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ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT BASIC ASSESSMENT REPORT

Eskom Bulge-Dorset 132kV line

DEA Ref nr 12/12/20/2094

NEAS Ref DEA/EIA/0000113/2011

TEXTURE

ENVIRONMENTAL CONSULTANTS

ENVIRONMENTAL IMPACT ASSESSMENT
DRAFT BASIC ASSESSMENT REPORT
ESKOM BULGE-DORSET 132KV LINE
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The **affected properties** for the **proposed Route Alternative 4** are on the farms Bulge Rivier 198 KQ portion 2, 6, Mokolo Rivier Private Nature Reserve 660 KQ portion 0, Hermanusdoorns 650 KQ portion 0, Hermanusdoorns 204 KQ portion 5, Welgevonden 186 KQ portion 0 en 1, Groenfontein 207 KQ portion 5, Keerom 208 KQ portion 0, Hanover 181 KQ portion 0, 3, Goudfontein 171 KQ portion 0, 1, 2, Welgevonden 180 KQ portion 0, Schuinskloof 175 KQ portion 1, 2, 3, Rietbokhoek 4 KR portion 1, 2, Rem, Zeekgat 5 KR portion 1, Rem, Steenbokfontein 9 KR portion Rem, 3, 4, Dwarsfontein 51 KR Rem, Dwarsfontein 51 KR (To be consolidated to Jacobshoogte T149848/07) portion 0, Brakfontein 16 KR portion Rem in the Lephalale Local Municipality in the Limpopo Province.

Compiled by :

Texture Environmental Consultants
PO Box 36593
MENLOPARK
Pretoria
0102
Ria Pretorius
riap@peopletexture.net
Tel 082 568 6344 / 012 362 7179
Fax 086 675 4026

Applicant :

Eskom Distribution Northern Region
PO Box 3499
POLOKWANE
0700

Nkateko Msimango
Tel (015) 299 0012 / 072 018 5167
Fax 086 666 0363

TEXTURE
ENVIRONMENTAL CONSULTANTS

28 May 2012

Courier to:
South African Heritage Resource Agency
111 Harrington Street
CAPE TOWN
8000

For Attention: Mr Philip Hine
(021) 462 4502

PROPOSED ESKOM BULGE-DORSET 132kV LINE: DEA Ref nr: 12/12/20/2094
Notification of an Environmental Impact Assessment Process: Submission of draft Basic Assessment Report

Request for input
You are hereby supplied with **one copy** of the **draft Basic Assessment Report** for your perusal and information. All comment received by **10 July 2012** will be included and addressed in the ongoing EIA process. Email copies are also available on request from the consultant.

Background
Texture Environmental Consultants has been appointed by Eskom Distribution Northern Region (the applicant) to lodge an application for environmental authorisation with the National Department of Environmental Affairs (DEA) for the construction of the following project:

Project Description
- Construct a 132kV line from the new Bulge rivier substation to the Dorset substation.
- Construct an access/ construction road for the new 132kV line.
- Obtain a servitude area of 31metres wide for the line.

Project Locality
Four Route alternatives are being investigated for the project. The proposed power line route for Alternative 4 is on the farms Bulge Rivier 198 KQ portion 2, 6, Mokolo Rivier Private Nature Reserve 660 KQ portion 0, Hermanusdoorns 650 KQ portion 0, Hermanusdoorns 204 KQ portion 5, Welgevonden 186 KQ portion 0 en 1, Groenfontein 207 KQ portion 5, Keerom 208 KQ portion 0, Hanover 181 KQ portion 0, 3, Goudfontein 171 KQ portion 0, 1, 2, Welgevonden 180 KQ portion 0, Schuinskloof 175 KQ portion 1, 2, 3, Rietbokhoek 4 KR portion 1, 2, Rem, Zeekgat 5 KR portion 1, Rem, Steenbokfontein 9 KR portion Rem, 3, 4, Dwarsfontein 51 KR Rem, Dwarsfontein 51 KR (To be consolidated to Jacobshoogte T149848/07) portion 0, Brakfontein 16 KR portion Rem in the Lephalale Local Municipality in the Limpopo Province.

Kind regards

Ria Pretorius

Peopletexture (PTY) Ltd t/a **texture** | | PO Box 36593 | Menlopark | 0102 www.peopletexture.net
Cell: 082 568 6344 | **Tel:** 012 362 7179 | **Fax:** 086 675 4026 | **Email:** riap@peopletexture.net

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EXECUTIVE SUMMARY

Eskom Bulge-Dorset 132kV line

DEA Ref nr 12/12/20/2094

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Basic Assessment Report

Executive Summary

Compiled May 2012

1. Background

Eskom Distribution Northern Region (the Applicant) commissioned Texture Environmental Consultants (the Environmental Assessment Practitioner) to undertake an Environmental Impact Assessment for the following project:

The proposed project requires the construction of a 65km 132kV power line from the authorised Bulge Rivier substation to the new Dorset substation. Inclusive to this application is the construction of the following:

- Construct a 132kV power line from the authorised Bulge rivier substation to the new Dorset substation.
- Construct an access/ construction road for the new 132kV line.
- Obtain a servitude area of 31metres wide for the line.

This EIA application is part of a broader scope of works to improve the network performance. Currently the network is experiencing under voltages and is incapable of handling additional loads due to the contingency constraints of the network. The applicant is Eskom Distribution Northern Region, Land Development with contact person Ms. Nkateko Msimango, Environmental Management in Polokwane.

1.1 Locality and Regional Context

Eskom is planning the construction of a 132kV power line from the authorised Bulge River substation to the new Dorset substation. At the time of the study Dorset Substation was under construction, while work on the Bulge River Substation had not yet started.

The study area for the power line servitude is situated in the Limpopo Province, close to the small towns of Vaalwater, Matlabas and Elmeston. Lephalale (Ellisras) is further to the north. The study area is south of Lephalale, north of Vaalwater and north of the Waterberg mountain range and the Marakele National Park. It is within the area south and east of the Mokolo Dam and Mokolo Dam Nature Reserve (previously Hans Strijdom Dam and Hans Strijdom Nature Reserve). The study area runs roughly in an east-west direction.

The study area falls within the well-known Waterberg Biosphere Reserve. The Waterberg Biosphere Reserve (WBR) comprises a large area (100km x 100km) with extraordinary wilderness quality. The area does not have any significant mining, industries or forestry, allowing for the area to remain largely intact. The WBR boasts a rich archaeological heritage; the Waterberg complex is a critically important water catchment area in a largely water scarce Province; and approximately 80% of the area is already under conservation management or is operating as game farms.

Taking the zonation of the Waterberg Biosphere Reserve into consideration, the Eskom power line route was designed to limit impact to the Waterberg Biosphere Reserve. The majority of the proposed project falls in Transition Zone 2 where infrastructure could be allowed. In fact, as mentioned, to limit impact to the WBR, approximately 50% of the proposed power line route runs on the border or outside of the Transitional Zone of the Waterberg Biosphere Reserve.

The **affected properties** for the **proposed Route Alternative 4** is on the farms Bulge Rivier 198 KQ portion 2, 6, Mokolo Rivier Private Nature Reserve 660 KQ portion 0, Hermanusdoorns 650 KQ portion 0, Hermanusdoorns 204 KQ portion 5, Welgevonden 186 KQ portion 0 en 1, Groenfontein 207 KQ portion 5, Keerom 208 KQ portion 0, Hanover 181 KQ portion 0, 3, Goudfontein 171 KQ portion 0, 1, 2, Welgevonden 180 KQ portion 0, Schuinskloof 175 KQ portion 1, 2, 3, Rietbokhoek 4 KR portion 1, 2, Rem, Zeekgat 5 KR portion 1, Rem, Steenbokfontein 9 KR portion Rem, 3, 4, Dwarsfontein 51 KR Rem, Dwarsfontein 51 KR (To be consolidated to Jacobshoogte T149848/07) portion 0, Brakfontein 16 KR portion Rem in the Lephalale Local Municipality in the Limpopo Province.

The study area is situated on the 1:50 000 topographical base maps 2327DC, 2327DD, 2427BA, 2328CC, 2428AA.
The proposed alternative 4 for the project is found at approximately:

Bulge rivier substation:

Longitude (Degrees Decimal Minutes)	Latitude (Degrees Decimal Minutes)
27° 40.237' E	24° 6.806' S

Proposed Alternative 4 Route (65.4km):

250m intervals	Longitude (Degrees Decimal Minutes)	Latitude (Degrees Decimal Minutes)
1	27° 40.326' E	24° 6.744' S
130	27° 53.781' E	24° 6.208' S
261	28° 9.522' E	24° 3.727' S

Dorset substation:

Longitude (Degrees Decimal Minutes)	Latitude (Degrees Decimal Minutes)
28° 9.633' E	24° 3.742' S

2 Legal Requirements

Application for authorisation, in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010, is submitted to the National Department of Environmental Affairs (DEA). The Environmental Impact Assessment Regulations were published on 18 June 2010 in Government Notice No. R.543 and relevant to this project is the activities listed in Listing Notices 1 and 3 that require a Basic Assessment (BA) to be conducted:

Relevant notice:	Activity No:	Description of each listed activity as per project description:
GNR 544 of 18 June 2010	10	The construction of facilities or infrastructure for the distribution of electricity outside urban areas with a capacity of 132kV.
GNR 546 of 18 June 2010	4	The construction of an access and construction road wider than 4 meters (ii) outside urban areas, in (gg) areas within 10 km from national parks or world heritage sites or 5 km from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.
GNR 546 of 18 June 2010	14	The clearance of an area of 5 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (activity to be confirmed)

3. Study approach

The approach followed by the consultants was based on the specifications for the undertaking of a Basic Assessment as provided in the document "Companion to the EIA Regulations, Integrated Environmental Management Guideline Series 5, Department of Environmental Affairs, 2010".
The study approach followed by the Consultants, in short, entailed the following steps:

- Preliminary site investigations to determine the scope of works of the project and to familiarise with the sites were done by the EAP and Eskom in November and December 2010.
- An application for a Basic Assessment was submitted to DEA and the project was issued with reference number 12/12/20/2094 on 25 November 2010.
- Specialist ecological input was obtained to investigate the flora, fauna and the general biophysical environment in an attempt to identify the potential impacts of the project.

- The proposed development is covered by the National Heritage Resources Act which incorporates heritage impact assessments in the Environmental Impact Assessment process. A Phase 1 Heritage Impact Assessment was therefore done by a specialist to identify the potential impact on heritage resources.
- Input from an avifauna specialist was also obtained to determine the impact of the proposed project on birds.
- During the months of January, February and June 2011 the EAP, the ecologist, the bird impact specialist and the archaeologist/cultural heritage management consultant conducted additional site investigations.
- The Public Participation Programme (PPP) started in November 2010 and continued until April 2012. It included the identification of key stakeholders, the distribution of information letters with a request for comment, as well as advertising of the project in the local press and on site.
- In addition, notification of an information meeting on 22 February 2011 was sent to all IAPs. The purpose of the meeting was to furnish the landowners and other interested parties with information regarding the extent of the project, the proposed alternatives, the process of negotiations for servitudes, and the extent of the Environmental Impact Assessment Process. Project posters with information and maps of the routes were presented at the meeting. Written comment was requested at the meeting.
- Several one-on-one meetings were conducted with affected landowners to address their specific requirements. This resulted in changes to the alignment of the final proposed power line route.
- A draft Basic Assessment Report was compiled with the main aim to identify issues, potential impacts and potential alternatives associated with this project. It included a description of the status quo of all relevant environmental components as well as the proceedings of the PPP and communication with registered Interested & Affected Parties (IAPs).
- The draft Basic Assessment Report (this document) was distributed on 29 May 2012 to the following stakeholders for their comment :
  - Department of Water Affairs: Water Resources & Water Quality Management
  - South African Heritage Resources Authority
  - Limpopo Department of Economic Development, Environment and Tourism: Environmental Impact Management
  - Department of Agriculture, Forestry and Fisheries: Land Use and Soil Management
  - Department of Minerals and Energy
  - SA National Road Agency Agency Ltd.: Northern Region
  - Road Agency Limpopo
  - Department of Roads and Transport
  - Department of Rural Development and Land Reform: Land Claims Commissioner
  - Department of Rural Development and Land Reform: State Land Administration
  - Transvaal Landou Unie SA Noord
  - Distriks Landbou Unie Vaalwater
  - Distriks Landbou Unie Thabazimbi
  - Distriks Landbou Unie Ellisras
  - Agri Limpopo
  - Agri Lephalale
  - Waterberg Biosphere Reserve
  - Waterberg Nature Conservancy
  - Mokolo River Nature reserve
  - Waterberg District Municipality
  - Lephalale Local Municipality
  - Eskom Transmission
  - Eskom Distribution Northern Region
  - Landowners
- The due date for comment on the draft Basic Assessment Report is 10 July 2012.
- Subsequently, a final Basic Assessment Report (BAR) will be compiled and forwarded to DEA by August 2012. This report will include all concerns raised to the draft BAR and responses thereto. The Consultants (EAP) will ensure that any concerns raised are addressed in appropriate detail in the subsequent final Basic Assessment Report.

4. Project description

4.1 Need for the project

A need has been identified to strengthen several reticulation feeders between Vaalwater and Ellisras. Currently the network is experiencing under voltages and is incapable of handling additional loads due to the contigency constraints of the network. Outages in the network occur due to the fact that feeders exceed the maximum length. It is therefore of

cardinal importance to split some of the rural lines to prevent outages. The feeder area of the Vaalwater-Bulge Rivier, Theunispan-Elmeston, Waterberg-Afguns en Flamingo-Sentrum would therefor be divided into smaller areas. The construction of the authorised Bulge Rivier substation and the construction of the new Dorset substation and the feeder line are part of the proposed master plan. Should this project be implemented then it should not be necessary to construct any new infrastructure for the next 15 years. Failure to strengthen the network will result in Eskom not being able to deliver the requested demand. If this project is not implemented then the network will suffer outages that will only worsen in time.

Eskom emphasised that the proposed projects would ensure a strengthening of the power supply of the entire macro area. The whole purpose of these projects is to enable Eskom to provide a reliable service to the relevant communities and farms within the macro area.

In summary the advantages to customers in the macro area:

- Upgrade the current supply from Radial feed to Ring feed, Currently Radial feed from Warmbad Substation. Ring feed will create an alternative supply from Matimba Power station. All substations in the project will form part of an integrated ring supply network.
- Place the High Voltage (132kV) sources closer to the customers (Bulge and Dorset substations) and shorten the Medium Voltage (22kV) networks to improve the quality of supply.

Therefore, the current EIA application is only part of a broader scope of works to improve the network performance.

The construction of the project entails the following:

1. Construct a ±65km 132kV power line from Bulge Rivier substation to Dorset substation.
2. Construct an access/ construction road for the new 132kV line.
3. Obtain a servitude area of 31metres wide for the 132kV line

4.2 Project components

The proposed project requires the construction of approximately 65km of 132kV line from the authorised (to be constructed) Bulge Rvier substation to the new Dorset Substation. Inclusive to this application is the construction of the following:

1. *Construct a 132kV line from Bulge Rivier substation to Dorset substation.*

It is proposed to construct a 132kV line from the authorised Bulge Rivier substation east towards Dorset substion near Visgat. The proposed structure for the 132kV power line, is a monopole steel structure. In general, these pylons could be placed 220-350 meters apart, for the length of the line. The pylons for a power line are between 18 to 30 meters high, depending on the terrain and existing land use. The flatter the terrain, the shorter the pylons to be used. The conductor attachment height on a pole is 13m (for 20m intermediate poles) and more for longer poles, depending on the pole length. Ground clearances will adhere to OSH-Requirements of 6.3m and 7.5m.

Strain poles have a planting depth of 2m but intermediate pole planting depths varies between 2.6m (for 20m poles) and 3m (for 24m poles) or more depending on the pole length. The pole is not planted in a slab - The pole foundation is dependant on the soil type and varies in size and consists of a 8:1 good soil:cement mix that are compacted in 200mm layers. A concrete cap of 1.2m x 1.2m is cast around the pole to "seal" the soil around the pole from oxygen - to control oxidation or rust on the pole.

Should the pylons be 21m high above ground then the planting depth of the pylon could be calculated as follows: For a pylon that need to be 21m above ground, the planting depth will be 0.6 meters plus 10% of the height of the pylon above ground = 0.6 meters plus 2.1 meters = pylon is planted 2.7 meters deep. Should stays be needed then the stays will be at a 45° angle to the pylon and planted 21meters from the pylon into the ground.

Where the site is relatively flat, single pylons without stays will be used, except for where the power line has to change direction. Stays will not be used except at turns in the route.

Clearance between phases on the same side of the pole structure is normally around 2.2m for this type of design, and the clearance on strain structures is 1.8m. This clearance should be sufficient to prevent phase – phase electrocutions of birds on the towers. The length of the stand-off insulators is likely to be about 1.5 meters.

Refer to Appendices C2 and C3 in the BAR for visuals of the monopole steel structure (pylon).

The route for the line has four alternatives that are discussed as follows:

Alternative 1: The route for the line is proposed to run from Bulge Rivier substation (at A-B) in an easterly direction adjacent to the R517 between Vaalwater and Lephalale. From there the route will turn north onto the Hermanusdorings dirt road (D1882) towards Witfontein (A towards G). Before the dirt road reaches the R33, the route will turn north from C to D. From there the route turns east, crosses the R33 and follows the dirt road to Visgat (D1005) and then road D1162 to Dorset (substation) (D-E-H-F).

Alternative 2: This alternative is proposed to run the same section as Route Alternative 1 from A-B-C, but will continue directly east towards G until it reaches the R33. At G the route will turn north onto the R33 towards D. From there the route will follow the same alignment as Route Alternative 1 from D-E-F, except for a shortcut between E-F.

Alternative 3: Alternative 3 runs from the Bulge Rivier substation all along farm borders towards the Hermanusdoorings dirt road. Firstly in a northernly direction, then in an easternly direction, then southwest towards the R517. (A-I-J-K). From there (K) in an easternly direction towards B, adjacent to the R517 towards Vaalwater. From there the route will turn north onto the Hermanusdorings dirt road (D1882) towards Witfontein (B towards G). Before the dirt road reaches the R33 (G), the route will turn northeast from L-M, southeast from M-N and northeast from N-D and run along farmborders. From there the route turns east, crosses the R33 and follows the dirt road to Visgat (D1005) and then road D1162 to Dorset (substation) (D-E-H-F).

Alternative 4: Alternative 4 runs the same route as Alternative 3 from the Bulge Rivier substation towards the Hermanusdorings dirt road all along farm borders, except for one small section. Firstly in a northernly direction, then in an easternly direction (A-I), then between I-J all along the border of Bulge Rivier 198KQ Portion 6. From J-K-B, the same alignment will be followed as in Route Alternative 3. From B the route will follow the Hermanusdorings road (D1882) towards Witfontein. At O-P the route will run to the south of the dirt road to avoid rocky areas. From P-L-M-Q-R-D the route will follow farm borders. From there the route turns east, crosses the R33 and follows the dirt road to Visgat (D1005) and then road D1162 to Dorset (substation) (D-E-H-F). (Refer to the maps attached in Appendix A of the BAR).

The National Road P198/1 (R33); the Provincial Road P84/1 (R517); and District roads D1882; D1005; and D1162 are affected by the proposed servitudes, should any of the route alternatives be constructed.

