guarantee that DWAS will issue a licence.

In terms of the legal requirements there should be no need for a water use licence application (WULA) for Route Alternative 1. With the understanding that mitigating measures are implemented and demarcated sensitive zones and bufferzones avoided in terms of construction. However, there is a section of Route Alternative 2 in the south, which may well require a WULA. This is in an area where the proposed corridor crosses and runs along the Witspruit for a distance of about 2,7km. It will be difficult in this area to completely avoid main channels, riparian zones and bufferzones.

However, Route Alternative 1 is the preferred route alignment and no development / construction of any kind will take place within the boundaries of any watercourses.

### 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.

### 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.

## CONSTRUCTION PHASE

### Main Activities During Construction Phase

#### Pegging of the construction site

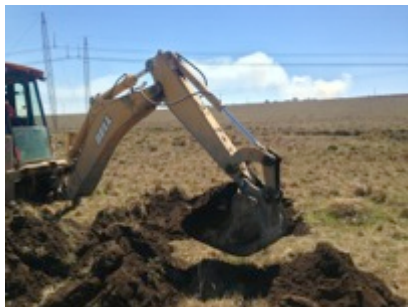
During pegging in areas where there is a possibility of finding sensitivities as identified during the EIA or Basic Assessment, the relevant specialist (Ecologist, Heritage, Avifaunal, etc) has to form part of the pegging team to identify where permits and licences are required. Relevant licences and 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 subsoil. 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.

When foundation holes are dug for the pylons, the topsoil (top approximate 30cm of the ground) needs to be placed aside separately. After construction this topsoil needs to be spread back over the disturbed area. The reason is that there might possibly be bulbs of geophytes in this topsoil and in this way if any where disturbed most would survive in this way, hereby mitigating the impact on the vegetation of the environment.

Construction footprint around each pole to be kept to a minimum (approximate radius of 20m). Work corridor to be limited to 20 metres along the route of the servitudes. To avoid animals from falling into the excavation, excavations of half a meter and more have to be barricaded properly, using netting or the like and not danger tape.



TLB / Backactor starting to dig the hole for the pole (pylon). Topsoil to be piled separate from the subsoil.



Backactor / TLB digging the hole for the pylon. Notice subsoil (with stone) piled to the left. This is then used to backfill around the erected pole.



Once the square hole is dug (approx. 2-3m in length, breath and height) concrete rings around placed in the middle. The pole will be placed inside the concrete rings.



Original subsoil is backfilled and compacted first around the outside of the concrete rings. Because of compaction often little to no soil is left.

### Concrete Mixing, Pouring and Foundation Creation

Concrete mixing must never be done on bare ground. The soil surface has to 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 of concrete trucks only to be done in such way that it does not cause pollution or concrete spillages on to the ground. In most cases the chute can be cleaned over a hole into which concrete has been poured.

### 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.



Poles (in this example steel H-poles) are lifted and placed inside the concrete rings, either by a TLB or small crane fitted on the back of a truck.

### 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.



Once the pole is in place, ready mix cement is poured into the concrete rings until near the top. Either a cap is put in place or it is covered completely with leftover topsoil.

### Conductor stringing and regulation

The winch and tensioner stations have to be in disturbed areas within the servitude where practical and possible. The stations must not be scrubbed and should be rehabilitated if damaged.

Stringing of line across wetland and other watercourse areas:

- Once the poles have been erected either side of the watercourse area, it is strung.
- No heavy vehicles or even bakkies to be used to drive across the watercourse (wetland, stream area).
- A rope is tied to the one end of the cable and one or two staff walk across the wetland area with the rope. All attempts should be made to either walk across along an existing road or thoroughfare. The impact should be negligible.
- Once on the other side the rope is pulled through the top of the erected pole. Staff (or a vehicle winch) is used to pull the rope through the top of the pole. The rope then pulls the cable along. Sometimes across the ground and sometimes up in the air. Once again the impact should be negligible on a wetland area.

### 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 local area have to be used. The local Department of Agriculture can be consulted for advice on which species to use for rehabilitation. 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.

After construction this topsoil needs to be spread back over the disturbed area. The reason is that there might possibly be bulbs of geophytes in this topsoil and in this way if any where disturbed most would survive in this way, hereby mitigating the impact on the vegetation of the environment.

