

DOCUMENT QUALITY CONTROL

CLIENT: ESKOM HOLDINGS SOC LIMITED

PROJECT: PROPOSED FOSKOR MERENSKY 275KV ±130KM LINE AND ASSOCIATED SUBSTATION WORKS

DOCUMENT: DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

	PREPARED BY:	REVIEWED BY:	APPROVED BY:
SIGNATURE	<p>X</p> <hr/> <p>MUNYADZIWA RIKHOTSO ENVIRONMENTAL ASSESSMENT PRACTITIONER</p>	<p>X</p> <hr/> <p>MBAVHALELO NGOBENI LEGAL ADVISOR & EXTERNAL REVIEWER</p>	<p>X</p> <hr/> <p>MUNYADZIWA RIKHOTSO ENVIRONMENTAL ASSESSMENT PRACTITIONER</p>
DATE			

Executive Summary

Nsovo Environmental Consulting has been appointed by Eskom Holdings SOC Limited as the independent Environmental Assessment practitioners to facilitate the Environmental Impact Assessment process for the proposed Foskop Merensky 131 km 275kV power line. Studies done by Eskom Grid planning indicate that the existing Eskom network in the Lowveld area has reached its capacity and will not be able to accommodate the expected load growth in the coming years. The existing Foskop Merensky 275kV line contingency is currently causing under voltages at the Foskop and Acornhoek substations which will worsen in the next year and deteriorate to voltage collapse as more load connects to the network. Consequently Eskom plans to strengthen the existing network by constructing a second Foskop Merensky 275kV ±131km power line and associated substation works at Foskop substation in Phalaborwa and Merensky substation in Steelpoort. The proposed project offers a solution that will improve and strengthen the current supply to cater for future developments.

The proposed transmission lines will stretch over a distance of ±131km on various farms between Phalaborwa and Steelpoort in the jurisdiction of Greater Sekhukhune, Capricorn and Mopani District Municipality in the Limpopo Province. The load center in question is predominantly driven by mines and rural development.

By strengthening the electrical supply to the regions, the foreseen load growth and the current constraints can be supported in a reliable and economical manner. The benefits for the proposed transmission lines and associated substations works will include the following:

- The power lines will form part of the link to strengthen the supply network between Foskop and Merensky;
- Improvement in the reliability of electricity supply which will benefit users in the region and country at large;
- Avoiding current and future possible voltage collapse; and creation of a more flexible electrical network;
- Improvement in the overall reliability of the electrical systems, which will be of benefit to both Eskom and electricity end-users in the region;
- Sustaining economic growth in the regions.

The EIA process was conducted in terms of the EIA Regulation of 2012 (Government Notice R. 543, 544, 545 AND 546 OF 2010) under the National Environmental Management Act (Act 107 of 1998). Accordingly the proposed project triggers listed activities in the aforementioned notices which are defined as activities that may have a detrimental impact on the environment and therefore requires Environmental Authorisation from the relevant authority prior to commencement. The proposed project is within the Limpopo province and thus the provincial authority responsible for commenting is the Limpopo Department of Economic Development Environment, and Tourism (LDEDET) and the approving authority in this case is the Department of Environmental Affairs. The

process followed for this application is a full EIA which comprises of the Scoping and EIA phases as per the requirements of the regulation.

The Scoping phase of the project is complete and approval was granted by the DEA in May 2012. The phase entailed a detailed description of the baseline environment which would form the backdrop of the impact assessment phase. Further it allowed for the identification of key issues and concerns based on input from the relevant stakeholders, interested and affected parties and the EAP's professional judgment based on experience and expertise in the field. This EIA report will include specialist studies that were commissioned to respond and provide meaningful input in addressing the issues and concerns raised during the scoping, a detailed assessment of the alternatives, a detailed impact assessment and recommendation of mitigation measures by both the specialist and the EAP. Further the EIA phase shall ensure that the Public participation process is undertaken in accordance with the requirement of the Act. All issues raised shall be addressed in the Issues and Response Report.

Consideration of alternatives is considered to be a key requirement for any EIA process accordingly the proposed project considered four alternatives as well as the no-go alternative. The consideration of alternatives considered technical, economic and environmental feasibility. The various alternatives were identified during the Scoping wherein somewhere dismissed. The EIA phase considered and comprehensively assessed the alternatives including those suggested by the I&APs during the PPP and the preferred alternative was selected based on a synthesis of the technical and environmental factors as well as input from the specialist studies that were undertaken. The route and no-go alternatives are comprehensively discussed and highlighted in this EIA report. Further the advantages and disadvantages of each alternative is also included which culminates to the selection of the preferred.