In terms of the National Roads Act (Act No 54 of 1971), the requirements of standard conditions applicable to power lines parallel to or across national and provincial roads are as follows:

- Only under exceptional circumstances will crossings within 500m of an intersection be permitted.
- No infrastructure will be allowed within 60m from the edge of the road reserve or within a distance of ninety-five (95) metres from the centre line of a building restriction road.
- Vertical clearance as set out in the Occupational Health and Safety Act No. 85 of 1993 to be maintained.
- The proposed angle of crossing to be as close to 90 degrees as possible.
- When considering an infrastructure site, no direct access from a national road to be permitted.

In addition, the following *general requirements of the Provincial Department of Roads and Transport*: Roads Management could be expected:

- A wayleave will be granted in terms of the Advertising on Roads and Ribbon Development Act (Act 21 of 1940, as amended) and the Roads Ordinance (Ordinance 22 of 1957, as amended) and its Regulations and does not exempt Eskom from the provisions of any other law.
- The Wayleave Application should be supplied to the Dept, with appropriate plans before the commencement of construction.
- The general conditions for the overhead wayleave should be accepted by Eskom in writing as per written notification of the Dept.
- The overhead lines are not to be lower than 10m above the highest point of the road surface.
- At crossings no pylons, poles, anchors or parts thereof may be erected closer than 16 m from the road reserve. Where the routes of the lines are parallel to the road(s), it must not be closer than 15m outside the road reserve.
- Crossing services should be perpendicular to the affected road(s).

It is expected that Eskom Land and Rights will apply for exemption from some of the requirements above. The specific requirements from the Provincial Department of Roads and Transport: Roads Management should be obtained.

2. *Obtain a servitude area of 31 meters wide*

Eskom relies on the goodwill of landowners and interested and affected parties to obtain rights of way, or servitudes for power lines. Hence, landowners are consulted during the construction of new power lines and existing landowners are

notified when vegetation clearance is due to be performed. Eskom obtains right of way by negotiating a right of way or registering a servitude. The difference between these is detailed below:
Servitude: A servitude is a real right which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. The effected owner normally gets compensated for this right according to market related values. A servitude stays effective even if a property is transferred to another owner. Rigths to obtain a servitude is negotiated for 33kV, 88kV and 132kV power lines.

Way Leave Agreement: A way leave agreement is a personal right, which Eskom obtained in order to construct its infrastructure, such as rural power lines, upon the affected property. The way leave document contains clauses to the effect that the agreement is also binding on the successors in title. These rights are not registered in the Deed Office and Eskom does not pay compensation for these rights. The argument for this is that Eskom normally obtains way leave agreements only for minor reticulation type of power line projects (11kV and 22kV lines) from which a property owner can benefit by utilising the available energy.
A servitude area is generally a no building area, except for Eskom structures. Usually, normal farming activities may continue in a servitude with the exception that no trees may be planted or high structures may be erected. In general, the servitude for Eskom 132kV power lines is 31 meters wide, which implies 15,5 meters on either side of the power line.

3. *Construct an access road for the new line*

Access to properties for the purpose of construction will be arranged with landowners. The existing roads will be used as far as possible. Relevant is the fact that the alternatives are adjacent to existing impact (roads) for most of the alignment. New access will therefore only be required at the sections away from the roads. Should a temporary construction road be unavoidable, then an area of 8m will be selectively cleared, 4m on either side of the center line of the power line. During construction all vehicle movement must be along existing roads, adjacent to the fences of the applicable properties, as far as is feasible.

5. Alternatives for the project

Alternatives for the project have been investigated. The purpose of investigating alternatives is to find the most effective way of meeting the need and purpose of the proposal. This can be attained by enhancing the environmental benefits of the proposed activity, through reducing or avoiding potentially negative impacts.

5.1 Alternative Activities

5.1.1 No-Go

It is suggested that to maintain the status quo is not the best option for the macro environment. This project is part of Eskom's implementation of their Master Plan for the extension of electrical infrastructure. Should this application not be approved then the supply to the broader area will not be reliable and this can result in blackouts and major disturbances in energy provision. In the future, new development might cause overloading of the already stressed existing system which can cause major disruptions of power supply to different areas at different times. The No-go option would not solve the current demand for electricity. The No-Go development alternative could therefore not be considered the responsible way to manage the site(s).

5.2 Location Alternatives

The project consists of the construction of approximately 65km of 132kV power line between the authorised Bulge Rivier substation and the new Dorset substation. Alternative routes for the power line were considered. Refer to Appendix A of the BAR for the project maps indicating the route Alternatives. Specialist input was obtained to investigate the impact of the various alternative routes that could accomplish the purpose of the project. The specialist input is summarised as follows:

5.2.1 Ecological status report

The ecological status report identified the following:

- The study area falls within the Savanna Biome. Three vegetation types are encountered in the area. Namely, Central Sandy Bushveld; Western Sandy Bushveld and Waterberg Mountain Bushveld.
- Red data species and protected species found in the area include Camel thorn (*Acacia erioloba*), Leadwood (*Combretum imberbe*) and Marula (*Sclerocarya birrea* subsp. *caffra*).
- A small grove of Camel Thorns on both sides of the D1882 sand road in the vicinity of the Mokolo River should be viewed as a 'No-Go" zone. The route should be planned to avoid the groves. (GPS coordinates taken from the road: S24^{0}06.822'; E27^{0}48.301'). Should the camel thorns be impacted, then a permit is needed.
- No threatened or protected mammal, butterfly or amphibian species were observed in the study area, although some are most likely present. These include African rock python (*Python natalensis*), Giant bullfrog (*Pyxicephalus adspersus*), Honey badger (*Mellivora capensis*), Pangonlin (*Manis temmincki*) and Southern African hedgehog (*Atelerix frontalis*).
- The soils in the proposed power line servitude routes and immediate vicinity are predominantly shallow to deep sandy and gravely soils with a low clay content. The colours of which are generally red to yellowish. A number of highlying areas and slopes have a high presence of large surface and sub-surface rocks.
- Large areas of the bushveld in the region are undisturbed, with a number of formal nature reserves, private game ranches and lodges. Other land-uses in the area include agriculture in the form of pivot-irrigated, cultivated lands and cattle farming. Urbanisation and human development of the immediate region are low.
- Floristic and faunal sensitivity calculations were done. A large percentage of the vegetation in the study area can be viewed as pristine. The vegetation is fairly uniform with no small ecosystems or islands of uniqueness being present.
- Floristic sensitivity calculations were as follows: Regional vegetation – medium (Go-Slow zone); Rivers – medium/high (Go-But zones); Rocky areas – medium/high (Go-But zone); Camel thorns – high (No-Go zone).
- Faunal sensitivity calculations were as follows: Regional vegetation – medium (Go-Slow zone); Rivers – medium/high (Go-But zones); Rocky areas – medium/high (Go-But zones); Camel thorns – medium (Go-Slow zone).
- The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components with the following outcomes: Regional vegetation – medium (Go-Slow zone); Rivers – medium / high (Go-But zones); Rocky areas - medium/high (Go-But zone); and the area of Camel thorns – high (No-Go zone).
- A number of mitigating actions where recommended and the proper implementation and management of these will ensure that impacts are reduced and are kept to acceptable levels.
- These measures include staying out of No-Go zones (highly sensitive areas such as the camel thorn grove); not placing any pylons closer than 30m from the edge of river banks or 10m from the edge of drainage lines; an ongoing management programme to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons; to not use chemicals in the control of weeds; to inspect the power line corridor every year (before and after the summer rain season) for soil erosion and if found to rehabilitate; to use wide spacing of pylons in the rocky areas to limit the physical footprint on the actual ground; and to remove all left over construction materials, rubble etc. upon completion of the project.
- Assessment of impacts on the various distinctive ecological units in the study area (before and after) mitigating and management measures were deemed to be as follows: Regional vegetation – medium (before), low (after); Rivers – medium, bordering on high (before), low (after); Rocky areas – medium, bordering on high (before), low (after). No rating matrix is given for the small area of camel thorns or the Mokolo River simply because there are no possible mitigating measures to reduce the negative impact and the area must be seen as a "No-Go" zone.
- Having taken all aspects of the investigation into account the following line variant is recommended - **Alternative Route 4 (A-B$_1$-C$_2$-C$_1$-D-H-F)**. However, between map points (C$_1$ – D) both sections of Alternative Routes 4 & 3 are equally ecologically acceptable and either may be used across this section. (Refer to map in specialist report on the ecological environment, in Appendix D1.)

Assessment of impacts on the various distinctive ecological units in the study area:

Regional vegetation

Significance of Impacts

- Surface changes within the regional vegetation of the undulating plains will result in the loss of some biophysical attributes, albeit slight. These effects are for the most part permanent, especially within the corridor of the power lines and substation sites. However, the impacts are likely to have a low negative affect on sensitive species or Red Data species. Representative habitat is still widely present in the surrounding regions and in good condition and diversity. The implementation of mitigating measures would suffice in limiting localised impacts, as well as allowing for effective control and reduction of impacts.

Mitigation of impacts

- Due to the long (65km) distance covered by the power line corridors between Bulge River Substation and Dorset Substation it may be necessary to set up temporary storage and accommodation facilities along the route. If so, areas of flat, open lands should be selected. This need to be old, previously cultivated lands that are open and not wooded. No area should be selected where it would be necessary to cut down any trees or clear any shrub land whatsoever. Any selected temporary site still needs to be within the 100m power line corridor. All mitigating and management measures as laid out for temporarily facilities under "Bulge River Substation" need to be adhered to.
- No site within a rocky area or within 300m of a river or stream may be used for temporary accommodation or storage.
- Positioning of the foundation slabs for the pylons must be a minimum of 10m away from the edge of all drainage lines.
- No trees outside of the power line corridor of 8m to be removed.
- Disturbed surface areas in the construction phase to be rehabilitated. No open trenches to be left. No mounds of soils created during construction to be left.
- The sandy nature of the soils in the area makes it susceptible to soil erosion by water once disturbed, especially in steeper areas. The ground around all foundation slabs for the pylons need to be inspected before and after the summer rainy season for erosion. Any erosion found needs to be fixed and preventative measures put in place to prevent a reoccurrence of the situation.
- An ongoing programme to be implemented to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons. This should be done in such as way as to allow the natural grasses and pioneer plants to colonise the disturbed areas.
- Mechanical control of alien species to be implemented within two months of completion of construction of the power line. Thereafter ever six months.
- Surface area under power lines to be mowed and not ploughed.
- No chemical control (herbicides) to be used in the control of alien plants or indigenous plants, except on tree and bush stumps in 8m corridors directly under power lines.
- Removal of all construction material and equipment after construction.
- Removal of all waste construction material to an approved waste disposal site.

Rivers and seasonal streams

Significance of impacts

- Rivers and wetlands are always seen as sensitive and should be avoided at all cost. In this instance there is no other choice but to cross over two such water courses. Namely, the Mokolo River and Poer se Loop. Mitigating measures are necessary, the implementation of which will ensure that almost no negative impact in terms of the ecological environment are felt.

Mitigation of impacts

- The two major water courses (Mokolo River and Poer se Loop) along with a few seasonal streams and drainage lines that cross the corridors for the power lines, need to be completely avoided and no pylons may be placed directly within any one of these water courses.
- No temporary or other construction facilities to be erected or stored within 200m of the banks of the Mokolo River or the Poer se Loop stream.
- Positioning of any pylons need to be a minimum of 30m from the edge of the river banks or outside of the 1 in 100 year floodline.
- Positioning of the foundation slabs for the pylons must be a minimum of 10m away from the edge of all drainage lines.
- Under no circumstances may a pylon be placed directly in the bed of a river or drainage line.
- No temporary ablution facilities to be placed within 200m of the banks of any of the rivers or seasonal streams.
- No temporary ablution facilites to be placed within 200m of any drainage line, even if they are dry.

- Only proper portable, chemical ablution facilities to be used and these to be positioned only within the 31m power line servitudes.
- Portable ablution facilities only to be serviced by registered companies and on a regular basis. Under no circumstances may any effluent or sewage to be dumped in the open veld.
- Proper water facilities need to be installed and maintained for construction workers. No water from out of the rivers may be used for drinking, washing or cooking purposes.

Rocky areas

Significance of impacts

- Surface changes within the rocky areas will result in greater loss of biophysical attributes than in those of the regional vegetation of the undulating plains. Fortunately the rocky areas encountered in the power line corridors area spread over a large area and are not as sensitive, or unique, with regard to species diversification as would be the case of isolated rocky outcrops or ridges. Effects are mostly permanent and the significance of these impacts is therefore deemed high. Implementation of mitigating measures is considered necessary.

Mitigation of impacts

- A few rocky areas have been identified along the proposed servitude routes. These areas are considered moderately sensitive and should be approached with caution.
- The area is not seen as a "No-Go" area, but care should still be taken to avoid any unnecessary disturbance of veld or soil. Removal of trees, shrubs and other vegetation should be kept strictly to within the 8m corridor under the power lines.
- Only a single, basic vehicle track to be constructed as an access road under pylons moving through the rocky area.
- Access roads need to be kept to an absolute minimum.
- No trees to be cut down or roads to be created to access the power line corridor from the public road by vehicle. Or to create shortcuts into this region. Any vehicles needing to access the power lines running through the rocky area will need to do so from out of the less sensitive plains along the corridor itself.
- No temporary storage facilities, toilets, dwellings, etc. of any kind to take place within this rocky area. Not even within the demarcated power line corridor.
- The longest possible distance between pylons should be used in an effort to limit the footprint size on the rocky area.
- The power line must run as straight as possible through and over rocky areas. This in an effort to limit sharp turns that literally create a larger physical footprint on the ground.
- Great care and thought must be taken into the actual positioning and construction of the foundation slabs. The soils are sandy and this area has the steepest gradient of the study site. There is therefore a real danger of soil erosion and resulting veld degradation in this area.
- The sandy nature of the soils in the area makes it susceptible to soil erosion by water once disturbed, especially in steeper areas. The ground around all foundation slabs for the pylons need to be inspected before and after the summer rainy season for erosion. Any erosion found needs to be fixed and preventative measures put in place to prevent a reoccurrence of the situation.
- Disturbance of the soils must be kept to an absolute minimum to limit the potential introduction of alien plants. This area is pristine with little to no alien infestation. Alien plants generally get a foothold in an area where the soils have been disturbed.
- Mechanical control of alien species must be implemented within two months of completion of construction of the power line. Thereafter ever six months.
- No chemical control of alien plant species to be used.

Camel thorns

Significance of impact

- Immediately east of the Mokolo River is a small grove of camel thorn trees (*Acacia erioloba*), which should be considered highly sensitive, due to the conservation status of the tree species and not the uniqueness of the micro ecosystem. This area needs to be handled as a "No-Go" area and avoided. For this reason, no mitigating measures are seen as been able to reduce the impact on the site, save the one of total avoidance.

Mitigation of impact

- There are no possible mitigating measures and the area must be approached as a "No-Go" area.

Line Variant Recommendations

Line variant recommendations are made on the strength of all the impacts and mitigating actions. As well as the sensitivities of the various biophysical features and vegetation types.

Comparison of the number of ecologically sensitive units alternative routes potentially impact on

Ecologically sensitive criteria	Alternative Route 1					Alternative Route 2				
	A-B	B-C	C-D	D-E	E-F	A-B	B-G	G-D	D-H	H-F
Areas of high sensitivity	0	1	0	0	0	0	1	0	0	0
No-Go areas	0	1	0	0	0	0	1	0	0	0
Rivers and streams	2	1	0	0	1	2	1	0	0	1
Rocky outcrops	0	1	0	0	1	0	1	0	0	1
Wetlands	0	0	0	0	0	0	0	0	0	0
Sub-Total	2	4	0	0	2	2	4	0	0	2
Total	8					8				

Ecologically sensitive criteria	Alternative Route 3					Alternative Route 4				
	A-B_1	B_1-C_1	C_1-D	D-H	H-F	A-B_1	B_1-C_2	C_2-C_1	C_1-D	D-F
Areas of high sensitivity	0	1	0	0	0	0	1	0	0	0
No-Go areas	0	1	0	0	0	0	1	0	0	0
Rivers and streams	1	1	0	0	1	1	0	0	0	1
Rocky outcrops	0	1	0	0	1	0	1	0	0	1
Wetlands	0	0	0	0	0	0	0	0	0	0
Sub-Total	1	4	0	0	2	1	3	0	0	2
Total	7					6				

- When the alternative power line routes are compared with each other regarding the possible number of ecological sensitive regions they could impact on, the results are the same for Routes 1 & 2 (both with a total of 8). Alternative Routes 3 & 4 have lower impact with Alternative Route 4 having the lowest (total of 6). The fundamental difference giving Alternative Route 4 the lowest calculated impact on ecologically sensitive regions is found on the route deviation C_2-C_1 (see ecological sensitivity maps). It is along this section of the proposed power line routes that the other alternative routes move through much rockier areas, while Route 4 is less rocky, more open and moves through more flat areas. The rockiness of the area increases to the north side of the public sand road (D1882). Keep in mind that rocky areas have a medium/high sensitivity rating prior to mitigating measures been implemented and that they need to be avoided wherever possible.
- The alternative routes also differ slighlty across the route section A-B (see ecological sensitivity maps). Here Routes 1&2 are the same, crossing over two rivers and potentially obstructing entrances to game and other farms. While Routes 3&4 follow another route which only crosses one major river and doesn't potentially impact on entrances to game and other farms. For these reasons Routes 3&4 have lower ecological impact ratings over this section of the route.
- The section of Alternative Route 1 (E-E_1) near the Dorset Substation, is seen as having a greater impact on the environment than the other three routes that follow the more disturbed route along the road (E-H-F), on their way to the Dorset Substation (F).
- Between map points C_1 and D (see ecological sensitivity maps) Alternative Routes 3 & 4 take different routes, albeit through the same general terrain. Across this specific section there is no difference in the potential ecological impact of Routes 3 & 4. In other words, across this specific section the ecological recommendation is that either route is acceptable and other factors need to be taken into consideration in determining the final route (eg. Cost of construction; agreements with landowners, etc.).
- All the alternative routes cross over drainage lines en route. These have been investigated during field trips, but have not been mentioned in determining the recommended route due to the fact that they balance out between the alternative routes and therefore carry no decisive weight in the descision process. Obviously, relevent

mitigating measures need to be implemented when such drainage lines are encountered during the construction phase and ongoing inspection of the power lines.

- Other factors have also been taken into account during investigations. Such as the number of sharp turns a route takes compared to a straight line between the two end points and the actual surface area in the 8m power line corridor that potentially needs to be totally cleared of any trees or shrubs. Sharp turns are significant because the actual footprint on the ground at a turn in a power line is much larger than along a straight line. Generally speaking the shorter and straighter a corridor is able to be constructed the better.
- For all of the above reasons, **Alternative Route 4 (A-B_1-C_2-C_1-D-H-F)** is the ecologically recommended alternative. However, between map points (C_1 – D) both sections of Alternative Routes 4 & 3 are ecologically acceptable and either may be used.