All excess soils and building materials to be removed immediately on completion of the construction phase and must be seen as part of the same project.



An example of a steel monopole, with a square concrete cap approximately a year after being erected. Notice the minimal disturbance and recovery of the veld. The concrete slab is approx. 1m by 1m.

## Roles, Responsibilities and Reporting

### Applicant

Waterberg JV Resources (Pty) Ltd 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. The holder of the authorisation must have processes in place to ensure that at least the EMP and Environmental Authorisation are issued during tender enquiry. They must periodically audit the contractors who work on their behalf to verify compliance with environmental specifications and must appoint an independent 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), Waterberg JV Resources (Pty) Ltd 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.

### 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 must be included in the contract with the Contractor and implemented by the Contractor during the construction phase. These measures should be included in the EMP.
- 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.
- 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.

## 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.

## 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 for operation.
- Liaise with the landowners on any construction related complaints that might arise.
- The ECO is also responsible for compiling monthly progress reports containing any issues arising, etc. and submitting them to the relevant departments, such as the DEA.

## 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 Programme
- 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)

## 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 Environmental Control Officer

### *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 Programme 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: \_\_\_\_\_

## Environmental Induction

- The Contractor's environmental officer 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 updated when necessary. Visitor's induction has to be conducted for any visitor to the construction site.

## 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.

### Method statement

- The Contractor shall be required to undertake various tasks / activities in order to fulfill the conditions as stipulated in the contract. Therefore, in order for the Project Manager to be satisfied that the Contractor has a comprehensive understanding of the requirements of the task / activity, the Contractor shall submit method statements to the Project Manager for approval prior to the commencement of the task / activity.
- The method statement is a dynamic document integrating all facets of the task / activity, thereby ensuring the reader a comprehensive understanding of the actions associated with implementing the task / activity.
- The method statement shall be submitted to the Project Manager for approval a minimum of 14 days prior to the commencement of the task / activity. During this period, the Project Manager shall consult with other members of the project management team to ascertain the Contractors knowledge and understanding of the requirements. Should the Project Manager ascertain there to be gaps within the Contractors understanding, the method statement shall be returned to the Contractor for review and re-submission.
- Upon approval of the method statement, both the Project Manager and the Contractor shall sign the method statement denoting mutual agreement that the contents thereof meets the minimum requirements to successfully complete the task / activity. By signing the method statement, the Contractor commits to working in accordance the agreed method.

- Due to the method statement being a dynamic document, regular amendments may be required to ensure the implementation thereof corresponds with how the task / activity is actually being implemented; and in accordance to potentially changing requirements.

### **Purpose**

The purpose of the method statement is to:

- Outline the safe manner in which the task / activity is to be undertaken
- Provide induction material for all undertaking the task / activity to understand
- Meet legal requirements – hazard identification and control
- Provide a programme against work, material, time, staff and anticipated problems are to be managed
- Act as a tool in quality assurance

### **Scope**

- A method statement describes the scope of the intended task / activity in an easy to understand step – by – step manner. This is particularly important to reduce potential confusion and ambiguity of the contents by those personnel required to implement it.
- The method statement should clearly indicate:
- What – a brief concise description of the task / activity to be undertaken;
- Who – a brief concise description of the personnel involved with undertaking the task / activity;
- When - a brief concise description of the sequence of actions with due commencement and completion dates of the task / activity to be undertaken;
- Where - a brief concise description and map / drawing of the locality of the task / activity to be undertaken;
- Why - a brief concise description of the importance and requirement of the task / activity to be undertaken; and
- How - a brief concise description of the methods to be implemented, materials and equipment to be used for the task / activity to be undertaken.

### **Language use**

- The method statement must be written in plain English so that they are understood by all. Therefore a well thought through and well written method statement providing clear and concise specific work plans, can save much time and money and potentially prevent the occurrence of incidents and accidents.
- The implementation therefore of the method statements shall be audited by the ECO. Consequently the method statements must contain sufficient information and detail to satisfy the Project Manager and ECO that the works will be implemented correctly and that potential incidents / accidents shall be mitigated and managed.