This report includes a detailed impact assessment of aspects that were identified as key during the Scoping phase and includes issues that the EAP deems to be significant in project of this nature based on previous experience. The impacts identified were similar for all the four routes. Consultation with the I&APs contributed significantly in the identification of issues related to the proposed project and this includes:

- Visual Impact
- Impact on Biodiversity
- Impact on Ecotourism
- Impact on Heritage Resources
- Impact on Avifauna
- Impact on Agriculture and soils
- Impact on land use

- Impact on the social environment
- Impact on air quality
- Impact on safety and security
- Impact on Surface and Ground water
- Noise impact

With the proposed mitigation measures all impacts rated medium will be low while the high impact will be reduced to medium or low.

The study concluded that the construction of the proposed 131km 275km powerline along the existing line which is Alternative 1 is the preferred option. Impacts on the environment, sensitivity of the area as well as issues raised by the affected parties were considered.

The EAP has taken consideration of the issues raised which have been discussed thoroughly in the report and considerations have further been made of the proposed alternative route highlighted in the Eco tourism study. It has become apparent that the Northern part of the proposed routes is predominantly game farm which attracts tourist across the globe, therefore moving the line east or west will impact those in proximity the same way which will unnecessarily delay the project. Consequently it is recommended that sensitive areas within the 3km buffer be avoided as far as practically possible and more localised adjustments be made to accommodate local conditions

Generally the nature and scale of the negative impacts are relatively small in comparison to the scale of the entire project and the benefits to be delivered by the project.

TABLE OF CONTENTS

1.	Introduction	6
2.	Details of Environmental assessment practitioners (eap).....	6
3.	DESCRIPTION OF THE PROPOSED ACTIVITY	8
3.1.	Background.....	8
3.2.	Proposed scope of work	9
3.3.	Activities associated with the project	9
3.3.1.	Corridor walk-down:.....	10
3.3.2.	Construction Camps	10
3.3.3.	Ground Clearance.....	10
3.3.4.	Pylon footings	10
3.3.5.	Steelwork structures.....	10
3.3.6.	Stringing.....	11
3.3.7.	Other Infrastructure	11
3.3.8.	Site Reinstatement	11
3.4.	Operational Phase	11
4.	LEGAL REQUIREMENTS	12
5.	DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY	21
5.1.	Local Authority	22
5.2.	Land Uses.....	23
5.2.1.	Mining and Industrial.....	23
5.2.2.	Farming.....	23
5.2.3.	Residential	24
5.2.4.	Agriculture	25
5.2.5.	Tourism.....	25
5.2.6.	Sensitive Environments	25
5.3.	Surface Infrastructure.....	26
5.3.1.	Roads	26
5.3.2.	Power lines	27
5.3.3.	Airports.....	27
5.4.	Photos of the Site	27
6.	DESCRIPTION OF THE NEED AND DESIRABILITY OF THE PROJECT	27
6.1.	Benefits of the project.....	28
6.1.1.	For organs of state:.....	28
6.1.2.	For individuals and communities:.....	28
6.1.3.	Supporting Strategies	29

7.	DESCRIPTION OF ENVIRONMENT THAT MAY BE AFFECTED.....	29
7.1.	Geology.....	29
7.2.	Climate.....	30
7.3.	Topography.....	31
7.4.	Soil	32
7.5.	Flora.....	33
7.6.	Fauna	36
7.7.	Avifauna.....	37
7.8.	Surface Water.....	38
7.9.	Sites of Archaeological and Cultural Significance.....	39
7.10.	Visual Aspects	40
7.11.	Regional and socio economic structure	40
8.	DETAILS OF THE PUBLIC PARTICIPATION PROCESS CONDUCTED.....	41
9.	DESCRIPTION OF THE IDENTIFIED ALTERNATIVES TO THE PROPOSED ACTIVITY (INCL. ADVANTAGES AND DISADVANTAGES).....	43
9.1.	Technical Alternative.....	43
9.2.	Structural Alternatives.....	44
9.3.	Route Alternatives.....	45
9.3.1.	Alternative 1 (Green Route)	45
9.3.2.	Alternative 2 (Blue Route)	45
9.3.3.	Alternative 3 (Pink Route)	46
9.3.4.	Alternative 4 (Yellow Route).....	46
9.3.5.	No-Go Alternative.....	46
10.	METHODOLOGY.....	47
11.	DESCRIPTION AND COMPARATIVE ASSESSMENT OF ALL ALTERNATIVES IDENTIFIED DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS	49
11.1.	Comparative assessment.....	52
11.2.	Preferred route.....	54
11.3.	No-Go.....	54
12.	A SUMMARY OF FINDINGS AND RECOMMENDATION OF ANY SPECIALIST REPORT	55
12.1.	Ecological specialist	56
12.2.	Visual impact assessment.....	57
12.3.	Avifaunal.....	59
12.4.	Heritage	60
12.5.	Agricultural Specialist	60
12.6.	Social Impact Assessment.....	61
12.7.	Eco-Tourism.....	63