5.2.2 Bird Impact Assessment

The Bird Impact Assessment indicated the following:

Habitat transformation impact

- The habitat surrounding the proposed power line comprises mostly undisturbed woodland, with limited existing impacts which consist mostly of a number of reticulation lines, fences and dirt roads. As a result it supports a number of power line sensitive species, particularly raptor species currently Red Data listed. The impact of the proposed line on the natural habitat (and therefore potentially on power line sensitive Red Data species) would be limited if it is placed next to existing linear impacts, particularly dirt roads, as is the case with alternative 1 and 2. Alternative 3 and 4 have a few sections where it deviates from existing dirt roads, which will have a bigger impact on the natural woodland vegetation. If alternative 2 is selected, the impact of the clearing of vegetation for the new line would be slightly less than if the line was partially constructed in undisturbed woodland, as would be the case with alternatives 3 and 4, and to a much lesser extent with alternative 1. The impact on smaller, non-Red Data species that are potentially breeding in the area that will be cleared for the new power line will be local in extent, in that it will not affect regional or national populations in any significant way.
- The proposed construction of the new power line should have a **low** habitat transformation impact from an avifaunal perspective, especially if **alternative 2** is used. If **alternative 1** is used, the impact would be **medium-low**, as it would involve more extensive clearing of undisturbed woodland. With **alternative 3 and 4**, the impact will be **medium,** as it would require more extensive clearing of woodland than the other.

Collisions

- The majority of species listed in Table 2 of the BIA (attached in Appendix D3 of the BA report) are all vulnerable to collisions with power lines. In the case of water-associated birds such as the Black Stork, Yellow-billed Stork and African Marsh-Harrier the drainage lines, and specifically the pools in the larger rivers such as the Mokolo and Malmanies, which are in the study area, might potentially hold some attraction to these species. The new line will cross these drainage lines and might be a potential cause of collisions for these species and other, non-Red Data species such as certain species of ducks, waders and possibly Hamerkops *Scopus umbretta*. Species such as Kori Bustard and Secretarybird are known to be vulnerable to collisions with power lines, and the risk would be higher where the proposed alignments cross open habitat, especially old lands. The collision risk should therefore be regarded as **medium-high** along some sections of the proposed power line alignments.

Electrocution

- A mono-pole steel pole will be used for the new 132kV line. Clearance between phases on the same side of the pole structure is normally around 2.2m for this type of design, and the clearance on strain structures is 1.8m. This clearance should be sufficient to prevent phase – phase electrocutions of birds on the towers. The length of the stand-off insulators is likely to be about 1.5 metres. This is relevant as birds such as vultures are able to touch both the conductor and the earthed pole simultaneously potentially resulting in a phase – earth electrocution. This is particularly likely when more than one bird sits on the same pole.
- Although not recorded in large numbers, it is likely that White-backed and Cape Vultures forage in the area. There are cattle and game in the surrounding area, and should a carcass be available to the birds, they might attempt to roost on the poles. The risk of phase-earth electrocution is therefore evaluated to be **medium**. It should be mentioned that the pole design holds no inherent electrocution risk for other large non-gregarious species such as eagles, as they almost never perch together in large numbers next to each other.

Conclusions

The construction of the proposed 132kV Bulge-Dorset power line should pose a limited threat to the birds. The power line poses a **medium-high** collision risk, mostly to water associated species, and those species attracted to open habitats, particularly old lands. The line will pose a **medium** electrocution risk, in particular to vultures. The proposed construction of the new power line should have a **low** habitat transformation impact from an avifaunal perspective, especially if **alternative 2** is used. If **alternative 1** is used, the impact would be **medium-low**, as it would involve more extensive clearing of undisturbed woodland. With **alternative 3 and 4**, the impact will be **medium,** as it would require more extensive clearing of woodland than the other.

Recommendations

- Power line: The span that crosses drainage lines and old lands should be marked with Bird Flight Diverters on the earth wire of the line, five metres apart, alternating black and white (see Appendix B Sensitivity map in the specialist report on bird impact for the area to be marked with Bird Flight Diverters). Appendix C indicates the preferred Bird Flight Diverters to be used.
- Poles: The poles should be fitted with bird perches on top of the poles to draw birds, particularly vultures, away from the potentially risky insulators.
- From a bird impact perspective, **all four alignments** (Route Alternatives 1, 2, 3 and 4) are suitable options, should the proposed mitigation be impemented.

5.2.3 Heritage Impact Assessment

The main findings of the Heritage Impact Assessment are summarised as follows:-

(Refer to Appendix D2 of the BAR for the full report)

The Phase I Heritage Impact Assesment for the Eskom Project revealed none of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) for the Eskom Project Area. Therefore, from a heritage point of view, **Alternatives 1, 2, 3 and 4** are suitable, for the construction of the project.

Recommendation

It is possible that this Phase I HIA study may have missed heritage resources in the Eskom Project Area. If any heritage resources of significance is exposed during the construction of the power lines the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notify in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures.

5.3 Conclusion

Alternative routes have been investigated for the project. From a heritage viewpoint there is no preferred alternative route. From a bird impact perspective, Route Alternative 2 will have the least impact, but **all four alignments** (Route Alternatives 1, 2, 3 and 4) are suitable options, should the proposed mitigation be impemented. From a purely ecological viewpoint, Route Alternative 4 is slightly preferred. The final decision between Route 3 or 4 should be made on the accumulative weight of other parameters such as feedback from public participation, land tenure issues, construction costs, etc.

Currently, Alternative 4 is preferred from the viewpoint of impact on the landowners and their activities.

The **affected properties** for the **proposed Alternative 4** is on the farms Bulge Rivier 198 KQ portion 2, 6, Mokolo Rivier Private Nature Reserve 660 KQ portion 0, Hermanusdoorns 650 KQ portion 0, Hermanusdoorns 204 KQ portion 5, Welgevonden 186 KQ portion 0 en 1, Groenfontein 207 KQ portion 5, Keerom 208 KQ portion 0, Hanover 181 KQ portion 0, 3, Goudfontein 171 KQ portion 0, 1, 2, Welgevonden 180 KQ portion 0, Schuinskloof 175 KQ portion 1, 2, 3, Rietbokhoek 4 KR portion 1, 2, Rem, Zeekgat 5 KR portion 1, Rem, Steenbokfontein 9 KR portion Rem, 3, 4, Dwarsfontein 51 KR Rem, Dwarsfontein 51 KR (To be consolidated to Jacobshoogte T149848/07) portion 0, Brakfontein 16 KR portion Rem in the Lephalale Local Municipality in the Limpopo Province.

6. Impact assessment

The expected **negative impacts** of the proposed project on the environment were identified as follows (evaluated in the BA Report):

1. Impact on natural habitat
2. Social impact
3. Impact on birds
4. Impact on Cultural Heritage Resources
5. Loss of cultivation potential
6. Visual impact
7. Risk of surface and ground water pollution
8. Risk of erosion
9. Influx of labourers to the area
10. Access to farms/properties
11. Impacts associated with firebreaks and servitude maintenance
12. Impact of solid waste
13. Impact of alien vegetation
14. Impact on tourism

For this project the investigations into these issues confirmed in summary the following:

1. Impact on natural habitat

This impact is associated with the potential for disruption of sensitive floral habitats and fauna populations. The planning regarding the route of the power line should take into account the ecological sensitivity of the site.
Relevant to the project is the following:

- The vegetation is fairly uniform and therefore for the greater part the vegetation of the study area is seen as moderately sensitive.
- Red data species and protected species found in the area include Camel thorn (*Acacia erioloba*), Leadwood (*Combretum imberbe*) and Marula (*Sclerocarya birrea* subsp. *caffra*).
- There are a few camel thorn (*Acacia erioloba*) trees growing just east of the Mokolo River on both sides of the sand road (D1882). Camel thorns are protected trees and this small grove should be viewed as a "No-Go" zone and totally avoided.
- No threatened or protected mammal, butterfly or amphibian species were observed in the study area, although some are most likely present. These include African rock python (*Python natalensis*), Giant bullfrog (*Pyxicephalus adspersus*), Honey badger (*Mellivora capensis*), Pangonlin (*Manis temmincki*) and Southern African hedgehog (*Atelerix frontalis*).
- There are a few areas of rockiness along the power line corridors, but these should not be confused with rocky outcrops (koppies) or rocky ridges. Notwithstanding, these rocky areas, although not highly sensitive, should still be viewed as sensitive and approached with care.
- Rivers and wetlands, along with their associated vegetation should all be viewed as sensitive. Two main rivers or streams fall within and/or cross the power line corridors. Namely, the Mokolo River and Poer se Loop. The proper implementation and management of mitigating measures are crucial. A number of drainage lines move across the power line corridors and also need to be avoided. No wetlands were found to be present in the study area.
- Floristic and faunal sensitivity calculations were done. A large percentage of the vegetation in the study area can be viewed as pristine. The vegetation is fairly uniform with no small ecosystems or islands of uniqueness being present.
- Floristic sensitivity calculations were as follows: Regional vegetation – medium (Go-Slow zone); Rivers – medium/high (Go-But zones); Rocky areas – medium/high (Go-But zone); Camel thorns – high (No-Go zone).
- Faunal sensitivity calculations were as follows: Regional vegetation – medium (Go-Slow zone); Rivers – medium/high (Go-But zones); Rocky areas – medium/high (Go-But zones); Camel thorns – medium (Go-Slow zone).
- The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components with the following outcomes: Regional vegetation – medium (Go-Slow zone); Rivers –

medium / high (Go-But zones); Rocky areas - medium/high (Go-But zone); and the area of Camel thorns – high (No-Go zone).

- A number of mitigating actions where recommended and the proper implementation and management of these will ensure that impacts are reduced and are kept to acceptable levels.

Mitigation for impact on natural habitat

Proper planning will limit the impact of the power lines on the natural habitat and therefore the following is proposed:

- Site specific measures in terms of ecology as identified by the ecologist, Johannes Maree (Tel 082 564 1211) must be included in the contract with the Contractor and implemented by the Contractor during the construction phase.
- The Mokolo River and Poer se Loop are seen as being sensitive. Pylons should not be placed closer than 30m from the edge of river banks or 10m from the edge of drainage lines.
- An ongoing management programme to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons is recommended.
- The power line corridor should be inspected every year (before and after the summer rain season) for soil erosion and if found, to rehabilitate; to not use chemicals in the control of weeds; and to remove all left over construction materials, rubble etc. upon completion of the project.
- A small grove of Camel Thorns on both sides of the D1882 sand road in the vicinity of the Mokolo River should be viewed as a 'No-Go" zone. The route should be planned to avoid the groves. GPS coordinates taken from the road: S24^{0}06.822'; E27^{0}48.301'. Should there be impact on any of the camel thorns, then a permit is needed.
- In general only one application requesting one permit per power line corridor is necessary. All the protected trees, in this corridor, 2m and above, should be indicated on a map.
- The rocky regions should be viewed as sensitive although not as "No-Go" zones. It is recommended to use wide spacing of pylons in the rocky areas to limit the physical footprint on the actual ground.
- Assessment of impacts on the various distinctive ecological units in the study area (before and after) mitigating and management measures were deemed to be as follows: Regional vegetation – medium (before), low (after); Rivers – medium, bordering on high (before), low (after); Rocky areas – medium, bordering on high (before), low (after). No rating matrix is given for the small area of camel thorns or the Mokolo River simply because there are no possible mitigating measures to reduce the negative impact and the area must be seen as a "No-Go" zone.
- Having taken all aspects of the investigation into account the following line variant is recommended - **Alternative Route 4 (A-B_1-C_2-C_1-D-H-F)**. However, between map points (C_1 – D) both sections of Alternative Routes 4 & 3 are equally ecologically acceptable and either may be used across this section. Refer to map in specialist report on the ecological environment. (Refer to maps in the BAR)

2. Social Impact

The construction of new power lines could potentially impact on landowners, land users or lands rights holders if not planned and designed to accommodate the needs of the landowners.

Mitigation of Social Impact

The route of power lines should be designed to accommodate the needs of landowners and land users.

- The design for the power line route and the placement of structures should be accommodating to existing structures in the alignment of the route.
- Routes with evident visual disturbance caused by existing power lines or roads are in general more acceptable than traversing through pristine area.
- For the above reasons the Route alternatives 1 and 2 had been proposed adjacent to existing disturbance (e.g. from the Bulge Rivier sub along the existing provincial R517 road; then along the D1182 sand road; along the R33; along D1005; and D1162 sand roads). This route was not supported by some landowners partly due to the impact thereof on their activities and entrances.
- Subsequently Route Alternatives 3 and 4 were proposed to, for some sections of the route, follow an alignment away from the roads.
- During the course of the EIA, all affected landowners were identified and consulted with regarding the proposed project.
- Alternative 4 is proposed as the route with the least impact to landowners considering that it is mostly all along roads with its existing impact. The route deviates for small sections from the roads, due to landowner preferences.

These deviations limit impact to their activities. All landowners indicated their agreement to the route or their willingness to enter into further negotiations.

- The properties in question (servitudes) will not be purchased and the registered owner will receive compensation for the use of the servitude. Further negotiations are taking place to confirm the details for the acquisition of the servitude and compensation therefore.
- A negotiator has been appointed by the applicant to consult with land owners/land rights holders. Further negotiations are taking place to confirm the details for the acquisition of the servitudes and compensation thereof. The negotiator will confirm the specific requests/requirements with each landowner. These will be stipulated in the final document, an option document. The option document is a binding document that reflects all the requirements of the landowner, for example: the exact positions of the pylons on the property; the negotiated compensation for the servitude; specific access arrangements to the property etc.

3. Impact on Birds

The construction of the proposed 132kV Bulge-Dorset power line should pose a limited threat to the birds. The power line poses a medium-high collision risk, mostly to water associated species, and those species attracted to open habitats, particularly old lands. The line will pose a medium electrocution risk, in particular to vultures. The proposed construction of the new power line should have a low habitat transformation impact from an avifaunal perspective, especially if alternative 2 is used. If alternative 1 is used, the impact would be medium-low, as it would involve more extensive clearing of undisturbed woodland. With alternative 3 and 4, the impact will be medium, as it would require more extensive clearing of woodland than the other.

Mitigation for impact on birds

- Power line: The span that crosses drainage lines and old lands should be marked with Bird Flight Diverters on the earth wire of the line, five metres apart, alternating black and white (see Appendix B Sensitivity map in the specialist report on bird impact in Appendix D3 for the area to be marked with Bird Flight Diverters). Appendix C indicates the preferred Bird Flight Diverters to be used.
- Poles: The poles should be fitted with bird perches on top of the poles to draw birds, particularly vultures, away from the potentially risky insulators.
- From a bird impact perspective, **all four alignments** (Route Alternatives 1, 2, 3 and 4) are suitable options, should the proposed mitigation be implemented.

4. Impact on cultural heritage resources

Construction can destroy heritage resources ('national estate') should it occur in or near the proposed project area.

Mitigation of impact on cultural heritage resources

A Phase I Heritage Impact Assessment (HIA) study as required in terms of Section 38 of the National Heritage Resources Act (No 25 of 1999) was done.

The Phase I HIA study revealed none of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999).

From a heritage point of view, **all 4 alignments (Route Alternatives 1,2,3 and 4) are suitable options**, should the proposed mitigation be implemented.

Recommendation: It is possible that this Phase I HIA study may have missed heritage resources in the Eskom Project Area. If any heritage resources of significance is exposed during the construction of the power lines the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notify in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures.

5. Loss of cultivation potential

The power line and their routes can have an impact on a number of other activities, such as cultivation potential.

The construction of power lines with the resulting clearance of servitudes can lead to a temporary loss in agricultural land.

Mitigation of impact on Agriculture

The proposed construction of the power line will not impact significantly on any agricultural activity. The following is relevant to this project:

- The land capabilities of the immediate surrounding areas within which the proposed servitudes fall are fairly limited. Most of the sandy soils are too shallow or nutrient-poor for high-yield crop production. Certain areas with heavier soils are suited for arable land. However, due to the dry winter periods irrigation would be necessary. The climate is generally favourable for year-round production of crops in open-field cultivation.
- The veld carrying capacity is relatively low although many sweet grasses are present. Cattle farming does occur in the area but suitably large areas for grazing are needed. The suitability for grazing land is there but needs to be carefully managed.
- The general land capability is highly suited to wilderness land. This is already a major form of land use in the region with numerous nature reserves, a biosphere reserve, private game farms and lodges. Including the Marakele National Park.
- Should the construction of the power line impact on any agricultural activities, this impact will only be for a limited period during construction. An access road of 8m wide could be cleared to construct the power line. After construction, normal agricultural activites could continue under the power line as usual.
- It is therefore submitted that the servitude area will not interfere with any agricultural activities. In addition, Eskom will not own the servitude but will purchase the rights to construct and maintain the line. A change in land use from agriculture to other land uses is not applicable.

6. Visual impact

Impact on the aesthetics of an area is related primarily to the visual impact of the proposed power line and secondary to the impact of habitat destruction.

Factors to consider regarding the visual impact are the following:

- The ability of the surrounding environment to absorb the visual impact of the power line.
- The structures to be used for the power line.
- The clearance of vegetation during construction.

Mitigation of Visual Impact

The following is relevant to this project:

- Impact to the natural habitat as a result of the project is to be expected. Construction could cause a significant impact to the habitat where insensitive clearing for construction and access purposes, etc. is required.
- It is suggested that any existing servitude roads as well as existing roads must be used during construction and maintenance of the power lines.
- The procedures for vegetation clearance and maintenance within overhead power line servitudes and on Eskom owned land, updated September 2009 must be implemented. These procedures includes i.e. the following:
  - Where clearing for an access road is essential, the maximum width to be cleared is 8m.
  - Clearing for pylon positions must be the minimum required for the specific tower, not more than a 5m radius around the structure position.
  - Indigenous vegetation, which does not interfere with the safe operation of the power line, should be left undisturbed.
- In general the recommendations from landowners are that the power line should not traverse any property, but rather run along the public or existing roads. The chosen route should be mostly along primary roads with wide verges or wide gravel roads. Routes with evident visual disturbance caused by existing power lines or roads are more acceptable than traversing through pristine area.
- In line with the above, Route Alternatives 1 and 2 were designed to run through more "disturbed" corridors, i.e. along the The National Road P198/1 (R33), and the Provincial Roads P84/1 (R517); D1882; D1005; and D1162.
- Route Alternative 3 and 4 were designed to follow the same corridor, but with slight deviations to accommodate site specific problems. These deviations were mostly due to impact on entrances to properties and agricultural activities.
- In addition, visual impact could generally be mitigated to some extend by constructing the line with monopole steel structures. Visuals of the structure are included in Appendices C2 and C3 of the BAR. From previous experience the steel poles are known to weather and with time blend into the environment.

7. Risk of surface and ground water pollution

- Construction materials and construction equipment will be stored at the campsite and used on site. The pollution of groundwater may result from spillages that may occur. In addition, the campsite may accommodate construction workers, in which case solid and liquid effluents will be produced, including sewage and domestic solid waste.
- Therefore diesel, oil and lubricant spills are the main concern in respect of water pollution during construction together with organic pollution caused by inadequately managed facilities at site camps and at the work sites. The above may result in a change in groundwater quality with the associated negative impact on humans and the natural habitat.
- A management plan must be in place to rehabilitate any such spills. Part of the management strategy must further include the proper storage and removal of any by-products and building rubble.
- Relevant to this project is the following:
- Two main rivers or streams fall within and/or cross the power line corridors. Namely, the Mokolo River and Poer se Loop. The proper implementation and management of mitigating measures are crucial.
- There are a few seasonal drainage routes that run across and through the servitudes. During the summer rainy season these are intermittently active. Due to the sandiness and drainage properties of the soils in the area, as well as the lack of high rainfall, there are no permanent or semi-permanent wetlands.
- The drainage routes (or lines) are not seen as being of any threat to the power line, but they should be kept in mind during construction and care should be taken to avoid them. Concrete foot supports should not be placed directly in or on the banks of these drainage furrows. Neither drainage nor erosion are seen to be significant threats as long as the proper mitigating measures are implemented. There were no signs of erosion along the investigated routes.
- Hence, no construction of any sort should take place within any aquatic and riparian habitats encountered, as these habitats are viewed as sensitive.
- There will therefore be *no impact on any watercourse or waterflow with regards to impeding flow or altering flow, as discussed in Section 21 c & I, or any of the listed water uses of the Water Act and relevant General Authorisations.*
- It is suggested that the applicant is complying with all aspects of the Water Act and General Authorisations, including all of the above points mentioned and there would therefore be **no need to obtain a water use license or register as a water user in terms of the General Authorisations.**
- It should however be noted, that If there are any activities which relates to section 21 water uses of the National Water Act 1998 (Act No. 36 of 1998), the applicant will need to get authorisation from the Department before such activities commences.