### **Site Specific Requirements**

- The method statement must be site and project specific. Method statements copying information contained within the EMP, specifications or other documents shall not be considered as they do not indicate to the person responsible for approving the document, that the Contractor has a clear understanding of what is required.

### **Minimum Requirements**

The method statement should as a minimum address the following:

#### **Description**

- Provide a brief and concise description of the task at hand.

#### **Personnel Qualifications and Experience**

- List all the details of qualifications and experience required for the completion of the task.
- Experience may cover previous work done in the area that may not require certificates or licences.

#### **Personnel, Duties and Responsibilities**

- Give details of the duties and specific responsibilities of supervisors and other personnel. For example, describe such things as daily toolbox talks.

#### **Training Required to Complete Work**

- Make sure that all workers and their supervisors are trained in the procedures needed to complete the job safely and in an environmentally responsible way, especially when undertaking task for the first time or where new or changed work methods are utilised.

#### **Programme**

- Provide a clear and concise programme indicating all phases and time frames associated with the task.

#### **Construction sequence and method**

- Indicate all steps associated with task at hand. This must be done in a manner which is easily understandable and leaves no uncertainties to staff that are required to implement the task in the field.

#### **Possible Hazards**

- Include all possible hazards such as:
  - Hazardous substances, explosives, dust, etc
  - Hazards to others in area
  - Rubbish, electrical, fills

#### **Resources/Plant/Equipment**

- List resources, plant and equipment that you will use on the job, e.g. ladders, scaffold etc.

#### **Environmental**

- Indicate Environmental management responsibilities
- Provide Environmental guidelines
- Specify Employee training and involvement
- Indicate the following:
  - Material consumption
  - Energy consumption
  - Water consumption
  - Buildings, machinery, soil
  - Residual materials and waste
  - Atmospheric emissions, noise and odour pollution
  - Wastewater
  - Accidents and accident prevention
  - Transport

#### **Health and Safety**

- List all safety controls such as:
  - MSDS
  - Warning Signs
  - Personal protective equipment
  - Storage of materials and equipment
  - Fellow workers/public safety provisions
  - Housekeeping

#### **Monitoring Systems**

- How will the execution of the task be monitored?

#### **Emergency/disaster incident and reaction procedures**

- Procedures must be included indicating how incidents/accidents will be dealt with and what steps are in place to prevent such an incident/accident from occurring.

#### **General**

- Explanation of important technical/environmental terms

## 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.
- Any selected temporary site (accommodation and storage) preferably must be on the demarcated site itself.
- Camp site, storage facilities and other necessary temporary structures to preferably be erected within the confines of the proposed mine area, substations, or similar area. Not near watercourses, sensitive environmental areas or in pristine veld.
- 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, the holder of the authorisation 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.

## 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 and Sanitation.
- If mobile chemical toilets are used, the contents thereof must be disposed of regularly at a licenced sewage treatment facility, permission for which must be obtained from the relevant local municipality.
- These portable toilets to be administered and serviced by a certified, registered company only.
- Proof of sewage disposal and quantities disposed to be kept on site.
- Toilets to be provided with a ratio of one for every 15 workers.
- Chemical toilets must be easily accessible by the employees but have to be placed away from natural water resources.
- 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 are maintained. Employees to be sensitised to use these toilets at all times.
- No use of the veld to be allowed as this results in pollution, unhygienic conditions and potential landowner complaints and claims.

## 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, 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.

## Access Roads and Access Control

- Identification and planning of access routes to be used must be done in conjunction with the Contractor, the Holder of the authorisation 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 site and layout areas and construction site to be controlled. Visitors have to be inducted prior to accessing the construction site.

## Gate Installation

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

## Earthworks and Layerworks

The Contractor has to take cognisance of the requirements set out below.

### 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, an 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 thereof, 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.

### 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.

### 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.

## Waste Management

The National Environmental Management: Waste Act stipulates requirements for waste generators and 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 a 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 Waste generation of any form during construction should be disposed off as stipulated in the Blouberg Local Municipality, the Aganang Local Municipality and Mogalakwena Local Municipality Solid Waste By-Laws and non-compliance is punishable in terms of this By-Law. There are various landfill sites available and permission must be obtained from the Waste Management Department of the local Municipality. A prescribed disposal tariff is required and payable to the Municipality.
- 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.
- Containers for food and general waste to be removed weekly, or more regularly depending on volumes, to avoid bins overflowing their capacity.
- 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.