13.	DESCRIPTION OF THE ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS IDENTIFIED	65
14.	AN ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT.....	71
14.1.	Impacts that are likely to result from the Planning and Design	71
14.1.1.	Employment Creation.....	71
14.2.	Construction Phase Impacts	73
14.2.1.	Change in land use.....	73
14.2.2.	Impact on Biodiversity.....	73
14.2.3.	Fauna (Avifauna).....	74
14.2.4.	Soils and erosion.....	75
14.2.5.	Impact on Traffic.....	76
14.2.6.	Air pollution	77
14.2.7.	Surface and groundwater pollution	78
14.2.8.	Waste Management	78
14.2.9.	Noise pollution	79
14.2.10.	Safety and security	80
14.2.11.	Fire hazards.....	81
14.2.12.	Visual Impact	82
14.2.13.	Job creation	84
14.2.14.	Influx of job seekers.....	84
14.2.15.	Resettlement	86
14.2.16.	Impact on Agriculture.....	87
14.3.	Operational Phase Impacts.....	88
14.3.1.	Bird collision, electrocutions and Faulting	88
14.3.2.	Visual Impact	88
14.3.3.	Economic	89
14.3.4.	Employment creation	90
14.4.	Decommissioning Phase Impacts	91
14.4.1.	Dust generation	92
14.4.2.	Loss of flora.....	92
14.4.3.	Surface and Groundwater Pollution.....	93
14.4.4.	Soil Erosion	93
15.	DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE	95
15.1.	Assumptions	95
15.2.	Limitations	95
15.2.1.	Public participation process	95
15.2.2.	Literature reviewed is viewed as correct	95
15.2.3.	Heritage	95

15.2.4. Ecology.....	95
15.2.5. Socioeconomic.....	96
16. a reasoned opinion as to whether the activity should or should not continue	96
17. ENVIRONMENTAL IMPACT STATEMENT.....	97
17.1. PLANNING AND DEVELOPMENT PHASE	98
17.2. CONSTRUCTION PHASE	98
17.3. OPERATIONAL PHASE	98
17.4. DECOMMISSIONING PHASE	99
18. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAM	99
19. CONCLUSION AND RECOMMENDATIONS	99

TABLE OF FIGURES

Figure 1: Locality Map	22
Figure 2: Kruger to Canyon Biosphere.....	26
Figure 3: Geological Map of the Study area	30
Figure 4: Topographical Map of the Study area.....	32
Figure 5: Topographical Map of Study Area	32
Figure 6: Soil Map of the Study Area.....	33
Figure 7: Vegetation Types along the Routes.....	35
Figure 8: Areas of sensitive fauna	38
Figure 9: The hydrology along the routes	39
Figure 10: Cross Rope Figure 11: Self supporting tower.....	44
Figure 12: Narrow base tower.....	45
Figure 13: Map indicating recommendation by I&AP	64

TABLES

Table 1: Details of the EAP	7
Table 2 Legislation pertaining to the proposed project.....	12
Table 3: Listed Activities	16
Table 4: List of Residential Areas along the Study Area	24
Table 5: Primary Vegetation Types.....	34
Table 6: Alternative Analysis	43
Table 7: Route Alternative Analysis.....	47
Table 8: Impact Prediction Methodology.....	48
Table 9: Comparative assessment of alternatives.....	52
Table 10	55
Table 11: Environmental Issues and potential impacts identified:	65