Mitigation of Surface and Groundwater Pollution

Construction camp

- 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.
- All construction activities and movement of people and machinery to remain within the designated power line corridor.
- Proper water facilities need to be installed and maintained for construction workers. No water from out of the rivers may be used for drinking, washing or cooking purposes.
- In all cases, abstraction of water for construction purposes will require a permit from the Department of Water Affairs unless pre-existing rights are purchased from farmers. For this project, water tanks will be provided at the construction site.
- 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 of underground water. The use of pre-mixed cement is recommended. No concrete to be allowed to be mixed in the veld.

Diesel, hydraulic fluid and lubricants

- Minimize on-site storage of petroleum products;
- Build adequate structures (berms and containment structures) to contain any oil spills which might emanate from transformers;
- Bund storage tanks to 120% of capacity;
- Ensure proper maintenance procedures in place for vehicles and equipment.

- Servicing of vehicles to be in designated areas with appropriate spill management procedures in place;
- Ensure measures to contain spills readily available on site (spill kits).

Site camp domestic waste (kitchens, showers)

- Deposit solid waste in containers and dispose regularly at the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008). Proof thereof to be kept by contractor.
- A copy of the service agreement, to verify the disposal sites that will be accepting the waste, should be submitted to the Dept of Water Affairs.
- Dispose of liquid waste (grey water) with sewerage.

Site camp sewage

- Minimize on-site accommodation.
- Only proper, certified portable chemical toilets to be used in campsites.
- Only certified, portable chemical ablution facilities to be used and these to be positioned only within the 31m power line servitudes.
- Only certified waste disposal companies to be used to regularly clean and empty portable toilets.
- Under no circumstances may any human waste (sewage) be discarded in the open veld. Not even buried.
- No ablution facilities allowed to be placed within 200m of the banks of any of the rivers or seasonal streams.
- No ablution facilities allowed to be within 200m of any drainage lines (even during times when they are dry)

Site camp inert waste (waste concrete, reinforcing rods, waste bags, wire, timber etc)

- Ensure compliance with stringent daily clean up requirements on site.
- Any waste that cannot be recycled will be transported to the appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008).

Rivers and drainage lines

- Rivers and drainage lines are always seen as sensitive and should be avoided at all cost. In this instance two major water courses (Mokolo River and Poer se Loop) along with a few seasonal streams and drainage lines cross the corridors for the power lines. These need to be completely avoided and no pylons may be placed directly within any one of these water courses.
- No temporary or other construction facilities to be erected or stored within 200m of the banks of the Mokolo River or the Poer se Loop stream.
- Positioning of any pylons need to be a minimum of 30m from the edge of the river banks or outside of the 1 in 100 year floodline.
- Positioning of the foundation slabs for the pylons must be a minimum of 10m away from the edge of all drainage lines.
- Under no circumstances may a pylon be placed directly in the bed of a river or drainage line.
- During and after construction, storm water control measures should be implemented especially around stockpiled soil, excavated areas, trenches etc. so that export of soil into the watercourse is avoided.

8. Risk of erosion

- The power line and their routes can have an impact on a number of other activities, such as erosion. However the impact on this is low.
- Unnecessary clearing of vegetation can result in exposed soil prone to erosive conditions.
- Insufficient soil coverage after placing of topsoil, where large surface areas are applicable, could also cause erosion.
- To cause the loss of soil by erosion is an offence under the Soil Conservation Act, Act No 76 of 1969.)
- The management of surface water runoff during construction is important to prevent soil erosion on the site. If construction takes place during the rainy season, sufficient storm water management will be required to manage water runoff.
- In summary, excavation of foundations for pylons, movement of vehicles and people and the run-off from cleared areas can cause erosion.

Mitigation of Impact on erosion

- The proposed alternative routes for the power line are dominated by relatively flat to low undulating plains of mixed bushveld. The general gradient along the corridors is low (typically 1-2%), with steeper gradients (3-4%) sometimes been encountered, such as in the vicinity of the Mokolo River.

- Neither drainage nor erosion is seen to be significant threats as long as the proper mitigating measures are implemented. There were no signs of erosion along the investigated routes.
- Construction activities should be well managed to prevent erosion and the following is relevant:
- Two major watercourses (Mokolo River and Poer se Loop) along with a few seasonal streams and drainage lines cross the corridors for the power lines. These need to be completely avoided and no pylons may be placed directly within any one of these water courses. Mitigation measures as previously indicated are relevant:
  - No temporary or other construction facilities to be erected or stored within 200m of the banks of the Mokolo River or the Poer se Loop stream.
  - Positioning of any pylons need to be a minimum of 30m from the edge of the river banks or outside of the 1 in 100 year floodline.
  - Positioning of the foundation slabs for the pylons must be a minimum of 10m away from the edge of all drainage lines.
  - Under no circumstances may a pylon be placed directly in the bed of a river or drainage line.
  - Construction must be limited to drier periods.
- Due to the physical nature of the power lines, their impact will be minimal over the medium to long term. Tree and shrub growth directly below the lines will be cleared and kept permanently so. Clearing of this 8m wide strip could have a massive impact on the flora directly within this corridor. However, due to the good condition of the veld and the low negative impacts in the immediate vicinity, the impact on the larger scale is minimal with regards to species destruction.
- Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions should be avoided.
- No trees or existing grass strata outside of the power line corridor should be removed to lower any kinetic energy of potential run-off.
- Indigenous vegetation, which does not interfere with the safe operation of the substation/ power line, should be left undisturbed.
- Only a few areas of rockiness have been identified along the proposed servitude routes. These areas are considered moderately sensitive and should be approached with caution.
- These areas are not seen as "No-Go" areas, but care should still be taken to avoid any unnecessary disturbance of veld or soil. Removal of trees, shrubs and other vegetation should be kept strictly to within the 8m corridor under the power lines.
- Only a single, basic vehicle track to be constructed as an access road under pylons moving through the rocky area.
- Access roads need to be kept to an absolute minimum.
- No trees to be cut down or roads to be created to access the power line corridor from the public road by vehicle. Or to create shortcuts into this region. Any vehicles needing to access the power line running through the rocky area will need to do so from out of the less sensitive plains along the corridor itself.
- No temporary storage facilities, toilets, dwellings, etc. of any kind to take place within this rocky area. Not even within the demarcated power line corridor.
- The longest possible distance between pylons should be used in an effort to limit the footprint size on the rocky area.
- The power line must run as straight as possible through and over rocky areas. This in an effort to limit sharp turns that literally create a larger physical footprint on the ground.
- Great care and thought must be taken into the actual positioning and construction of the foundation slabs. The soils are sandy and this area has the steepest gradient of the study site. There is therefore a real danger of soil erosion and resulting veld degradation in this area.
- The ground around all foundation slabs for the pylons need to be inspected before and after the summer rainy season for erosion. Any erosion found needs to be fixed and preventative measures put in place to prevent a reoccurrence of the situation.
- Pro-active measures must be implemented to curb erosion and to rehabilitate eroded areas. All areas susceptible to erosion must be installed with temporary and permanent diversion channels and berms to prevent concentration of surface water and scouring of slopes and banks, thereby countering soil erosion.
- Specifications (as identified in the Environmental Management Programme) for topsoil storage and replacement, to ensure sufficient soil coverage as soon as possible after construction activities, must be implemented.
- All cleared areas must be ripped and rehabilitated after construction. The top 200mm layer of topsoil must be removed and stockpiled in heaps not higher than 2m and replaced on the construction areas once the activities have been completed. The affected areas should be replanted with a grass mixture indigenous to the area.

9. Influx of labourers to the area

- An uncontrolled influx of labourers with associated squatter and increased crime problems create pressure on the natural environment (placement of snares, removal of trees for firewood, careless waste disposal, etc.). This could be severe resulting in permanent damage to the environment if not mitigated properly.

Mitigation of impact of labourers

- Mitigation measures to counter impact on the natural environment and limit potential for crime include specifications in terms of control of construction workers (i.e. provision of toilet and cooking facilities, provision of either accommodation facilities or transport facilities, implementation of Environmental Educational Programmes, etc.). Accommodation for labourers must either be limited to guarding personnel on the construction site (with labourers transported to and from existing neighbouring towns) or a separate fenced and controlled area where proper accommodation and relevant facilities are provided.
- Prepare a comprehensive Environmental Management Programme (EMPr) for the control of environmental impacts at the site camps.
- The EMPr is to include specific provision for the management of the following:
  - Site location
  - Solid waste
  - Liquid effluent (sewage)
  - Storm water
  - Litter
  - Nuisance (Noise)
  - Hazardous substances
  - Social pathologies (prostitution, drunkenness, theft)
  - HIV/Aids prevention.
  - Develop a HIV/Aids workplace policy.
- Ensure that the contractors develop a comprehensive site camp management plan. This should apply even in the case of the limited accommodation camps recommended above.
- Plan campsites an appropriate distance from any facility where it can cause a nuisance.

10. Access to farms/ properties

Eskom Holdings has a right to enter farms in order to maintain plant and obtain meter readings, therefor the manner of access to land, on which Eskom holds servitudes and electrical infrastructure, should be adhered to by Eskom as well as Landowners.

Security on farms is important to Landowners who need to ensure that the safety of their family, staff and property is catered for. Coupled to this is the escalating crime rate on farms.

Mitigation to establish a protocol for Access to farms

Approaches to facilitate access to farms for all Eskom staff and contractors (performing work on behalf of Eskom) is stipulated in the Access to Farms (Distribution, Transmission and Generation) Standard 32-1173 of which a copy can be obtained from the local organised agriculture structures.

Protocol measures are i.e. as follows:

- All Eskom staff will carry identity cards containing their photographs, indicating that they are Eskom employees. Landowners may verify presence of Eskom staff telephonically at the Contact Centre, at 08600 37566.
- Eskom contractors will carry identity cards displaying their photographs, indicating that they are contractors. Letters containing contract appointment as well as whom at Eskom to contact will be given to each Contractor. In the case of unplanned activities, the contractor must be in possession of a work order number.
- Eskom vehicles will be clearly marked on the door. Vehicles operating after dark will be fitted with amber rotating lights.

11. Impacts associated with firebreaks and servitude maintenance

The servitude areas have to be maintained to ensure the safety of the Eskom hardware, as well as the landowner and his property. Should the servitude not be maintained this could result in danger to the power line as well as damage to the property of the landowner.

Mitigation of the impact associated with firebreaks and servitude maintenance

- In the case of 33kV, 88kV and 132kV distribution power lines, Eskom obtains the rights to a servitude.
- A servitude is a real right, which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. The effected owner normally gets compensated for this right according to market related values. The servitude stays effective even if a property is transferred to another owner.
- The National Veld and Forest Fire Act (Act 101 of 1998) places an obligation on the owner to ensure compliance and hence creation of firebreaks amongst other. The Act defines owner as follows: "owner" has its common law meaning and includes— (a) a lessee or other person who controls the land in question in terms of a contract, testamentary document, law or order of a High Court;.
- The Eskom understanding is that Eskom needs to ensure compliance to the Act where it has purchased a property (hence being the owner), such as a substation, where Eskom controls the access to the site. Eskom is not considered as the owner for rights obtained via a wayleave agreement or servitude. Hence, the requirements for creating firebreaks or joining Fire Protection Agencies are applicable as far as where Eskom has a substation, or other similar areas, and not for power lines. These opinions were reflected in the specifications – thus, the Vegetation Management Standard does not specify requirements for fire breaks.
- 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.
- Eskom Distribution does not make use of the practice to burn firebreaks, since this is not a legal requirement. Rather, it relies on the maintenance of vegetation in accordance to its Vegetation Management Standard to reduce the risk of fires starting from Eskom infrastructure.
- Eskom Distribution Division does not remove the grass below power lines as this does not pose a safety risk and will create the potential for erosion, causing environmental degradation and hence legal liability. It will furthermore be an economically unsustainable exercise for Eskom given the amount of power lines throughout South Africa.

12. Impact of Solid Waste

- It is expected that a small amount of construction waste will be generated during construction.
- Expected waste could be unused steel, conductor cables, cement or concrete and general waste around the construction site (plastic, tins and paper), which may degrade the environment if not disposed in the correct manner.
- Solid waste might remain on site after the completion of construction. This can cause pollution to the environment and be detrimental to animals.

Mitigation of Impact of Solid waste

- The construction teams should ensure that all waste is removed from the site and that they recycle the items that can be used again. Unusable waste steel and aluminum will be sold to scrap dealers for recycling at the Eskom stores.
- The solid waste will be transported off site by the contractor and returned to Eskom Stores where the scrap will be handed over to buyers (scrap dealers). Mostly the waste is steel that is recycled and taken to the Eskom stores. Other waste is normally the used cement bags and this is disposed of in the construction hole for the pylon. The bags will be mixed into the cement and used to fill the excavated hole of the pylon.
- Any other waste that cannot be recycled (this is minimal) will be transported to an appropriate landfill site licensed in terms of section 20 (b) of the National Environment Management Waste Act, 2008 (Act No 59 of 2008).
- The disposal of any construction waste will be the responsibility of the developer and should be done at least twice a week. A letter of agreement between the developer and the Permit Holder of the waste disposal site shall be provided to the DWA and a copy kept on site.
- These measures are also included as requirements in the EMPr under the headings *"Appointment of Contractors"* and "*Waste Management*". Also refer to the other mitigation measures under the same headings.
- Stockpiling of construction material should be such that pollution of water resources is prevented and that the materials will be retained in a storm event.

- Once construction is completed, the contractor has to obtain written consent from the relevant landowner that the construction site, construction areas, access routes, etc. are sufficiently and adequately rehabilitated to the landowner's satisfaction.

13. Impact of alien vegetation

- One of the impacts of concern is the introduction of alien plants to the project area.
- The manner in which the right of way was obtained/registered is an important factor in determining the legal requirements for erosion and weed control.
- The Conservation of Agricultural Resources Act (Act 43 of 1983) places a duty on the land user to control erosion and declared weeds and invader plants. Hence, the standard specifies weed control as a requirement for all power lines: The act defines land user as follows:
- 'land user' means the owner of land, and includes-
  - any person who has a personal or real right in respect of any land in his capacity as fiduciary, fideicommissary, servitude holder, possessor, lessee or occupier, irrespective of whether he resides thereon;
  - any person who has the right to cut trees or wood on land or to remove trees, wood or other organic material from land.
- A servitude is a real right, which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. This places a duty on Eskom to control declared weeds and invader plants.

Mitigation of alien vegetation

- Alien vegetation in servitudes shall be managed in terms of Regulation GNR.1048 of 25 May 1984 (as amended) issued in terms of the Conservation of Agricultural Resources Act, Act 43 of 1983. In Terms of these regulations, Eskom shall "control" i.e. combat category 1, 2 and 3 plants to the extent necessary to prevent or to contain the occurrence, establishment, growth, multiplication, propagation, regeneration and spreading such plants within servitude areas or land owned by Eskom. Due to the nature of alien vegetation, a programme for alien vegetation control must be implemented. The implementation thereof is recommended as follows:
- Mechanical control of alien plants around disturbed areas to be implemented within two months of completion of construction. Thereafter every six months. These areas will be predominantly around the erected pylons where the soils were originally disturbed during the construction phase. Mechanical control to be of such a nature as to allow local grasses and other pioneer plants to colonise the previously disturbed areas, thereby keeping out alien invasives.
- No chemical control (herbicides) of alien plants to be used. These chemicals will have a detrimental effect on the surrounding vegetation and habitats.
- Vegetation under pylons and next to pylons to be mowed and not ploughed. This in an effort to avoid disturbing the ground which leaves it open to colonisation by alien weeds.
- Disturbance of the soils must be kept to an absolute minimum to limit the potential introduction of alien plants. This area is pristine with little to no alien infestation. Alien plants generally get a foothold in an area where the soils have been disturbed.

14. Impact of project on Tourism

The promotion of tourism is the key to socio-economic development in this region. But tourism is inseparable from a unique environment, with incomparable natural attributes and potential for nature conservation. The Waterberg Biosphere Reserve has therefore been launched. The significance is that this area with its game reserves and farms receives international exposure, thus attracting foreign revenue because of tourism, resulting in a number of opportunities for entrepreneurs and the potential for job creation. The tourism attractions in the broader area of the project are Marakele National Park, Welgevonden, Mokolo Dam, Kwalata and Lapalala Nature Reserves.

The impact of the project on tourism could be related to the visual impact of the proposed power line. It could be argued that the value of the environment lies in its remoteness and the wilderness feel. It is understood that the visibility of the power line could well impact negatively on the land values since visitors would not be able to escape the sights of human intervention. Should the power line be constructed, the value of the land/all the properties will be substantially decreased. This could culminate in a loss of income and loss of jobs for local labour, which will impact on the whole community.

Mitigation of impact on Tourism

As indicated, the area is an emerging and fast growing tourism destination, with its large reserves and private game farms in the area. It is therefore of importance that the tourism industry should not be hampered by poor quality of supply and bad performance of the power supply network. Most complaints emanate from severe voltage dips and frequent supply interruptions caused by the poor condition of the current network. The proposed project would address the need for firm supply in the area and aid in the growth of the tourism industry. The project would therefore contribute positively towards tourism. Obviously, the sensitive placement of the route is of vital importance. The route is designed according to the preferences of landowners and key stakeholders. Landowners prefer routes with evident visual disturbance caused by existing power lines or roads above traversing through pristine area. This preference culminated in the investigation into the four options for the power line route.

The positive impacts of the proposed power line project on the environment are as follows:

- Long-term, regional benefits of reliable power supply and the resultant socio-economic benefits.
  - Included in this is the fact that any infrastructure development as a secondary impact will ultimately positively influence the development of the SMME- sector through electricity provision.
  - On the opposite pole the lack thereof will most certainly be to the detriment of SMMEs, especially in rural developing areas, where the lack of, as well as inconsistent, infrastructure could seriously lead to the detriment of economic development directly impacting on social well-being.
- Potential reduction in crime as a result of short-term job creation during construction (providing farm safety and security measures are implemented)
- Possible local growth in the economy of the surroundings towns and others in the sub-region, and for local businesses depending on where the construction camp is.
- Economic benefits for contractors and other suppliers of goods and services.
- The project as proposed would ensure significant capital investment that will contribute to the economical growth of the area.
- Private business opportunities could be stimulated.

It is suggested that to maintain the status quo is not the best option for the macro environment.