## 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 banded.
- 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.
- The fuel storage areas to be located away from streams, rivers and wetlands. Fuel storage tanks to be adequately secured.
- Storage and handling of fuels, lubricants, paint, tar, bitumen binders and other chemicals must be done in especially demarcated impervious and bunded areas.
- 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.

## Spillages

- Water resources 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, the Holder of the authorisation is responsible for spill treatment and is liable to arrange for competent assistance to clear the affected area.
- The Holder of the authorisation 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 the 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 the Holder of the authorisation'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.
- Section 28 of NEMA places a duty of care on the applicant to ensure that reasonable measures are taken to prevent pollution or degradation of the environment from occurring, continuing or recurring. Should any environmental damage result, the applicant must within 14 days rectify the situation to its original state, at his or her own expense.

## Water Use and Storm Water Management

- The use of water from natural resources, whether surface or groundwater, without the required permits / authorisation 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 and Sanitation 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.

## 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.

### 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.
- Relevant to this project the following:
- Nineteen sites of cultural heritage importance were identified during the survey. In this case it would be easy to avoid the graves within the corridor. It is therefore recommended that all grave sites be avoided and that the final route be kept at a buffer zone of at least 20 m from these.
- Protected trees were found directly within the demarcated zones of the powerline alternatives for the proposed project. Most of the large trees standing in the northern and central sections of the study area are marula trees, which is a protected tree in South Africa and the Limpopo Province. The Shepherd's tree, which is also a protected tree, can be found scattered sparsely throughout the region, including the study area. It will be possible to avoid most of these trees during the construction phase of the powerlines. However, a final walk-down will be required to mark specific trees in the way and a tree permit will need to be obtained from the Limpopo Province before any of these trees may be removed, transplanted or trimmed.

### 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 contact details of the Holder of the authorisation's Environmental Officer should be available on site.
- A copy of the EMP has to be submitted to relevant landowners if they request it. They can assist the Holder of the authorisation 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.

## Fire Prevention

- To minimise the risk of veld fires, no open fires are allowed on site, except under strictly controlled conditions.
- No open fires to be allowed outside of the camp site.
- Collection of wood for fires and cooking from out of the surrounding veld is prohibited.
- No open fires to be allowed in campsites erected outside of the substations. In such cases proper provision for portable gas stoves should be made. All relevant laws related to flammable substances to be strictly adhered to.
- 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.

## Dust Control

- Appropriate dust suppression techniques must be implemented on all exposed surfaces to minimise and control airborne dust. Such measures must include wet suppression, chemical stabilisation, the use of a wind fence, covering surfaces with straw chippings and re-vegetation of open areas. Techniques implemented may be site-specific.
- 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.
- Dust suppression measures have to be taken. The introduction of speed limits to be looked into as a way of minimising dust in dusty access roads.

## 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.

## 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.

## 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.

## Measures to Protect Hydrological Features

- No large perennial rivers are found in the study area. There are however, a few small seasonal (non-perennial) streams or small rivers present. Namely, the Matlalane River, Matlala River and Seepabana River. A stream or small river, the Witspruit, is also found in the vicinity of the existing Borutho Main Transmission Station (MTS).
- A final walkdown will be required once initial pole and substation positions have been determined to fine-tune positions to avoid watercourses.
- Existing river crossings / roads must be used during construction and the transporting of materials and equipment.
- No new river crossing to be created, including simply driving through a river and thus creating a two-track vehicle path.
- 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 and Sanitation.
- New drifts and bridges only to be constructed with the approval of the Holder of authorisation 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 accommodation or temporary storage sites to be erected within 100m of the any river, stream, drainage line, pan, wetland or farm dam.
- Positioning of the foundation slabs for the pylons must be a minimum of 50m away from the edge of all drainage lines. That is, outside of the demarcated 50m buffer zones.
- Positioning of the foundation slabs for the pylons must be a minimum of 50m away from the edge of riverbanks and riparian zones, if present.
- No foundation slabs or pylons to be erected directly within the main channel of any watercourse, including seasonal drainage lines even if dry at the time of construction.
- No foundation slabs or pylons to be erected directly within the open water zone of a farm dam or any other artificial impoundment.
- No construction activities take place directly within the demarcated areas of any watercourse, including its' riparian zone. No vehicles to drive in the demarcated areas and no construction material to be stored or even placed temporarily in these areas.
- No water for drinking or construction purposes of any kind may be extracted directly out of existing streams, drainage lines, etc. without the necessary prior authorisations, permits, etc.
- No water for drinking, cooking or other purposes to be taken out of farm dams without the prior consent of the landowners.
- Only certified, portable toilets to be used. These are not to be situated within 100m of any watercourses or artificial impoundments (eg. Farm dams). These portable toilets to be administered and serviced by a certified, registered company only.