GLOSSARY OF TERMS AND ACRONYMS

DEA	Department of Environmental Affairs and Tourism
DEDET	Department of Economic Development Environment and Tourism
DWA	Department of Water Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EIMP	Environmental Impact Management Plan
EIR	Environmental Impact Report
ESKOM	Eskom Holdings SOC Limited
GPS	Global Positioning System
HIA	Heritage Impact Assessment
IAPs	Interested and Affected Parties
IEM	Integrated Environmental Management Process
IRR	Issues Response Report
K2C	Kruger to Canyon
KV	kilo Volts
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998)
PPP	Public Participation Process
ROD	Record of Decision
SAHRA	South African Heritage Resources Agency
SIA	Social Impact Assessment
VIA	Visual Impact Assessment

1. INTRODUCTION

Eskom proposes to construct the Foskop- Merensky 275kV approximately 131km power line and associated substation works. In accordance with the requirements of the National Environmental Management Act (Act 107 of 1998) (NEMA) and associated regulations Eskom is in the process of applying for Environmental Authorisation (EA) from the competent authority for the proposed project through the undertaking of an Environmental Impact Assessment (EIA) as prescribed in Chapter 3 of GNR 543 of the EIA regulations, 2010.

The proposed activity is a listed activity under GN R. 545 of the EIA Regulations, 2010, Activity No.8 i.e.: *The construction of facilities or infrastructure for the transmission and distribution of the electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex*; it also triggers associated listings under GNR544 and GNR. 546 included in the application. This listing dictates that a full EIA be undertaken, which includes the Scoping and the Impact Assessment phases with full consultation with the commenting authorities and Interested and Affected Parties (I&AP).

This report forms part of the EIA process that aims to provide the relevant authority, which in this case is the Department of Environmental Affairs (DEA) with information regarding the proposed project and its potential impacts on the environment. The report details the baseline information which will form the backdrop on which the assessment of potential impacts on the environment has been based. The report correspondingly assesses the impacts identified during the scoping phase as well as the specialist input to ensure that relevant information is provided and propose mitigation measures.

The applicant for this specific project is Eskom Holdings SOC Limited (hereafter referred to as Eskom), the decision-maker is the DEA and the independent Environmental Assessment Practitioner (EAP) is Nsovo Environmental Consulting (hereafter referred as Nsovo). I&APs are individuals or groups who are concerned with or who may be affected by the project and its consequences; these include government and municipal authorities, local residents, community groups and the general public.

2. DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONERS (EAP)

Nsovo Environmental Consulting was appointed by Eskom to be the independent Environmental Assessment Practitioner EAP for the proposed project. Below are the details of the EAP responsible for the project as well as their qualifications and related expertise.

Nsovo is conversant with the definition of an Environmental Assessment Practitioner (EAP) as defined in regulation 17 of the EIA regulations promulgated in June 2010 in terms of the National Environmental Management Act ([NEMA] No 107 of 1998) which became effective on 2 August 2010. This includes, inter alias, the requirement that Nsovo is:

- Objective and Independent;
- Has expertise in conducting EIA's;
- Takes into account all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

Table 1: Details of the EAP

Name of Company	Nsovo Environmental Consulting
Person Responsible	Munyadziwa Rikhotso
Postal Address	P/Bag x29, Postnet Suite 696 Gallo Manor 2052
Telephone Number	C: 071 602 2369 T: 0113129984
Fax Number	086 602 8821
Email	munyadzi@nsovo.co.za
Qualifications & Experience	BSc Honours in Environmental Management obtained from University of Johannesburg in 2004 BSc in Geography and Archaeology obtained from Wits University in 2003 Certificate in Project Management obtained From UNISA in 2007 9 years of experience
CV	Please find World bank CV attached
Project Related Expertise	In terms of project related expertise the EAP has completed the following projects: <ul style="list-style-type: none"> • EIA for the Wildebess Substation and loop in lines • EIA for the proposed Westgate DS 132Kv Randfontein Strategic Servitude • Basic Assessment for Simmerpan Strengthening • EIA for the proposed Wildebees infeed Station and associated power lines. • Basic Assessment for Marula Substation

- Basic Assessment for Craighall Benmore 88kv Cable

3. DESCRIPTION OF THE PROPOSED ACTIVITY

3.1. BACKGROUND

Foskor Main Transmission Substation (MTS) forms part of the Lowveld Customer Load Network (CLN) in the Northern Grid. The Lowveld CLN consists of industrial, residential and mining. Foskor and Acornhoek MTS interconnects directly with the North East grid via three 275kV lines, i.e. 1x Merensky-Foskor and 2x Marathon-Acornhoek. Acornhoek MTS is supplied from the Mpumalanga Generation Pool through 2x Marathon-Acornhoek 97km 132kV lines. Acornhoek is interconnected to Foskor MTS at 275kV level by a single 67km line and at 132kV level by 3x 67km lines, two direct and one indirectly through Mirage Distribution substation.