- This proposed project is part of the infrastructure to improve the supply of electricity to the broader area. Should this application not be approved then the supply will not be reliable and this can result in major disturbances in the supply of electricity.
- As indicated in this EIA report the impacts that are likely to occur as a result of the proposed power line are minimal over the medium- to long-term and can be mitigated to acceptable levels. The No-Go development alternative could therefore not be considered the responsible way to manage the site.

An **Environmental Management Plan (EMP)** was compiled to ensure that

- mitigation measures are identified and implemented to avoid or minimise the expected negative environmental impact and enhance the potential positive impact associated with the project;
- the developer, construction workers and the operational and maintenance staff are well acquainted with their responsibilities in terms of the environment;
- communication channels to report on environment related issues are in place.

7. Conclusion and recommendations

- A draft Basic Assessment Report was compiled with the main aim to identify issues, potential impacts and potential alternatives associated with this project. It includes a description of the status quo of all relevant environmental components as well as the proceedings of the PPP and communication with registered Interested & Affected Parties (IAPs). **Notification of the availability thereof was sent to all IAPs on 29 May 2012 with comment requested until 10 July 2012.**
- Subsequently, a final Basic Assessment Report (BAR) will be compiled and forwarded to DEA by August 2012. This report would include all concerns raised to the draft BAR and responses thereto. The Consultants (EAP) will ensure that any concerns raised are addressed in appropriate detail in the subsequent final Basic Assessment Report.

It is concluded that the construction of the proposed Bulge-Dorset 132kV line will have an overall positive impact on the socio-economic environment should the necessary mitigation measures be implemented. At this stage, it is proposed that **Alternative 4** be considered for the construction of the line.

BASIC ASSESSMENT REPORT

environmental affairs

Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

	(For official use only)
File Reference Number:	
Application Number:	NEAS DEA/EIA/0000113/2011 DEA 12/12/20/2094
Date Received:	

Basic assessment report in terms of the Environmental Impact Assessment Regulations, 2010, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended.

Kindly note that:

1. This **basic assessment report** is a standard report that may be required by a competent authority in terms of the EIA Regulations, 2010 and is meant to streamline applications. Please make sure that it is the report used by the particular competent authority for the activity that is being applied for.

2. The report must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The report is in the form of a table that can extend itself as each space is filled with typing.

3. Where applicable **tick** the boxes that are applicable in the report.

4. An incomplete report may be returned to the applicant for revision.

5. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the rejection of the application as provided for in the regulations.

6. This report must be handed in at offices of the relevant competent authority as determined by each authority.

7. No faxed or e-mailed reports will be accepted.

8. The report must be compiled by an independent environmental assessment practitioner.

9. Unless protected by law, all information in the report will become public information on receipt by the competent authority. Any interested and affected party should be provided with the information contained in this report on request, during any stage of the application process.

10. A competent authority may require that for specified types of activities in defined situations only parts of this report need to be completed.

1. INTRODUCTION

South Africa's new Environmental Impact Assessment (EIA) regulations came into effect on 02 August 2010 signaling the start of the official implementation process of a new regime aimed at improving the efficiency and effectiveness of Environmental Impact Assessment.

EIA is a pro-active and systematic process where potential environmental impacts, both positive and negative, associated with certain activities are assessed, investigated and reported. The process contributes to giving effect to the objectives of integrated environmental management as decision makers are informed of the desirability of such activities and on the conditions which authorisation of the activity should be subject to, where relevant.

The new revised regulations were published by the Minister of Water and Environmental Affairs in Government Gazette 33306 of 18 June 2010. The National Environmental Management Act (NEMA) EIA 2010 regulations and the listing notices thereto replaced the NEMA EIA regulations of 2006 and its associated listing notices.

These regulations signify an important step towards a more efficient and effective EIA system, in that apart from aligning the 2006 Regulations with the new and improved Act, the 2010 EIA Regulations seek to streamline the EIA process. It also introduces an approach where impacts associated with the sensitivity of the receiving environment are treated with more care - this is achieved through the introduction of a Listing Notice dedicated to activities planned for predefined sensitive areas.

The lists of activities requiring environmental authorisation prior to commencement have also been revised. This was a major focus of the amendment process as the EIA system was inter alia overburdened by large numbers of applications associated with insignificant activities; the comprehensive scoping and EIR process with its associated substantial costs was in some instances unjustifiably required for activities for which the impacts were known and thereby potential entrepreneurs could be excluded from the economy; and some critical activities were omitted.

Subsequently, three listing notices have been published in conjunction with the new regulations.
Listing notice one (1) stipulates the activities requiring a basic assessment report (BAR). These are typically activities that have the potential to impact negatively on the environment but due to the nature and scale of such activities, these impacts are generally known. Listing notice two (2) identifies the activities requiring both Scoping and an Environmental Impact Report (EIR). These are typically large scale or highly polluting activities and the full range of potential impacts need to be established through a scoping exercise prior to it being assessed. Listing notice three (3) contains activities that will only require an environmental authorisation through a basic assessment process if the activity is undertaken in one of the specified geographical areas indicated in that listing notice. Geographical areas differ from province to province.

2. LEGAL REQUIREMENTS

An application for environmental authorisation is submitted to the National Department of Environmental Affairs (DEA) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), read with the Environmental Impact Assessment Regulations, 2010 (GNR 543 of 2010) (EIA Regulations).

Relevant to this project is the activities that are listed in Listing Notices 1 and 3. A Basic Assessment (BA) is the procedure designed for Listing Notices 1 and 3, where the impacts of activities are more generally known and can be easily managed.

This document constitutes the Basic Assessment Report prepared in support of an environmental authorisation application. In addition to the statutory provisions in the NEMA more fully referred to herein below, other legislation and guidelines that have been considered in the preparation of the Report, includes relevant legislation on all levels including the constitutional, national, provincial and local level. A brief summary of the relevant legislation is outlined below.

2.1 *The Constitution of the Republic of South Africa (Act 108 of 1996)*

Section 2 of the Constitution of the Republic of South Africa (Act 108 of 1996) (CA) states that: "This Constitution is the supreme law of the Republic; law or conduct inconsistent with it is invalid, and the obligations imposed by it must be fulfilled." Section 24 of the CA, states that everyone has the right to an environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that:

- prevent pollution and ecological degradation;
- promote conservation; and
- secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Section 24 guarantees the protection of the environment through reasonable legislative (and other measures) and such legislation is continuously in the process of being promulgated. Section 33(1) concerns administrative justice which includes the constitutional right to administrative action that is lawful, reasonable and procedurally fair. This Basic Assessment Report was accordingly prepared, submitted and considered within the constitutional framework set by inter alia section 24 and 33 of the Constitution.

2.2 *The National Environmental Management Act (107 of 1998) and the Environmental Impact Assessment Regulations, 2010*

The overarching principle of the National Environmental Management Act 1998 (Act 107 of 1998) (NEMA) is sustainable development. It defines sustainability as meaning the integration of social, economic and environmental factors into planning, implementation and decision making so as to ensure the development serves present and future generations.

Section 2 of NEMA (Act no 107 of 1998) provides for National Environmental Management Principles. These principles include inter alia:

- Environmental management must place people and their needs at the forefront of its concern.
- Development must be socially, environmentally and economically sustainable.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.
- Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing must be pursued.
- The participation of all Interested and Affected Parties (I&APs) in environmental governance must be promoted.
- Decisions must take into account the interests, needs and values of all I&APs.
- The social, economic and environmental impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions must be appropriate in the light of such consideration and assessment.
- The environment is held in public trust for the people, the beneficial use of environmental resources must serve the public interest and the environment must be protected as the people's common heritage.

The Environmental Impact Assessment (EIA) process to be undertaken in respect of the authorisation process of the proposed project is in compliance with the NEMA read with the Environmental Impact Assessment Regulations of 2010 (Government Notice No's R543, 544, 545 and 546 of 2010). The proposed development involves 'listed activities', as identified in terms of the NEMA and in terms of section 24(1), the potential consequences for or impacts on the environment of *inter alia* listed activities must be considered, investigated, assessed and reported on to the competent authority except in respect of those activities that may commence without having to obtain an environmental authorisation in terms of the NEMA.

As stated above, an environmental authorisation application has been submitted to the DEA for consideration. The following activities as listed were identified as applicable to the proposed construction of the project:

Relevant notice:	Activity No:	Description of each listed activity as per project description:
GNR 544 of 18 June 2010	10	The construction of facilities or infrastructure for the distribution of electricity outside urban areas with a capacity of 132kV.

GNR 546 of 18 June 2010	4	The construction of an access and construction road wider than 4 meters (ii) outside urban areas, in (gg) areas within 10 km from national parks or world heritage sites or 5 km from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.
GNR 546 of 18 June 2010	14	The clearance of an area of 5 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (activity to be confirmed)

2.3 National Water Act (Act No 36 of 1998) (NWA)

In terms of the NWA, the national government, acting through the Minister of Water and Environmental Affairs (previously the Minister of Water Affairs and Forestry), is the public trustee of South Africa's water resources, and must ensure that water is protected, used, development, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all persons (section 3(1)).
In terms of the NWA a person may only use water without a license under certain circumstances. All other use, provided that such use qualify as a use listed in section 21 of the Act, require a water use license. A person may only use water without a license if such water use is permissible under Schedule 1 (generally domestic type use) if that water use constitutes a continuation of an existing lawful water use (water uses being undertaken prior to the commencement of the NWA, generally in terms of the Water Act of 1956), or if that water use is permissible in terms of a general authorisation issued under section 39 (general authorisations allow for the use of certain section 21 uses provided that the criteria and thresholds described in the general authorisation is met). Permissible water use furthermore includes water use authorised by a license issued in terms of the NWA.

Section 21 of the NWA indicates that "water use" includes:
- taking water from a water resource (section 21(a));
- storing water (section 21(b));
- impeding or diverting the flow of water in a water course (section 21(c));
- engaging in a stream flow reduction activity contemplated in section 36 (section 21(d));
- engaging in a controlled activity which has either been declared as such or is identified in section 37(1) (section 21(e));
- discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit (section 21(f));
- disposing of waste in a manner which may detrimentally impact on a water resource (section 21(g);
- disposing in any manner of water which contains waste from, or which has heated in, any industrial or power generation process (section 21 (h));
- altering the bed, banks, course or characteristics of a water course (section 21(i));
- 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 (section 21(j)); and
- using water for recreational purposes (section 21(k)).

Of relevance is, that the four Alternative Routes traverse two major water courses (Mokolo River and Poer se Loop) along with a few seasonal streams and drainage lines. Whichever route is finally decided upon, river crossings will still be necessary and mitigation measures are recommended to prevent any impact on water courses.
- Hence, no construction of any sort should take place within any aquatic and riparian habitats encountered, as these habitats are viewed as sensitive.
- There will therefore be *no impact on any watercourse or waterflow with regards to impeding flow or altering flow, as discussed in Section 21 c & I, or any of the listed water uses of the Water Act and relevant General Authorisations.*
- It is suggested that the applicant is complying with all aspects of the Water Act and General Authorisations, including all of the above points mentioned and there would therefore be **no need to obtain a water use license or register as a water user in terms of the General Authorisations.**
- It should however be noted, that If there are any activities which relates to section 21 water uses of the National Water Act 1998 (Act No. 36 of 1998), the applicant will need to get authorisation from the Department before such activities commences.

2.4 *The National Heritage Resources Act (Act 25 of 1999)*

The National Heritage Resources Act (Act No 25 of 1999, Art 3) outlines the following types and ranges of heritage resources that qualify as part of the National Estate, namely:

(a) places, buildings structures and equipment of cultural significance;
(b) places to which oral traditions are attached or which are associated with living heritage;
(c) historical settlements and townscapes;
(d) landscapes and natural features of cultural significance;
(e) geological sites of scientific or cultural importance;
(f) archaeological and palaeontological sites;
(g) graves and burial grounds including-
  (i) ancestral graves;
  (ii) royal graves and graves of traditional leaders;
  (iii) graves of victims of conflict;(iv) graves of individuals designated by the Minister by notice in the Gazette;
  (v) historical graves and cemeteries; and
  (vi) other human remains which are not covered by in terms of the Human Tissues Act, 1983 (Act No 65 of 1983);
(h) sites of significance relating to the history of slavery in South Africa;
(i) movable objects, including -
  (i) objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
  (ii) objects to which oral traditions are attached or which are associated with living heritage;
  (iii) ethnographic art and objects;
  (iv) military objects;
  (v) objects of decorative or fine art;
  (vi) objects of scientific or technological interest; and
  (vii) books, records, documents, photographs, positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No 43 of 1996).

The National Heritage Resources Act (Act No 25 of 1999, Art 3) also distinguishes nine criteria for places and objects to qualify as 'part of the national estate if they have cultural significance or other special value ...'. These criteria are the following:

a) its importance in the community, or pattern of South Africa's history;
b) its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
c) its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
d) its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
e) its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
f) its importance in demonstrating a high degree of creative or technical achievement at a particular period;
g) its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
h) its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
(i) sites of significance relating to the history of slavery in South Africa

The current application requires a Phase 1 Heritage Impact Assessment by a qualified archaeologist/cultural heritage management consultant. Report attached in Appendix D2.

2.5 *National Environmental Management: Biodiversity Act (Act 10 of 2004)*

The National Environmental Management Biodiversity Act (Act No. 10 of 2004) (NEMBA) aims to provide for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998; the protection of species and ecosystems that warrant national protection; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bio prospecting involving indigenous biological resources; the establishment and functions of a South African National Biodiversity Institute; and for matters connected therewith.

The NEMBA provides for the publishing of various lists of species and ecosystems by the Minister of Water and Environmental Affairs as well as by a Member of the Executive Council responsible for the conservation of biodiversity of a province in relation to which certain activities may not be undertaken without a permit. In terms of Section 57 of the NEMBA, no person may carry out any restricted activity involving any species which has been identified by the Minister as "critically endangered species", "endangered species", "vulnerable species" or "protected species" without

a permit. The NEMBA defines "restricted activity" in relation to such identified species so as to include, but not limited to, "hunting, catching, capturing, killing, gathering, collecting, plucking, picking parts of, cutting, chopping off, uprooting, damaging, destroying, having in possession, exercising physical control over, moving or translocating".
The Minister has made regulations in terms of section 97 of the NEMBA with regards to Threatened and Protected Species which came into effect on 1 June 2007. Furthermore, the Minister published lists of critically endangered, endangered, vulnerable and protected species in terms of section 56(1) of the NEMBA.

2.6 National Forests Act (Act 84 of 1998)

The project may involve the cutting, disturbing, damaging or destroying of any protected trees declared in terms of section 12 of the National Forest Act (NFA) (Act 84 of 1998). If this is proven during the EIA a license in terms of section 15 of the NFA will be required from the relevant provincial office of the Department of Agriculture, Forestry and Fisheries in order to cut them. In general all protected trees must be recorded during a walk down phase (once final route is pegged) and the presence of protected trees in the corridor must be confirmed.
Relevant to this project is that Red data species and protected species found in the area include Camel thorn (*Acacia erioloba*), Leadwood (*Combretum imberbe*) and Marula (*Sclerocarya birrea* subsp. *caffra*). In addition a small grove of Camel Thorns (*Acacia erioloba*) on both sides of the D1882 sand road in the vicinity of the Mokolo River should be viewed as a 'No-Go" zone. The route should be planned to avoid the groves. GPS coordinates taken from the road: S24^{0}06.822'; E27^{0}48.301'. Should the camel thorns be impacted, then a permit is needed.

2.7 National Veld and Forest Fire Act (Act 101 of 1998)

The National Veld and Forest Fire Act (Act 101 of 1998) places an obligation on the owner of property to ensure compliance and hence creation of fire-breaks and consider amongst other the following:

- Fire rating
- Consultation of adjoining owners and the fire protection association (if any)
- be present at such burning or have an agent attend.

The fire break should:

- be wide and long enough to prevent or to have a reasonable chance of preventing a veldfire from spreading to or from neighbouring land;
- not cause soil erosion; and be reasonably free of inflammable material capable of carrying a veldfire across it.

Servitudes are registered for all Eskom sub-transmission (33 to 132kV) power lines and a way leave agreement is obtained for the reticulation power lines (11 and 22 kV). The Act defines 'owner' as a lessee or other person who controls the land in question in terms of a contract, testamentary document, law or order of a High Court. Hence, the requirements for creating firebreaks or joining Fire Protection Agencies are applicable as far as where Eskom has a substation and not for power lines.

2.8 The Limpopo Environmental Management Act (LEMA), 2003 (Act no 7 of 2003)

The Limpopo Environmental Management Act (LEMA), 2003 (Act no 7 of 2003) took the place of the former Nature Conservation ordinances. The district offices of the Department of Economic Development, Environment & Tourism, Limpopo Province are designated to deal with compliance in terms of LEMA and the protected plants in terms thereof or applicable permits applications.

2.9 National Environmental Management: Waste Act (Act 59 of 2008) (NEMWA)

The NEMWA commenced on 1 July 2009 and as a result of its commencement the relevant provisions in the Environment Conservation Act 73 of 1989 (ECA) in respect of waste management, were repealed.
Section 19 of the NEMWA provides for listed waste management activities and states in terms of section 19(1), the Minister may publish a list of waste management activities that have, or are likely to have a detrimental effect on the environment. Such a list was published in GN 718 of 3 July 2009 (GN 718).
In accordance with section 19(3), the Schedule to GN 718 provides that a waste management license is required for those activities listed therein prior to the commencement, undertaking or conducting of same. In addition, GN 718 differentiates between Category A and Category B waste management activities. Category A waste management

activities are those which require the conducting of a basic assessment process as stipulated in the EIA Regulations, 2006 promulgated in terms of the NEMA as part of the waste management license application and Category B waste management activities are those that require the conducting of a scoping and environmental impact assessment process stipulated in the EIA Regulations, 2006 as part of the waste management license application.
No activity in respect of which a waste management license might be required under NEMWA, is envisaged for this project.

2.10 Civil Aviation Technical Standards (CATS)

Eskom has to adhere to Civil Aviation Technical Standards (CATS) regarding power lines. Power lines, overhead wires and cables are considered as obstacles and the detail shall be communicated to the Commissioner at an early planning stage. The Commissioner shall require the route of the power line, the co-ordinates (*latitude and longitude in degree, minute, seconds and tenth of seconds format*) of turning points in the line, the maximum height of the structures above ground level and the name of the power line. The Commissioner shall evaluate the route and require those sections of the line (if any), which is considered a danger to aviation to be marked or rerouted.
There is no specified definite distance between power lines and runways. The distances depends on various factors such as height of lines, surrounding topography, runway approach, length of airstrip, size of planes landing at aerodrome, etc. A directory of airfields that lists registered airfields around the country ("Airfields Directory for Southern Africa") is available and could be obtained from Aviation Direct cc (Tel 011 465 2669 or 011 465 5291).
The South African Civil Aviation Authority (SACAA) suggests that Eskom follows the following procedure for each project:

- Send map showing power line routes with pertinent GPS points (or.kmz points – google earth) along power line route.
- Highlight any airstrips we are aware of.
- Then SACAA (Contact Mr. Chris Isherwood) will then give feedback as to distances from airstrip, possible alterations in routes, etc.