## 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 chances of successfully re-establishing on the new site.
- Immediately after construction (within two weeks) a mix of local, indigenous grass seeds to be sowed on any large areas of disturbed, bare soils. This is not necessary around poles (pylons) where the bare soil might only be a metre or two in radius.
- Valid tree permit to be obtained if protected trees are identified within construction area. Most of the large trees standing in the northern and central sections of the study area are marula trees, which is a protected tree in South Africa and the Limpopo Province. The Shepherd's tree, which is also a protected tree, can be found scattered sparsely throughout the region, including the study area. It will be possible to avoid most of these trees during the construction phase of the powerlines. However, a final walk-down will be required to mark specific trees in the way and a tree permit will need to be obtained from the Limpopo Province before any of these trees may be removed, transplanted or trimmed.
- There are a few marula trees in the vicinity of the proposed Ketting and Goedetrouw Substations. The footprint of the proposed substations is small, each covering an area of approximately 50m by 50m. It is therefore easy to place the substations in such a manner as to avoid the need to remove or impact on any

marula trees. Marula trees in the area are not found in clumps or groves, but scattered sparsely through the veld.

- Depending on whether or how many trees need to be removed at least the same amount of young trees might need to be purchased and re-established nearby or in a similar habitat as offset on the loss of trees, especially protected trees.

## 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.
- 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 be removed but are close enough to the construction activities has to be made so that this vegetation is not tampered with.
- 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.
- Plants not interfering with the construction activities have to be left undisturbed. Collection of medicinal plants is prohibited.
- 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.

## Alien Invasive Management Plan

- All invasive species have to be removed, as stipulated by CARA (Act No 43 of 1983), and an on-going monitoring programme implemented. This monitoring plan can be incorporated into the routine inspection activities.
- 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.

## 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.

## 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.
- It is therefore imperative that the breeding sites of these birds are kept intact and that the breeding pairs are not disturbed especially where there are young nestlings.
- If any new sites or nests 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.
- 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.
- The construction activities must be restricted to the actual footprint of the development. Measures must be put in place to ensure that construction personnel are prevented from accessing the properties outside the actual construction site. Care must be taken to ensure that the habitat destruction is kept to what is absolutely necessary for the construction.
- Sections of line that will require the application of bird flight diverters (BFDs) are indicated on the accompanying sensitivity maps. Sensitive sections will include dams, wetlands, rivers, streams, and drainage line crossings. The proposed BFD is the Double Loop Bird Flight Diverter. BFDs should be placed on the earthwires, staggered, alternating black and white, 10 metres apart.
- The construction of access roads in sensitive watercourses and any other water habitats should be avoided.
- No pylons to be erected within 50m of the banks of any watercourse.

## 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.
- No unauthorised vehicle tracks/routes through the open veld.

## Heritage Resources

During the survey a number of grave yards and single grave sites were identified. However, it would be possible to prevent the lines from crossing these. It is therefore indicated and needs to be steered clear from. Two other sites of cultural heritage importance were identified. Mitigation measures are proposed.

### Iron Age sites

Two sites where Iron Age remains were identified were identified. These are:

Site 1: Iron Age lower grinding stones at Ketting. GPS - 23° 22' 40.1"S; 28° 53' 29.5" E

Site 2: Iron Age upper and lower grinding stones on route alternative 1. GPS - 23° 50' 13.9"S; 28° 59' 24.1" E

### Graves

Seventeen grave sites were identified throughout the surveyed area, but there may well be more. These mostly consist of large grave yards close to or within villages or a few/ single graves close to homesteads or somewhere in the field. The following ones were identified:

Site 3: 23° 24' 59.8"S; 28° 54' 05.2"E

Site 4: 23° 23' 16.0"S; 28° 52' 26.1"E

Site 5: 23° 26' 33.6"S; 28° 54' 17.0"E

Site 6: 23° 31' 23.5"S; 28° 56' 19.0"E

Site 7: 23° 32' 58.6"S; 28° 56' 11.6"E

Site 8: 23° 40' 12.23"S; 28° 58' 27.8"E

Site 9: 23° 42' 54.8"S; 28° 58' 02.3"E

Site 10: 23° 46' 03.3"S; 28° 56' 33.7"E

Site 11: 23° 50' 13.9"S; 28° 59' 24.1"E

Site 12: 23° 48' 22.1"S; 28° 56' 23.3"E

Site 13: 23° 46' 15.2"S; 28° 56' 36.8"E

Site 14: 23° 45' 27.11"S; 28° 56' 12.9"E

Site 15: 23° 34' 37.5"S; 28° 54' 45.9"E

Site 16: 23° 34' 12.8"S; 28° 54' 46.8"E

Site 17: 23° 26' 33.3"S; 28° 53' 43.8"E

Site 18: 23° 25' 03.9"S; 28° 54' 04.4"E

Site 19: 23° 23' 13.9"S; 28° 52' 41.5"E

#### Mitigation of impact on cultural heritage resources

Nineteen sites of cultural heritage importance were identified during the survey.

The final recommendations are as follows:

- Graves are always regarded as having a high cultural significance. The field rating thereof is Local Grade III B. It should be included in the heritage register, but may be mitigated.  
Two possibilities exist. The first option would be to fence the graves in and have a management plan drafted for the sustainable preservation thereof. This should be written by a heritage expert. This usually is done when the graves are in no danger of being damaged, but where there will be a secondary impact due to the activities of the mine.  
The second option is to exhume the mortal remains and then to have it relocated. This usually is done when the graves are in the area to be directly affected by the mining activities. For this a specific procedure should be followed which includes social consultation. For graves younger than 60 years only an undertaker is needed. For those older than 60 years and unknown graves an undertaker and archaeologist is needed. Permits should be obtained from the Burial Grounds and Graves unit of SAHRA. This procedure is quite lengthy and involves social consultation.  
In this case it would be easy to avoid the graves within the corridor. It is therefore recommended that all grave sites be avoided and that the final route be kept at a buffer zone of at least 20 m from these.
- The two Iron Age site are given a rating of low heritage significance as there does not seem to be any other associated artefacts. The field rating is General Protection C (IV C). It may therefore be demolished during development, but seeing that the development entails the construction of a power line, it is highly unlikely that impact will be direct.
- From a heritage perspective there is no distinction between any of the alternatives for the power lines and therefore any of these may be used.
- Both positions for the proposed substations may also be utilised.
- It would be advisable to avoid areas known to have a high potential of having heritage sites. For Stone and Iron Age sites, these would be mountainous areas and close to rivers. Historical sites are a bit more difficult to predict, but are also usually found close to water sources and high lying areas. Graves are the most difficult to predict, but in this area all seem to be reasonably close to villages and therefore the latter should be avoided.
- After implementation of the mitigation measures indicated, the development may continue. This will include verifying that the final route misses heritage sites.
- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. The state of the environment also makes it possible that not all sites were identified. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence and adapt this report.
- 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, or other categories of heritage resources are found during the proposed activities, SAHRA APM Unit (Colette Scheermeyer 021 462 4502) must be alerted immediately, and a professional archaeologist 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 significance, a Phase 2 rescue operation might be necessary.

#### Palaeontology

- There is no objection to the development, but it may be necessary to request a Phase 1 PIA to determine whether the development will affect fossiliferous outcrops as the palaeontological sensitivity is HIGH at the northern section of the proposed development. A Phase 2 Palaeontological Mitigation will only be required if the Phase 1 Palaeontological Assessment finds fossiliferous outcrops.