3. STUDY APPROACH

The approach followed by the consultants was based on the specifications for the undertaking of a Basic Assessment as provided in the document "Companion to the EIA Regulations, Integrated Environmental Management Guideline Series 5, Department of Environmental Affairs, 2010".
The study approach followed by the Consultants, in short, entailed the following steps:

- Preliminary site investigations to determine the scope of works of the project and to familiarise with the sites were done by the EAP and Eskom in November and December 2010.
- An application for a Basic Assessment was submitted to DEA and the project was issued with reference number 12/12/20/2094 on 25 November 2010.
- Specialist ecological input was obtained to investigate the flora, fauna and the general biophysical environment in an attempt to identify the potential impacts of the project.
- The proposed development is covered by the National Heritage Resources Act which incorporates heritage impact assessments in the Environmental Impact Assessment process. A Phase 1 Heritage Impact Assessment was therefore done by a specialist to identify the potential impact on heritage resources.
- Input from an avifauna specialist was also obtained to determine the impact of the proposed project on birds.
- During the months of January, February and June 2011 the EAP, the ecologist, the bird impact specialist and the archaeologist/cultural heritage management consultant conducted additional site investigations.
- The Public Participation Programme (PPP) started in November 2010 and continued until April 2012. It included the identification of key stakeholders, the distribution of information letters with a request for comment, as well as advertising of the project in the local press and on site.
- In addition, notification of an information meeting on 22 February 2011 was sent to all IAPs. The purpose of the meeting was to furnish the landowners and other interested parties with information regarding the extent of the project, the proposed alternatives, the process of negotiations for servitudes, and the extent of the Environmental

Impact Assessment Process. Project posters with information and maps of the routes were presented at the meeting. Written comment was requested at the meeting.

- Several one-on-one meetings were conducted with affected landowners to address their specific requirements. This resulted in changes to the alignment of the final proposed power line route.
- A draft Basic Assessment Report was compiled with the main aim to identify issues, potential impacts and potential alternatives associated with this project. It included a description of the status quo of all relevant environmental components as well as the proceedings of the PPP and communication with registered Interested & Affected Parties (IAPs).
- The draft Basic Assessment Report (this document) was distributed on 29 May 2012 to the following stakeholders for their comment :
  - Department of Water Affairs: Water Resources & Water Quality Management
  - South African Heritage Resources Authority
  - Limpopo Department of Economic Development, Environment and Tourism: Environmental Impact Management
  - Department of Agriculture, Forestry and Fisheries: Land Use and Soil Management
  - Department of Minerals and Energy
  - SA National Road Agency Agency Ltd.: Northern Region
  - Road Agency Limpopo
  - Department of Roads and Transport
  - Department of Rural Development and Land Reform: Land Claims Commissioner
  - Department of Rural Development and Land Reform: State Land Administration
  - Transvaal Landou Unie SA Noord
  - Distriks Landbou Unie Vaalwater
  - Distriks Landbou Unie Thabazimbi
  - Distriks Landbou Unie Ellisras
  - Agri Limpopo
  - Agri Lephalale
  - Waterberg Biosphere Reserve
  - Waterberg Nature Conservancy
  - Mokolo River Nature reserve
  - Waterberg District Municipality
  - Lephalale Local Municipality
  - Eskom Transmission
  - Eskom Distribution Northern Region
  - Landowners
- The **due date for comment on the draft Basic Assessment Report is 10 July 2012** .
- Subsequently, a final Basic Assessment Report (BAR) will be compiled and forwarded to DEA by August 2012. This report will include all concerns raised to the draft BAR and responses thereto. The Consultants (EAP) will ensure that any concerns raised are addressed in appropriate detail in the subsequent final Basic Assessment Report.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	YES	NO
If YES, please complete the form entitled "Details of specialist and declaration of interest" for appointment of a specialist for each specialist thus appointed:		

Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

Describe the activity, which is being applied for, in detail[1]*:*

1.1 Background

Eskom Distribution Northern Region (the Applicant) commissioned Texture Environmental Consultants (the Environmental Assessment Practitioner) to undertake an Environmental Impact Assessment for the following project:

The proposed project requires the construction of a 65km 132kV power line from the authorised Bulge Rivier substation to the new Dorset substation. Inclusive to this application is the construction of the following:

- Construct a 132kV power line from the authorised Bulge rivier substation to the new Dorset substation.
- Construct an access/ construction road for the new 132kV line.
- Obtain a servitude area of 31metres wide for the line.

The applicant is Eskom Distribution Northern Region, Land Development with contact person Ms. Nkateko Msimango, Environmental Management in Polokwane.

1.2 Locality and Regional Context

Eskom is planning the construction of a 132kV power line from the authorised Bulge River substation to the new Dorset substation. At the time of the study Dorset Substation was under construction, while work on the Bulge River Substation had not yet started.
The study area for the power line servitude is situated in the Limpopo Province, close to the small towns of Vaalwater, Matlabas and Elmeston. With Lephalale (Ellisras) further to the north. The area is south of Lephalale, north of Vaalwater and north of the Waterberg mountain range and the Marakele National Park. It is within the area south and east of the Mokolo Dam and Mokolo Dam Nature Reserve (previously Hans Strijdom Dam and Hans Strijdom Nature Reserve). The study area runs roughly in a east-west direction.

The study area falls within the well-known *Waterberg Biosphere Reserve*. The Waterberg Biosphere Reserve (WBR) comprises a large area (100km x 100km) with extraordinary wilderness quality. The area does not have any significant mining, industries or forestry, allowing for the area to remain largely intact. The WBR boasts a rich archaeological heritage; the Waterberg complex is a critically important water catchment area in a largely water scarce Province; and approximately 80% of the area is already under conservation management or is operating as game farms.

Biosphere reserves are seen to promote an integrated approach that recognises the link between conservation of biodiversity and the development needs of communities as a central component of the biosphere approach. Biosphere reserves are intended to fulfill three complementary functions:

- Conservation function - to preserve genetic resources, species, ecosystems and landscapes;
- Development function - to foster sustainable economic and human development; and
- Logistic support function - to support demonstration projects, environmental education and training, and research and monitoring related to local, national and global issues of conservation and sustainable development.

[1] Please note that this description should not be a verbatim repetition of the listed activity as contained in the relevant Government Notice, but should be a brief description of activities to be undertaken as per the project description.

To facilitate these functions the following three types of physical elements or zones were recommended:

1. Core areas

   Core areas are areas which are securely protected sites for conserving biological diversity, monitoring minimally disturbed ecosystems, and undertaking non-destructive research and other low-impact uses (such as education). These areas do not have to be formally protected, but should be devoted to long-term protection. Provincial nature reserves and national parks naturally fall within this category, but so can privately owned land that has been placed under strict conservation management, by way of a legally established conservancy agreement. The Mokolo Dam Nature Reserve and incorporated land, that are situated immediately north and northwest of the study area, fall within the core area.

   Regarding Service Infrastructure in the core areas:

   - No bulk services will be allowed unless it directly services the Biosphere.
   - Service infrastructure will be limited to what is absolutely necessary.
   - Service Infrastructure must be of a good quality and have only limited visual and environmental impact.

2. Buffer Zones

   Buffer zones are areas which usually surround or adjoin the core areas, and are used for cooperative activities compatible with sound ecological practices, including environmental education, recreation, ecotourism, and applied and basic research. Buffer zones are predominantly natural or near natural areas with clearly defined boundaries and formal administrative status.

3. Transition areas

   Transition areas are flexible transition areas or areas of co-operation, which may contain a variety of agricultural activities, settlements and other uses and in which local communities, management agencies, scientists, non-governmental organizations, cultural groups, economic interests and other stakeholders work together to manage and sustainably develop the area's resources.

   The Transition Zone comprises of two sub-zones for the purpose of distinguishing between those areas with low impact and those with high impact. The land use within the Transition Zone 1 remains nature-based game ranching, also allowing for cattle grazing, pastures and eco-tourism developments. Emphasis is still placed on the protection of the Waterberg's character and ecology. Eco-tourism developments of a slightly higher impact and greater size are allowed than within the Buffer Zone. Within the Transition Zone 2, all of the above will be allowed. In addition, higher level tourism developments, cultivated lands, irrigation, orchards, agro-industries, human settlements and related light industry, support services and infrastructure will be allowed.

   According to a report on the status of the ecology of the Waterberg Biosphere Reserve, the study area falls within both highly and moderately transformed areas. Most of the study area falls within an area of low conservation priority, but the Mokolo dam area to the north and west of the study area falls within an area of very high conservation priority. The zonation map of the Waterberg Biosphere Reserve shows the study area to fall mostly within the Transition Zone 2. In fact, approximately 50% of the proposed power line route runs on the border of the Transitional Zone of the Waterberg Biospere Reserve. This section is adjacent to the dirt road between Hermanusdoorns and Witfontein.

Taking the zonation of the Waterberg Biosphere Reserve into consideration, the Eskom power line route was designed to limit impact to the Waterberg Biosphere Reserve. The majority of the proposed project falls in Transition Zone 2 where infrastructure could be allowed. In fact, as mentioned, to limit impact to the WBR, approximately 50% of the proposed power line route runs on the border of the Transitional Zone of the Waterberg Biosphere Reserve.

The **affected properties** for the **proposed Alternative 4** is on the farms Bulge Rivier 198 KQ portion 2, 6, Mokolo Rivier Private Nature Reserve 660 KQ portion 0, Hermanusdoorns 650 KQ portion 0, Hermanusdoorns 204 KQ portion 5, Welgevonden 186 KQ portion 0 en 1, Groenfontein 207 KQ portion 5, Keerom 208 KQ portion 0, Hanover 181 KQ portion 0, 3, Goudfontein 171 KQ portion 0, 1, 2, Welgevonden 180 KQ portion 0, Schuinskloof 175 KQ portion 1, 2, 3, Rietbokhoek 4 KR portion 1, 2, Rem, Zeekgat 5 KR portion 1, Rem, Steenbokfontein 9 KR portion Rem, 3, 4, Dwarsfontein 51 KR Rem, Dwarsfontein 51 KR (To be consolidated to Jacobshoogte T149848/07) portion 0, Brakfontein 16 KR portion Rem in the Lephalale Local Municipality in the Limpopo Province.

The study area is situated on the 1:50 000 topographical base maps 2327DC, 2327DD, 2427BA, 2328CC, 2428AA.

(Refer to Appendices A1-A7 for copies of the Locality map and the route maps). The proposed alternative 4 for the project is found at approximately:

Bulge rivier substation:

Longitude (Degrees Decimal Minutes)	Latitude (Degrees Decimal Minutes)
27° 40.237' E	24° 6.806' S

Proposed Alternative 4 Route (65.4km):

250m intervals	Longitude (Degrees Decimal Minutes)	Latitude (Degrees Decimal Minutes)
1	27° 40.326' E	24° 6.744' S
2	27° 40.472' E	24° 6.731' S
3	27° 40.619' E	24° 6.717' S
4	27° 40.766' E	24° 6.703' S
5	27° 40.913' E	24° 6.690' S
6	27° 41.060' E	24° 6.676' S
7	27° 41.206' E	24° 6.662' S
8	27° 41.353' E	24° 6.649' S
9	27° 41.500' E	24° 6.635' S
10	27° 41.646' E	24° 6.621' S
11	27° 41.793' E	24° 6.607' S
12	27° 41.899' E	24° 6.702' S
13	27° 42.004' E	24° 6.797' S
14	27° 41.986' E	24° 6.918' S
15	27° 41.937' E	24° 7.045' S
16	27° 41.888' E	24° 7.173' S
17	27° 41.838' E	24° 7.300' S
18	27° 41.977' E	24° 7.335' S
19	27° 42.120' E	24° 7.367' S
20	27° 42.263' E	24° 7.399' S
21	27° 42.407' E	24° 7.431' S
22	27° 42.550' E	24° 7.463' S
23	27° 42.614' E	24° 7.362' S
24	27° 42.718' E	24° 7.345' S
25	27° 42.857' E	24° 7.391' S
26	27° 42.919' E	24° 7.298' S
27	27° 42.961' E	24° 7.168' S
28	27° 43.003' E	24° 7.038' S
29	27° 43.070' E	24° 6.953' S
30	27° 43.209' E	24° 6.998' S
31	27° 43.348' E	24° 7.043' S
32	27° 43.487' E	24° 7.088' S
33	27° 43.626' E	24° 7.133' S
34	27° 43.765' E	24° 7.178' S
35	27° 43.904' E	24° 7.223' S
36	27° 44.044' E	24° 7.268' S
37	27° 44.183' E	24° 7.313' S
38	27° 44.322' E	24° 7.358' S
39	27° 44.461' E	24° 7.403' S
40	27° 44.600' E	24° 7.448' S
41	27° 44.739' E	24° 7.493' S
42	27° 44.879' E	24° 7.538' S
43	27° 45.018' E	24° 7.583' S
44	27° 45.157' E	24° 7.628' S
45	27° 45.296' E	24° 7.673' S
46	27° 45.435' E	24° 7.718' S
47	27° 45.468' E	24° 7.790' S
48	27° 45.375' E	24° 7.895' S
49	27° 45.281' E	24° 8.000' S
50	27° 45.188' E	24° 8.105' S
51	27° 45.094' E	24° 8.210' S
52	27° 45.001' E	24° 8.314' S

53	27° 45.009' E	24° 8.398' S
54	27° 45.144' E	24° 8.454' S
55	27° 45.278' E	24° 8.510' S
56	27° 45.412' E	24° 8.566' S
57	27° 45.546' E	24° 8.622' S
58	27° 45.681' E	24° 8.679' S
59	27° 45.815' E	24° 8.735' S
60	27° 45.949' E	24° 8.791' S
61	27° 46.083' E	24° 8.847' S
62	27° 46.217' E	24° 8.904' S
63	27° 46.355' E	24° 8.949' S
64	27° 46.461' E	24° 8.915' S
65	27° 46.514' E	24° 8.788' S
66	27° 46.567' E	24° 8.662' S
67	27° 46.620' E	24° 8.536' S
68	27° 46.673' E	24° 8.409' S
69	27° 46.747' E	24° 8.293' S
70	27° 46.829' E	24° 8.180' S
71	27° 46.911' E	24° 8.068' S
72	27° 46.993' E	24° 7.955' S
73	27° 47.075' E	24° 7.843' S
74	27° 47.157' E	24° 7.730' S
75	27° 47.230' E	24° 7.613' S
76	27° 47.269' E	24° 7.482' S
77	27° 47.303' E	24° 7.351' S
78	27° 47.345' E	24° 7.223' S
79	27° 47.452' E	24° 7.129' S
80	27° 47.558' E	24° 7.036' S
81	27° 47.664' E	24° 6.942' S
82	27° 47.771' E	24° 6.848' S
83	27° 47.910' E	24° 6.816' S
84	27° 48.057' E	24° 6.822' S
85	27° 48.204' E	24° 6.828' S
86	27° 48.352' E	24° 6.835' S
87	27° 48.499' E	24° 6.841' S
88	27° 48.646' E	24° 6.847' S
89	27° 48.794' E	24° 6.852' S
90	27° 48.937' E	24° 6.880' S
91	27° 49.067' E	24° 6.944' S
92	27° 49.196' E	24° 7.009' S
93	27° 49.325' E	24° 7.075' S
94	27° 49.455' E	24° 7.140' S
95	27° 49.584' E	24° 7.205' S
96	27° 49.716' E	24° 7.264' S
97	27° 49.851' E	24° 7.319' S
98	27° 49.986' E	24° 7.374' S
99	27° 50.121' E	24° 7.430' S
100	27° 50.251' E	24° 7.493' S
101	27° 50.377' E	24° 7.564' S
102	27° 50.515' E	24° 7.519' S
103	27° 50.654' E	24° 7.474' S
104	27° 50.794' E	24° 7.429' S
105	27° 50.932' E	24° 7.383' S
106	27° 51.026' E	24° 7.443' S
107	27° 51.093' E	24° 7.564' S
108	27° 51.160' E	24° 7.684' S
109	27° 51.241' E	24° 7.728' S
110	27° 51.346' E	24° 7.633' S
111	27° 51.451' E	24° 7.538' S
112	27° 51.556' E	24° 7.443' S
113	27° 51.660' E	24° 7.348' S
114	27° 51.765' E	24° 7.252' S
115	27° 51.870' E	24° 7.157' S

116	27° 51.975' E	24° 7.062' S
117	27° 52.080' E	24° 6.967' S
118	27° 52.185' E	24° 6.872' S
119	27° 52.290' E	24° 6.776' S
120	27° 52.404' E	24° 6.695' S
121	27° 52.542' E	24° 6.646' S
122	27° 52.680' E	24° 6.598' S
123	27° 52.818' E	24° 6.549' S
124	27° 52.955' E	24° 6.500' S
125	27° 53.093' E	24° 6.451' S
126	27° 53.230' E	24° 6.403' S
127	27° 53.368' E	24° 6.354' S
128	27° 53.506' E	24° 6.305' S
129	27° 53.643' E	24° 6.257' S
130	27° 53.781' E	24° 6.208' S
131	27° 53.919' E	24° 6.159' S
132	27° 54.056' E	24° 6.111' S
133	27° 54.194' E	24° 6.062' S
134	27° 54.332' E	24° 6.016' S
135	27° 54.474' E	24° 6.050' S
136	27° 54.617' E	24° 6.085' S
137	27° 54.760' E	24° 6.119' S
138	27° 54.903' E	24° 6.153' S
139	27° 55.045' E	24° 6.188' S
140	27° 55.188' E	24° 6.222' S
141	27° 55.331' E	24° 6.256' S
142	27° 55.445' E	24° 6.213' S
143	27° 55.535' E	24° 6.106' S
144	27° 55.626' E	24° 5.999' S
145	27° 55.717' E	24° 5.893' S
146	27° 55.837' E	24° 5.849' S
147	27° 55.929' E	24° 5.745' S
148	27° 56.018' E	24° 5.637' S
149	27° 56.107' E	24° 5.529' S
150	27° 56.196' E	24° 5.421' S
151	27° 56.285' E	24° 5.313' S
152	27° 56.374' E	24° 5.205' S
153	27° 56.463' E	24° 5.097' S
154	27° 56.552' E	24° 4.989' S
155	27° 56.641' E	24° 4.881' S
156	27° 56.730' E	24° 4.773' S
157	27° 56.795' E	24° 4.654' S
158	27° 56.837' E	24° 4.524' S
159	27° 56.878' E	24° 4.394' S
160	27° 56.920' E	24° 4.264' S
161	27° 56.961' E	24° 4.135' S
162	27° 57.003' E	24° 4.005' S
163	27° 57.044' E	24° 3.875' S
164	27° 57.086' E	24° 3.745' S
165	27° 57.128' E	24° 3.615' S
166	27° 57.169' E	24° 3.485' S
167	27° 57.211' E	24° 3.355' S
168	27° 57.252' E	24° 3.225' S
169	27° 57.294' E	24° 3.096' S
170	27° 57.441' E	24° 3.108' S
171	27° 57.588' E	24° 3.121' S
172	27° 57.735' E	24° 3.134' S
173	27° 57.881' E	24° 3.147' S
174	27° 58.028' E	24° 3.159' S
175	27° 58.175' E	24° 3.172' S
176	27° 58.322' E	24° 3.185' S
177	27° 58.468' E	24° 3.201' S
178	27° 58.610' E	24° 3.237' S