- The following should be conserved: if any palaeontological material is exposed during digging, excavating, drilling, or blasting SAHRA/PRHA must be notified. All construction activities must be stopped and a palaeontologist should be called in to determine proper mitigation measures.

## 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.

## Traffic Management Plan

- Property owners that would be affected by the 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.
- The Holder of the authorisation 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 construction personnel, malfunction of or damage to structures; etc. will be investigated by the applicant in co-operation with all the relevant stakeholders.
- The existing complaints structure must be revised by the applicant 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 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.

## OPERATIONAL PHASE

### 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.
- Restricted roads have to be clearly marked.
- Existing road infrastructure to be used as far as possible.
- Rehabilitation of roads to start immediately after construction phase.
- Roads used to be maintained and rehabilitated during the construction phase as well.
- No mounds of topsoil or other soil types to be left 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 settled.
- Any visible erosion to be immediately attended to and corrected.

### Soil Erosion

- Vegetation under pylons and next to pylons to be mowed and not ploughed.
- 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 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.

### Avifauna

The maintenance should have very little added impact on the physical environment in general and micro bird habitats in particular. The greatest risk is that of disturbance. Implementing the following mitigating measures will however further assist in reducing impact and disturbance to the avifaunal component.

- Only use existing roads and vehicle paths.
- Do not drive through watercourses unless over an official bridge.
- Avoid areas where birds are nesting.
- Ensure that all install BFDs are maintained and replaced if missing.

## DECOMMISSIONING

It is not envisaged that the proposed powerlines or substations will be decommissioned. Eskom is currently experiencing a demand for the supply and distribution of additional electricity in the project area.

It is generally assumed that the decommissioning process is the reverse of the construction process and as such the indicated impacts will also be relevant to decommissioning phase.

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

## CONCLUSION

At a project level, EMPs should be prepared following an EIA and incorporate the proposed management actions (i.e. actions to mitigate negative impacts and enhance positive benefits).

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.

\*\*\*\*\*

## REFERENCES

- Acocks, J.P.H. 1988. 3<sup>rd</sup> ed. Veld types of South Africa. Memoirs of the Botanical Survey of South Africa 57: 1-146.
- CSIR, 2003. Strategic Environmental Assessment (SEA) Resource document: Introduction to the Process, principles and Application of SEA. CSIR Report ENV-S-C 2002-073, Version 3. Environmentek, Stellenbosch. South Africa.
- Department of Environmental Affairs and Tourism (DEAT), 2000. Strategic Environmental Assessment in South Africa: Guideline Document. Department of Environmental Affairs and Tourism and CSIR.
- DEAT, 2004. Strategic Environmental Assessment, Integrated Environmental Management, Information Series 10, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- DEAT, 2004. Environmental Management Plans, Integrated Environmental Management, Information Series 12, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- Driver, A., Sink, KJ., Nel, JL., Van Niekerk, L. 2011. An assessment of South Africa's Biodiversity and ecosystems. Synthesis report. SANBI. Pretoria.
- Gauteng Conservation Plan Version 3.3 (C-Plan 3.3). 2011. Gauteng Department of Agriculture and Rural Development. Nature Conservation Section. October 2011.
- Lochner, P. 2005. Guideline for Environmental Management Plans. CSIR Report No ENV-SC 2005-053 H. Republic of South Africa, Provincial Government of Western Cape, Department of Environmental Affairs & Development Planning, Cape Town.
- Low, A.B. & G. Rebelo (eds). 1998. Vegetation of South Africa, Lesotho and Swaziland. Dept. Environmental Affairs and Tourism, Pretoria.
- Mucina, L. & M.C. Rutherford (eds). 2006. The vegetation of South Africa, Lesotho and Swaziland. SANBI, Pretoria.
- North West Department of Agriculture, Conservation, Environment and Rural Development. (2009). North West Provincial Biodiversity Conservation Assessment Technical Report, Version 1.2., March 2009. North West Department of Agriculture, Conservation, Environment and Rural Development, Mmbatho.
- Raimondo, D., Von Staden, L., Foden, W. Victor, JE., Turner, RC (eds). 2009. Red list of South African plants 2009. Strelitzia 25. SANBI. Pretoria.