179	27° 58.753' E	24° 3.215' S
180	27° 58.861' E	24° 3.139' S
181	27° 58.933' E	24° 3.021' S
182	27° 59.006' E	24° 2.904' S
183	27° 59.079' E	24° 2.786' S
184	27° 59.152' E	24° 2.668' S
185	27° 59.266' E	24° 2.628' S
186	27° 59.413' E	24° 2.646' S
187	27° 59.559' E	24° 2.663' S
188	27° 59.705' E	24° 2.681' S
189	27° 59.851' E	24° 2.699' S
190	27° 59.996' E	24° 2.693' S
191	28° 0.139' E	24° 2.661' S
192	28° 0.282' E	24° 2.629' S
193	28° 0.426' E	24° 2.596' S
194	28° 0.569' E	24° 2.564' S
195	28° 0.712' E	24° 2.532' S
196	28° 0.855' E	24° 2.500' S
197	28° 0.999' E	24° 2.468' S
198	28° 1.142' E	24° 2.435' S
199	28° 1.285' E	24° 2.403' S
200	28° 1.428' E	24° 2.371' S
201	28° 1.572' E	24° 2.339' S
202	28° 1.715' E	24° 2.307' S
203	28° 1.858' E	24° 2.275' S
204	28° 2.001' E	24° 2.242' S
205	28° 2.144' E	24° 2.210' S
206	28° 2.288' E	24° 2.178' S
207	28° 2.431' E	24° 2.146' S
208	28° 2.574' E	24° 2.119' S
209	28° 2.716' E	24° 2.156' S
210	28° 2.857' E	24° 2.193' S
211	28° 2.999' E	24° 2.231' S
212	28° 3.141' E	24° 2.268' S
213	28° 3.282' E	24° 2.305' S
214	28° 3.424' E	24° 2.343' S
215	28° 3.566' E	24° 2.380' S
216	28° 3.702' E	24° 2.428' S
217	28° 3.819' E	24° 2.510' S
218	28° 3.937' E	24° 2.591' S
219	28° 4.054' E	24° 2.673' S
220	28° 4.172' E	24° 2.756' S
221	28° 4.289' E	24° 2.837' S
222	28° 4.403' E	24° 2.923' S
223	28° 4.507' E	24° 3.019' S
224	28° 4.611' E	24° 3.115' S
225	28° 4.717' E	24° 3.206' S
226	28° 4.864' E	24° 3.201' S
227	28° 5.012' E	24° 3.196' S
228	28° 5.159' E	24° 3.191' S
229	28° 5.306' E	24° 3.186' S
230	28° 5.451' E	24° 3.166' S
231	28° 5.593' E	24° 3.157' S
232	28° 5.736' E	24° 3.190' S
233	28° 5.872' E	24° 3.168' S
234	28° 6.011' E	24° 3.197' S
235	28° 6.152' E	24° 3.237' S
236	28° 6.285' E	24° 3.286' S
237	28° 6.372' E	24° 3.385' S
238	28° 6.509' E	24° 3.435' S
239	28° 6.632' E	24° 3.505' S
240	28° 6.734' E	24° 3.602' S
241	28° 6.837' E	24° 3.699' S

242	28° 6.939' E	24° 3.797' S
243	28° 7.066' E	24° 3.742' S
244	28° 7.195' E	24° 3.676' S
245	28° 7.324' E	24° 3.611' S
246	28° 7.452' E	24° 3.544' S
247	28° 7.581' E	24° 3.479' S
248	28° 7.710' E	24° 3.413' S
249	28° 7.839' E	24° 3.347' S
250	28° 7.970' E	24° 3.309' S
251	28° 8.110' E	24° 3.353' S
252	28° 8.249' E	24° 3.397' S
253	28° 8.389' E	24° 3.441' S
254	28° 8.528' E	24° 3.485' S
255	28° 8.668' E	24° 3.529' S
256	28° 8.808' E	24° 3.572' S
257	28° 8.947' E	24° 3.616' S
258	28° 9.087' E	24° 3.660' S
259	28° 9.230' E	24° 3.688' S
260	28° 9.376' E	24° 3.707' S
261	28° 9.522' E	24° 3.727' S

Dorset substation:

Longitude (Degrees Decimal Minutes)	Latitude (Degrees Decimal Minutes)
28° 9.633' E	24° 3.742' S

1.3 Project Details

1.3.1 Need for the project

A need has been identified to strengthen several reticulation feeders between Vaalwater and Ellisras. Currently the network is experiencing under voltages and is incapable of handling additional loads due to the contigency constraints of the network. Outages in the network occur due to the fact that feeders exceed the maximum length. It is therefore of cardinal importance to split some of the rural lines to prevent outages. The feeder area of the Vaalwater-Bulge Rivier, Theunispan-Elmeston, Waterberg-Afguns en Flamingo-Sentrum would therefor be divided into smaller areas. The construction of the authorised Bulge Rivier substation and the construction of the new Dorset substation and the feeder line are part of the proposed master plan. Should this project be implemented then it should not be necessary to construct any new infrastructure for the next 15 years. Failure to strengthen the network will result in Eskom not being able to deliver the requested demand. If this project is not implemented then the network will suffer outages that will only worsen in time.

Eskom emphasised that the proposed projects would ensure a strengthening of the power supply of the entire macro area. The whole purpose of these projects is to enable Eskom to provide a reliable service to the relevant communities and farms within the macro area.

In summary the advantages to customers in the macro area:

- Upgrade the current supply from Radial feed to Ring feed, Currently Radial feed from Warmbad Substation. Ring feed will create an alternative supply from Matimba Power station. All substations in the project will form part of an integrated ring supply network.
- Place the High Voltage (132kV) sources closer to the customers (Bulge and Dorset substations) and shorten the Medium Voltage (22kV) networks to improve the quality of supply.

Therefore, the current EIA application is only part of a broader scope of works to improve the network performance.

Part of the **scope of works** for this new project is the following:

- Install 10MVA 132/33kV transformer at Bulge Rivier substation.
- Construct a ±65km 132kV power line from Bulge Rivier substation to Dorset substation.
- Construct an access/ construction road for the new 132kV line.

- Obtain a servitude area of 31metres wide for the 132kV line

(Refer to the Eskom Scope of works, in Appendix C1, for more information).

1.3.2 Project components

The proposed project requires the construction of an approximately 65km of 132kV line from the authorised (to be constructed) Bulge Rvier substation to the new Dorset Substation. Inclusive to this application is the construction of the following:

1. *Construct a 132kV line from the authorised (to be constructed) Bulge Rivier substation to the new (in construction) Dorset substation.*

It is proposed to construct a 132kV line from the authorised Bulge Rivier substation east towards Dorset substion near Visgat. The proposed structure for the 132kV power line, is a monopole steel structure. In general, these pylons could be placed 220-350 meters apart, for the length of the line. The pylons for a power line are between 18 to 30 meters high, depending on the terrain and existing land use. The flatter the terrain, the shorter the pylons to be used. The conductor attachment height on a pole is 13m (for 20m intermediate poles) and more for longer poles, depending on the pole length. Ground clearances will adhere to OSH-Requirements of 6.3m and 7.5m.
Strain poles have a planting depth of 2m but intermediate pole planting depths varies between 2.6m (for 20m poles) and 3m (for 24m poles) or more depending on the pole length. The pole is not planted in a slab - The pole foundation is dependant on the soil type and varies in size and consists of a 8:1 good soil:cement mix that are compacted in 200mm layers. A concrete cap of 1.2m x 1.2m is cast around the pole to "seal" the soil around the pole from oxygen - to control oxidation or rust on the pole.
Should the pylons be 21m high above ground then the planting depth of the pylon could be calculated as follows: For a pylon that need to be 21m above ground, the planting depth will be 0.6 meters plus 10% of the height of the pylon above ground = 0.6 meters plus 2.1 meters = pylon is planted 2.7 meters deep. Should stays be needed then the stays will be at a 45° angle to the pylon and planted 21meters from the pylon into the ground.
Where the site is relatively flat, single pylons without stays will be used, except for where the power line has to change direction. Stays will not be used except at turns in the route.
Clearance between phases on the same side of the pole structure is normally around 2.2m for this type of design, and the clearance on strain structures is 1.8m. This clearance should be sufficient to prevent phase – phase electrocutions of birds on the towers. The length of the stand-off insulators is likely to be about 1.5 meters.
Refer to Appendices C2 and C3 in the BAR for visuals of the monopole steel structure (pylon).

The route for the line has four alternatives that are discussed as follows:
(Refer to the maps in Appendix A).
Alternative 1: The route for the line is proposed to run from Bulge Rivier substation (at A-B) in an easternly direction adjacent to the R517 between Vaalwater and Lephalale. From there the route will turn north onto the Hermanusdorings dirt road (D1882) towards Witfontein (A towards G). Before the dirt road reaches the R33, the route will turn north from C to D. From there the route turns east, crosses the R33 and follows the dirt road to Visgat (D1005) and then road D1162 to Dorset (substation) (D-E-H-F).
Alternative 2: This alternative is proposed to run the same section as Route Alternative 1 from A-B-C, but will continue directly east towards G until it reaches the R33. At G the route will turn north onto the R33 towards D. From there the route will follow the same alignment as Route Alternative 1 from D-E-F, except for a shortcut between E-F.
Alternative 3: Alternative 3 runs from the Bulge Rivier substation all along farm borders towards the Hermanusdoorings dirt road. Firstly in a northernly direction, then in an easternly direction, then southwest towards the R517. (A-I-J-K). From there (K) in an easternly direction towards B, adjacent to the R517 towards Vaalwater. From there the route will turn north onto the Hermanusdorings dirt road (D1882) towards Witfontein (B towards G). Before the dirt road reaches the R33 (G), the route will turn northeast from L-M, southeast from M-N and northeast from N-D and run along farmborders. From there the route turns east, crosses the R33 and follows the dirt road to Visgat (D1005) and then road D1162 to Dorset (substation) (D-E-H-F).
Alternative 4: Alternative 4 runs the same route as Alternative 3 from the Bulge Rivier substation towards the Hermanusdorings dirt road all along farm borders, except for one small section. Firstly in a northernly direction, then in an easternly direction (A-I), then between I-J all along the border of Bulge Rivier 198KQ Portion 6. From J-K-B, the

same alignment will be followed as in Route Alternative 3. From B the route will follow the Hermanusdorings road (D1882) towards Witfontein. At O-P the route will run to the south of the dirt road to avoid rocky areas. From P-L-M-Q-R-D the route will follow farm borders. From there the route turns east, crosses the R33 and follows the dirt road to Visgat (D1005) and then road D1162 to Dorset (substation) (D-E-H-F). (Refer to the maps in Appendix A).

The National Road P198/1 (R33); the Provincial Road P84/1 (R517); and District roads D1882; D1005; and D1162 are affected by the proposed servitudes, should any of the route alternatives be constructed.

In terms of the National Roads Act (Act No 54 of 1971), the requirements of standard conditions applicable to power lines parallel to or across national and provincial roads are as follows:

- Only under exceptional circumstances will crossings within 500m of an intersection be permitted.
- No infrastructure will be allowed within 60m from the edge of the road reserve or within a distance of ninety-five (95) metres from the centre line of a building restriction road.
- Vertical clearance as set out in the Occupational Health and Safety Act No. 85 of 1993 to be maintained.
- The proposed angle of crossing to be as close to 90 degrees as possible.
- When considering an infrastructure site, no direct access from a national road to be permitted.

In addition, the following *general requirements of the Provincial Department of Roads and Transport*: Roads Management could be expected:

- A wayleave will be granted in terms of the Advertising on Roads and Ribbon Development Act (Act 21 of 1940, as amended) and the Roads Ordinance (Ordinance 22 of 1957, as amended) and its Regulations and does not exempt Eskom from the provisions of any other law.
- The Wayleave Application should be supplied to the Dept, with appropriate plans before the commencement of construction.
- The general conditions for the overhead wayleave should be accepted by Eskom in writing as per written notification of the Dept.
- The overhead lines are not to be lower than 10m above the highest point of the road surface.
- At crossings no pylons, poles, anchors or parts thereof may be erected closer than 16 m from the road reserve. Where the routes of the lines are parallel to the road(s), it must not be closer than 15m outside the road reserve.
- Crossing services should be perpendicular to the affected road(s).

It is expected that Eskom Land and Rights will apply for exemption from some of the requirements above. The specific requirements from the Provincial Department of Roads and Transport: Roads Management should be obtained.

2. Obtain a servitude area of 31 meters wide

Eskom relies on the goodwill of landowners and interested and affected parties to obtain rights of way, or servitudes for power lines. Hence, landowners are consulted during the construction of new power lines and existing landowners are notified when vegetation clearance is due to be performed. Eskom obtains right of way by negotiating a right of way or registering a servitude. The difference between these is detailed below:

Servitude: A servitude is a real right which Eskom obtained in order to construct its infrastructure upon the affected property and it is registered in the Deeds Office against the title deed of the affected property. The effected owner normally gets compensated for this right according to market related values. A servitude stays effective even if a property is transferred to another owner. Rigths to obtain a servitude is negotiated for 33kV, 88kV and 132kV power lines.

Way Leave Agreement: A way leave agreement is a personal right, which Eskom obtained in order to construct its infrastructure, such as rural power lines, upon the affected property. The way leave document contains clauses to the effect that the agreement is also binding on the successors in title. These rights are not registered in the Deed Office and Eskom does not pay compensation for these rights. The argument for this is that Eskom normally obtains way leave agreements only for minor reticulation type of power line projects (11kV and 22kV lines) from which a property owner can benefit by utilising the available energy.

A servitude area is generally a no building area, except for Eskom structures. Usually, normal farming activities may continue in a servitude with the exception that no trees may be planted or high structures may be erected. In general, the servitude for Eskom 132kV power lines is 31 meters wide, which implies 15,5 meters on either side of the power line.

3. *Construct an access road for the new line*

Access to properties for the purpose of construction will be arranged with landowners. The existing roads will be used as far as possible. Relevant is the fact that the alternatives are adjacent to existing impact (roads) for most of the alignment. New access will therefore only be required at the sections away from the roads. Should a temporary construction road be unavoidable, then an area of 8m will be selectively cleared, 4m on either side of the center line of the power line. During construction all vehicle movement must be along existing roads, adjacent to the fences of the applicable properties, as far as is feasible.

1.4 Consideration for servitudes

The process of negotiations can commence as soon as the Environmental Impact Assessment recommend the preferred alternative i.e. route, site etc. for the project. After identification of the preferred alternative, a land valuator will be appointed to value the property(ies). The distance/length of the line affecting each property is measured to calculate the area affected by the line. A process of negotiations will follow between landowner(s) and Eskom appointed negotiators. After agreement has been reached, Eskom and the landowner will sign the documents. The valuations will be tabled before an Eskom tender committee for approval. Eskom pays the consideration as determined by the professional evaluator on a before and after basis. Servitude rights for a servitude in general terms will be obtained by means of an "Option to Acquire a Servitude". Interest will be paid according to the laid down principle by the National Treasury Act.

Eskom Distribution has a compensation model that allows for a once-off compensation for the servitude which will be paid upon registration of the servitude. A servitude will be registered which provides Eskom with the rights to construct and maintain a power line on the applicable property. The applicable land is therefore not purchased. All normal activity on the farm/land can continue as usual. For the sake of safety the landowner should not construct any structures in the servitude area underneath the power line. Eskom has the right to enter the servitude 24 hours per day to maintain the line in so much as following the laid down farm access protocol.

Power for rural supply cannot be supplied directly from an 132kV line. There is however indirect benefit in the construction of the line for the community, in that the supply would be strengthened with a feed to the substations that feed the rural lines. Eskom strives to follow the shortest route from point A to B due to the fact that the line costs approximately R1 600 000 per kilometer to construct. Objections from landowners/users and site-specific problems will be considered in the finalisation of any route/site.

The option document (referred to above) is a binding document that will reflect all the requirements of the landowner, for example: the negotiated compensation for the servitude; specific access arrangements to his property etc. Negotiations between the landowner and the negotiator will address site-specific requirements such as the positions of the pylons, on the property in question. These agreements/requirements will be noted on a site plan, as part of the option document. Construction may only commence once the environmental authorisation has been issued and the option document has been signed by the affected landowner.

2. FEASIBLE AND REASONABLE ALTERNATIVES

"alternatives", *in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—*

(a) the property on which or location where it is proposed to undertake the activity;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline

against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

THE FOLLOWING ALTERNATIVES HAVE BEEN IDENTIFIED AND ARE DESCRIBED AS FOLLOWS:

2.1 ACTIVITY ALTERNATIVES:

2.1.1 Electricity Distribution

The outcome of this project will ensure the injection of supply into the Eskom Distribution Network. The addition of the proposed 132kV line from the authorised Bulge Rivier substation towards the new Dorset substation will ensure sufficient supply to the network.
The proposed project is part of a total solution to supply the network with electricity. There is no other activity alternative due to the technical constraints of the proposed project.

2.1.2 Agriculture

The construction of power lines with the resulting clearance of servitudes can lead to a loss in agricultural land. The proposed construction of the power line will however not impact significantly on any agricultural activity. The following is relevant for this project:

- The land capabilities of the immediate surrounding areas within which the proposed servitudes fall are fairly limited. Most of the sandy soils are too shallow or nutrient-poor for high-yield crop production. Certain areas with heavier soils are suited for arable land. However, due to the dry winter periods irrigation would be necessary. The climate is generally favourable for year-round production of crops in open-field cultivation.
- The veld carrying capacity is relatively low although many sweet grasses are present. Cattle farming does occur in the area but suitably large areas for grazing are needed. The suitability for grazing land is there but needs to be carefully managed.
- The general land capability is highly suited to wilderness land. This is already a major form of land use in the region with numerous nature reserves, a biosphere reserve, private game farms and lodges.
- Should the construction of the power line impact on any agricultural activities, this impact will only be for a limited period during construction. An access road of 8m wide will be cleared to construct the power line. After construction the access road could be revegetated and normal agricultural activites could continue under the power line as usual.
- It is therefore submitted that the servitude area will not interfere with any agricultural activities. In addition, Eskom will not own the servitude but will purchase the rights to construct and maintain the line. A change in land use from agriculture to other land uses is not applicable.
- In addition, in terms of the Subdivision of Agricultural Land Act, 1970 (Act 70 of 1970), Section 2(a) Eskom is a statutory body and therefore it is not subjected to the provisions of the Act.

2.1.3 No-Go

It is suggested that to maintain the status quo is not the best option for the macro environment. This project is part of Eskom's implementation of their Master Plan for the extension of electrical infrastructure. Should this application not be approved then the supply to the broader area will not be reliable and this can result in blackouts and major disturbances in energy provision. In the future, new development might cause overloading of the already stressed existing system which can cause major disruptions of power supply to different areas at different times. The No-go option would not solve the current demand for electricity. The No-Go development alternative could therefore not be considered the responsible way to manage the site(s).

2.2 LOCATION ALTERNATIVES

The project consists of the construction of an approximately 65km of 132kV power line between the authorised Bulge Rivier substation and the new Dorset substation. Alternative routes for the power line were considered. Refer to Appendix A for the project maps indicating the route Alternatives. Specialist input was obtained to investigate the impact of the various alternative routes that could accomplish the purpose of the project. The specialist input is summarised as follows:

2.2.1 Ecological Status Report

The ecological status report identified the following:
(Refer to the full Ecological Status Report in Appendix D1)

- The study area falls within the Savanna Biome. Three vegetation types are encountered in the area. Namely, Central Sandy Bushveld; Western Sandy Bushveld and Waterberg Mountain Bushveld.
- Red data species and protected species found in the area include Camel thorn (*Acacia erioloba*), Leadwood (*Combretum imberbe*) and Marula (*Sclerocarya birrea* subsp. *caffra*).
- A small grove of Camel Thorns on both sides of the D1882 sand road in the vicinity of the Mokolo River should be viewed as a 'No-Go" zone. The route should be planned to avoid the groves. (GPS coordinates taken from the road: S24^{0}06.822'; E27^{0}48.301'). Should the camel thorns be impacted, then a permit is needed.
- No threatened or protected mammal, butterfly or amphibian species were observed in the study area, although some are most likely present. These include African rock python (*Python natalensis*), Giant bullfrog (*Pyxicephalus adspersus*), Honey badger (*Mellivora capensis*), Pangonlin (*Manis temmincki*) and Southern African hedgehog (*Atelerix frontalis*).
- The soils in the proposed power line servitude routes and immediate vicinity are predominantly shallow to deep sandy and gravely soils with a low clay content. The colours of which are generally red to yellowish. A number of highlying areas and slopes have a high presence of large surface and sub-surface rocks.
- Large areas of the bushveld in the region are undisturbed, with a number of formal nature reserves, private game ranches and lodges. Other land-uses in the area include agriculture in the form of pivot-irrigated, cultivated lands and cattle farming. Urbanisation and human development of the immediate region are low.
- Floristic and faunal sensitivity calculations were done. A large percentage of the vegetation in the study area can be viewed as pristine. The vegetation is fairly uniform with no small ecosystems or islands of uniqueness being present.
- Floristic sensitivity calculations were as follows: Regional vegetation – medium (Go-Slow zone); Rivers – medium/high (Go-But zones); Rocky areas – medium/high (Go-But zone); Camel thorns – high (No-Go zone).
- Faunal sensitivity calculations were as follows: Regional vegetation – medium (Go-Slow zone); Rivers – medium/high (Go-But zones); Rocky areas – medium/high (Go-But zones); Camel thorns – medium (Go-Slow zone).
- The ecological sensitivity of the study area is determined by combining the sensitivity analyses of both the floral and faunal components with the following outcomes: Regional vegetation – medium (Go-Slow zone); Rivers – medium / high (Go-But zones); Rocky areas - medium/high (Go-But zone); and the area of Camel thorns – high (No-Go zone).
- A number of mitigating actions where recommended and the proper implementation and management of these will ensure that impacts are reduced and are kept to acceptable levels.
- These measures include staying out of No-Go zones (highly sensitive areas such as the camel thorn grove); not placing any pylons closer than 30m from the edge of river banks or 10m from the edge of drainage lines; an ongoing management programme to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons; to not use chemicals in the control of weeds; to inspect the power line corridor every year (before and after the summer rain season) for soil erosion and if found to rehabilitate; to use wide spacing of pylons in the rocky areas to limit the physical footprint on the actual ground; and to remove all left over construction materials, rubble etc. upon completion of the project.
- Assessment of impacts on the various distinctive ecological units in the study area (before and after) mitigating and management measures were deemed to be as follows: Regional vegetation – medium (before), low (after); Rivers – medium, bordering on high (before), low (after); Rocky areas – medium, bordering on high (before), low

(after). No rating matrix is given for the small area of camel thorns or the Mokolo River simply because there are no possible mitigating measures to reduce the negative impact and the area must be seen as a "No-Go" zone.

- Having taken all aspects of the investigation into account the following line variant is recommended - **Alternative Route 4 (A-B_1-C_2-C_1-D-H-F)**. However, between map points (C_1 – D) both sections of Alternative Routes 4 & 3 are equally ecologically acceptable and either may be used across this section. (Refer to map in specialist report on the ecological environment, in Appendix D1)

Assessment of impacts on the various distinctive ecological units in the study area:

Regional vegetation

Significance of Impacts

- Surface changes within the regional vegetation of the undulating plains will result in the loss of some biophysical attributes, albeit slight. These effects are for the most part permanent, especially within the corridor of the power lines and substation sites. However, the impacts are likely to have a low negative affect on sensitive species or Red Data species. Representative habitat is still widely present in the surrounding regions and in good condition and diversity. The implementation of mitigating measures would suffice in limiting localised impacts, as well as allowing for effective control and reduction of impacts.

Mitigation of impacts

- Due to the long (65km) distance covered by the power line corridors between Bulge River Substation and Dorset Substation it may be necessary to set up temporary storage and accommodation facilities along the route. If so, areas of flat, open lands should be selected. This need to be old, previously cultivated lands that are open and not wooded. No area should be selected where it would be necessary to cut down any trees or clear any shrub land whatsoever. Any selected temporary site still needs to be within the 100m power line corridor. All mitigating and management measures as laid out for temporarily facilities under "Bulge River Substation" need to be adhered to.
- No site within a rocky area or within 300m of a river or stream may be used for temporary accommodation or storage.
- Positioning of the foundation slabs for the pylons must be a minimum of 10m away from the edge of all drainage lines.
- No trees outside of the power line corridor of 8m to be removed.
- Disturbed surface areas in the construction phase to be rehabilitated. No open trenches to be left. No mounds of soils created during construction to be left.
- The sandy nature of the soils in the area makes it susceptible to soil erosion by water once disturbed, especially in steeper areas. The ground around all foundation slabs for the pylons need to be inspected before and after the summer rainy season for erosion. Any erosion found needs to be fixed and preventative measures put in place to prevent a reoccurrence of the situation.
- An ongoing programme to be implemented to mechanically control alien plant species that invade the disturbed soils around the newly erected pylons. This should be done in such as way as to allow the natural grasses and pioneer plants to colonise the disturbed areas.
- Mechanical control of alien species to be implemented within two months of completion of construction of the power line. Thereafter ever six months.
- Surface area under power lines to be mowed and not ploughed.
- No chemical control (herbicides) to be used in the control of alien plants or indigenous plants, except on tree and bush stumps in 8m corridors directly under power lines.
- Removal of all construction material and equipment after construction.
- Removal of all waste construction material to an approved waste disposal site.

Rivers and seasonal streams

Significance of impacts

- Rivers and wetlands are always seen as sensitive and should be avoided at all cost. In this instance there is no other choice but to cross over two such water courses. Namely, the Mokolo River and Poer se Loop. Mitigating measures are necessary, the implementation of which will ensure that almost no negative impact in terms of the ecological environment are felt.

Mitigation of impacts

- The two major water courses (Mokolo River and Poer se Loop) along with a few seasonal streams and drainage lines that cross the corridors for the power lines, need to be completely avoided and no pylons may be placed directly within any one of these water courses.
- No temporary or other construction facilities to be erected or stored within 200m of the banks of the Mokolo River or the Poer se Loop stream.
- Positioning of any pylons need to be a minimum of 30m from the edge of the river banks or outside of the 1 in 100 year floodline.
- Positioning of the foundation slabs for the pylons must be a minimum of 10m away from the edge of all drainage lines.
- Under no circumstances may a pylon be placed directly in the bed of a river or drainage line.
- No temporary ablution facilities to be placed within 200m of the banks of any of the rivers or seasonal streams.
- No temporary ablution facilites to be placed within 200m of any drainage line, even if they are dry.
- Only proper portable, chemical ablution facilities to be used and these to be positioned only within the 31m power line servitudes.
- Portable ablution facilities only to be serviced by registered companies and on a regular basis. Under no circumstances may any effluent or sewage to be dumped in the open veld.
- Proper water facilities need to be installed and maintained for construction workers. No water from out of the rivers may be used for drinking, washing or cooking purposes.

Rocky areas

Significance of impacts

- Surface changes within the rocky areas will result in greater loss of biophysical attributes than in those of the regional vegetation of the undulating plains. Fortunately the rocky areas encountered in the power line corridors area spread over a large area and are not as sensitive, or unique, with regard to species diversification as would be the case of isolated rocky outcrops or ridges. Effects are mostly permanent and the significance of these impacts is therefore deemed high. Implementation of mitigating measures is considered necessary.

Mitigation of impacts

- A few rocky areas have been identified along the proposed servitude routes. These areas are considered moderately sensitive and should be approached with caution.
- The area is not seen as a "No-Go" area, but care should still be taken to avoid any unnecessary disturbance of veld or soil. Removal of trees, shrubs and other vegetation should be kept strictly to within the 8m corridor under the power lines.
- Only a single, basic vehicle track to be constructed as an access road under pylons moving through the rocky area.
- Access roads need to be kept to an absolute minimum.
- No trees to be cut down or roads to be created to access the power line corridor from the public road by vehicle. Or to create shortcuts into this region. Any vehicles needing to access the power lines running through the rocky area will need to do so from out of the less sensitive plains along the corridor itself.
- No temporary storage facilities, toilets, dwellings, etc. of any kind to take place within this rocky area. Not even within the demarcated power line corridor.
- The longest possible distance between pylons should be used in an effort to limit the footprint size on the rocky area.
- The power line must run as straight as possible through and over rocky areas. This in an effort to limit sharp turns that literally create a larger physical footprint on the ground.
- Great care and thought must be taken into the actual positioning and construction of the foundation slabs. The soils are sandy and this area has the steepest gradient of the study site. There is therefore a real danger of soil erosion and resulting veld degradation in this area.
- The sandy nature of the soils in the area makes it susceptible to soil erosion by water once disturbed, especially in steeper areas. The ground around all foundation slabs for the pylons need to be inspected before and after the summer rainy season for erosion. Any erosion found needs to be fixed and preventative measures put in place to prevent a reoccurrence of the situation.

- Disturbance of the soils must be kept to an absolute minimum to limit the potential introduction of alien plants. This area is pristine with little to no alien infestation. Alien plants generally get a foothold in an area where the soils have been disturbed.
- Mechanical control of alien species must be implemented within two months of completion of construction of the power line. Thereafter ever six months.
- No chemical control of alien plant species to be used.

Camel thorns

Significance of impact

- Immediately east of the Mokolo River is a small grove of camel thorn trees (*Acacia erioloba*), which should be considered highly sensitive, due to the conservation status of the tree species and not the uniqueness of the micro ecosystem. This area needs to be handled as a "No-Go" area and avoided. For this reason, no mitigating measures are seen as been able to reduce the impact on the site, save the one of total avoidance.

Mitigation of impact

- There are no possible mitigating measures and the area must be approached as a "No-Go" area.

Line Variant Recommendations

Line variant recommendations are made on the strength of all the impacts and mitigating actions. As well as the sensitivities of the various biophysical features and vegetation types.

Comparison of the number of ecologically sensitive units alternative routes potentially impact on

Ecologically sensitive criteria	Alternative Route 1					Alternative Route 2				
	A-B	B-C	C-D	D-E	E-F	A-B	B-G	G-D	D-H	H-F
Areas of high sensitivity	0	1	0	0	0	0	1	0	0	0
No-Go areas	0	1	0	0	0	0	1	0	0	0
Rivers and streams	2	1	0	0	1	2	1	0	0	1
Rocky outcrops	0	1	0	0	1	0	1	0	0	1
Wetlands	0	0	0	0	0	0	0	0	0	0
Sub-Total	2	4	0	0	2	2	4	0	0	2
Total	8					8				

Ecologically sensitive criteria	Alternative Route 3					Alternative Route 4				
	$A-B_1$	B_1-C_1	C_1-D	D-H	H-F	$A-B_1$	B_1-C_2	C_2-C_1	C_1-D	D-F
Areas of high sensitivity	0	1	0	0	0	0	1	0	0	0
No-Go areas	0	1	0	0	0	0	1	0	0	0
Rivers and streams	1	1	0	0	1	1	0	0	0	1
Rocky outcrops	0	1	0	0	1	0	1	0	0	1
Wetlands	0	0	0	0	0	0	0	0	0	0
Sub-Total	1	4	0	0	2	1	3	0	0	2
Total	7					6				

- When the alternative power line routes are compared with each other regarding the possible number of ecological sensitive regions they could impact on, the results are the same for Routes 1 & 2 (both with a total of 8). Alternative Routes 3 & 4 have lower impact with Alternative Route 4 having the lowest (total of 6). The fundamental difference giving Alternative Route 4 the lowest calculated impact on ecologically sensitive regions is found on the route deviation C_2-C_1 (see ecological sensitivity maps). It is along this section of the proposed power line routes that the other alternative routes move through much rockier areas, while Route 4 is less rocky, more open and moves through more flat areas. The rockiness of the area increases to the north side of the public sand road (D1882). Keep in mind that rocky areas have a medium/high sensitivity rating prior to mitigating measures been implemented and that they need to be avoided wherever possible.

- The alternative routes also differ slighlty across the route section A-B (see ecological sensitivity maps). Here Routes 1&2 are the same, crossing over two rivers and potentially obstructing entrances to game and other farms. While Routes 3&4 follow another route which only crosses one major river and doesn't potentially impact on entrances to game and other farms. For these reasons Routes 3&4 have lower ecological impact ratings over this section of the route.
- The section of Alternative Route 1 (E-E_1) near the Dorset Substation, is seen as having a greater impact on the environment than the other three routes that follow the more disturbed route along the road (E-H-F), on their way to the Dorset Substation (F).
- Between map points C_1 and D (see ecological sensitivity maps) Alternative Routes 3 & 4 take different routes, albeit through the same general terrain. Across this specific section there is no difference in the potential ecological impact of Routes 3 & 4. In other words, across this specific section the ecological recommendation is that either route is acceptable and other factors need to be taken into consideration in determining the final route (eg. Cost of construction; agreements with landowners, etc.).
- All the alternative routes cross over drainage lines en route. These have been investigated during field trips, but have not been mentioned in determining the recommended route due to the fact that they balance out between the alternative routes and therefore carry no decisive weight in the descision process. Obviously, relevent mitigating measures need to be implemented when such drainage lines are encountered during the construction phase and ongoing inspection of the power lines.
- Other factors have also been taken into account during investigations. Such as the number of sharp turns a route takes compared to a straight line between the two end points and the actual surface area in the 8m power line corridor that potentially needs to be totally cleared of any trees or shrubs. Sharp turns are significant because the actual footprint on the ground at a turn in a power line is much larger than along a straight line. Generally speaking the shorter and straighter a corridor is able to be constructed the better.
- For all of the above reasons, **Alternative Route 4 (A-B_1-C_2-C_1-D-H-F)** is the ecologically recommended alternative. However, between map points (C_1 – D) both sections of Alternative Routes 4 & 3 are ecologically acceptable and either may be used.

2.2.2 Bird Impact Assessment

The Bird Impact Assessment indicated the following:
(Refer to the full Bird Impact Assessment Report in Appendix D3)

Habitat transformation impact

- The habitat surrounding the proposed power line comprises mostly undisturbed woodland, with limited existing impacts which consist mostly of a number of reticulation lines, fences and dirt roads. As a result it supports a number of power line sensitive species, particularly raptor species currently Red Data listed. The impact of the proposed line on the natural habitat (and therefore potentially on power line sensitive Red Data species) would be limited if it is placed next to existing linear impacts, particularly dirt roads, as is the case with alternative 1 and 2. Alternative 3 and 4 have a few sections where it deviates from existing dirt roads, which will have a bigger impact on the natural woodland vegetation. If alternative 2 is selected, the impact of the clearing of vegetation for the new line would be slightly less than if the line was partially constructed in undisturbed woodland, as would be the case with alternatives 3 and 4, and to a much lesser extent with alternative 1. The impact on smaller, non-Red Data species that are potentially breeding in the area that will be cleared for the new power line will be local in extent, in that it will not affect regional or national populations in any significant way.
- The proposed construction of the new power line should have a **low** habitat transformation impact from an avifaunal perspective, especially if **alternative 2** is used. If **alternative 1** is used, the impact would be **medium-low**, as it would involve more extensive clearing of undisturbed woodland. With **alternative 3 and 4**, the impact will be **medium,** as it would require more extensive clearing of woodland than the other.

Collisions

- The majority of species listed in Table 2 of the BIA (attached in Appendix D3) are all vulnerable to collisions with power lines. In the case of water-associated birds such as the Black Stork, Yellow-billed Stork and African Marsh-Harrier the drainage lines, and specifically the pools in the larger rivers such as the Mokolo and Malmanies, which are in the study area, might potentially hold some attraction to these species. The new line will cross these

drainage lines and might be a potential cause of collisions for these species and other, non-Red Data species such as certain species of ducks, waders and possibly Hamerkops *Scopus umbretta*. Species such as Kori Bustard and Secretarybird are known to be vulnerable to collisions with power lines, and the risk would be higher where the proposed alignments cross open habitat, especially old lands. The collision risk should therefore be regarded as **medium-high** along some sections of the proposed power line alignments.

Electrocution

- A mono-pole steel pole will be used for the new 132kV line. Clearance between phases on the same side of the pole structure is normally around 2.2m for this type of design, and the clearance on strain structures is 1.8m. This clearance should be sufficient to prevent phase – phase electrocutions of birds on the towers. The length of the stand-off insulators is likely to be about 1.5 metres. This is relevant as birds such as vultures are able to touch both the conductor and the earthed pole simultaneously potentially resulting in a phase – earth electrocution. This is particularly likely when more than one bird sits on the same pole.
- Although not recorded in large numbers, it is likely that White-backed and Cape Vultures forage in the area. There are cattle and game in the surrounding area, and should a carcass be available to the birds, they might attempt to roost on the poles. The risk of phase-earth electrocution is therefore evaluated to be **medium**. It should be mentioned that the pole design holds no inherent electrocution risk for other large non-gregarious species such as eagles, as they almost never perch together in large numbers next to each other.

Conclusions

The construction of the proposed 132kV Bulge-Dorset power line should pose a limited threat to the birds. The power line poses a **medium-high** collision risk, mostly to water associated species, and those species attracted to open habitats, particularly old lands. The line will pose a **medium** electrocution risk, in particular to vultures. The proposed construction of the new power line should have a **low** habitat transformation impact from an avifaunal perspective, especially if **alternative 2** is used. If **alternative 1** is used, the impact would be **medium-low**, as it would involve more extensive clearing of undisturbed woodland. With **alternative 3 and 4**, the impact will be **medium,** as it would require more extensive clearing of woodland than the other.

Recommendations

- Power line: The span that crosses drainage lines and old lands should be marked with Bird Flight Diverters on the earth wire of the line, five metres apart, alternating black and white (see Appendix B Sensitivity map in the specialist report on bird impact for the area to be marked with Bird Flight Diverters). Appendix C indicates the preferred Bird Flight Diverters to be used.
- Poles: The poles should be fitted with bird perches on top of the poles to draw birds, particularly vultures, away from the potentially risky insulators.
- From a bird impact perspective, **all four alignments** (Route Alternatives 1, 2, 3 and 4) are suitable options, should the proposed mitigation be impemented.

2.2.3 Heritage Impact Assessment

The main findings of the Heritage Impact Assessment are summarised as follows:-

(Refer to Appendix D2 of the BAR for the full report)

The Phase I Heritage Impact Assesment for the Eskom Project revealed none of the types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) for the Eskom Project Area. Therefore, from a heritage point of view, **Alternatives 1, 2, 3 and 4** are suitable, for the construction of the project.

Recommendation

It is possible that this Phase I HIA study may have missed heritage resources in the Eskom Project Area. If any heritage resources of significance is exposed during the construction of the power lines the South African Heritage Resources Authority (SAHRA) should be notified immediately, all development activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) should be notify in order to determine appropriate mitigation measures for the discovered finds. This may include obtaining the necessary authorisation (permits) from SAHRA to conduct the mitigation measures.