Currently, the Lowveld North CLN connects with the North East Grid through three 275kV lines, i.e. 1 x 129km Merensky-Foskor and 2x 97km Marathon-Acornhoek. Foskor MTS consists of 2 x 250MVA 275/132kV and a single 20MVA 132/22kV transformers. The Foskor MTS is supplied from Acornhoek and Merensky MTS through two single 275kV lines. On the 132kV level, Foskor is linked directly to Acornhoek MTS through 2x Foskor-Acornhoek 132kV "Wolf" lines and via Mirage Distribution substation through a single 132kV line. Foskor 132kV load is predominantly mining and traction. At 132kV level Foskor supplies Foskor Turling Transfer Pumps (TTPS), Gravelotte, Chermie, Foskor Extension 8, Palmin 1 and 2 and PMC. At the 22kV level Foskor supplies Kruger Park 1, Mica and Waterboard. The Acornhoek MTS consists of 2x 75MVA 275/132kV and 2 x 40MVA 132/22kV transformers. It is supplied by three 275kV lines, one from Foskor and two from Marathon MTS. At the 132kV level it supplies Klasserie, Acornhoek traction, Tintswalo Champagne, Blydrevier, Timbavati, Mariepskop, Nwarele and Boulders.

The Foskor 2x 250MVA 275/132kV transformation is laden to its firm level of 250MVA and will not be able to accommodate the forecasted load growth. . The existing Foskor- Merensky 275kV line contingency causes under voltages at the Foskor and Acornhoek substations, which will worsen in the coming years and deteriorate to voltage collapse as more load connect to the network.

Consequently Eskom plans to strengthen the existing network by constructing a second Foskor- Merensky 275kV approximately 130 kilometer (km) power line and associated substation works. The proposed

project offers a solution that will add and strengthen the current supply to cater for current and future developments.

3.2. PROPOSED SCOPE OF WORK

The proposed scope of work comprises a 3rd Foskor 275/132kV transformer, replacing the Acornhoek 2x 75MVA 275/132kV transformers with 2 x 125MVA transformers as well as a 2nd Merensky-Foskor 275kV line. The proposal entails:

Foskor MTS

- Extend the 275kV busbar 1 & 2 westwards by 4x feeder bays
- Install a 3rd 250MVA 275/132kV transformer ,
- Install and equip 1x 275kV bus section,
- Install and equip 1x 275kV bus coupler,
- Install and equip 1x 275kV feeder bay for the proposed 2nd Merensky-Foskor 275kV line
- Extend the Foskor 132kV busbar westwards by 5x feeder bays to create space for future feeder bays,
- Install and equip 1x 132kV bus section 1,
- Install and equip 1x 132kV bus coupler B
- Commission all new infrastructure

Merensky MTS

- Establish a spare 275kV feeder bay to create space for the proposed 2nd Merensky-Foskor 275kV line
- Install and equip 1x 275kV feeder bay for the proposed 2nd Merensky-Foskor 275kV line
- Acquire the servitude for the proposed 2nd Foskor–Merensky 275kV line,
- Construct the 2nd Foskor–Merensky Kingbird 275kV line
- Equip and commission all new infrastructure with all associated primary and secondary plant equipment
- Upgrade under-rated switchgear at Merensky.

3.3. ACTIVITIES ASSOCIATED WITH THE PROJECT

The construction phase of the proposed project will take up to 18 months and activities will include the following:

3.3.1. Corridor walk-down:

The corridor walk-down will be undertaken prior to construction in order to identify the exact coordinates on which the pylons will be situated and to identify any sensitive areas and create the necessary conservation buffer zones. The central line and footprint of the transmission line and towers will be pegged by a team of surveyors and this process requires that access to properties be negotiated with the relevant property owners, resulting in the first basic track being laid along the route. Through this process fatal flaws to the initial route will be identified which may result in route relocation within the 3km buffer.

3.3.2. Construction Camps

A project of this nature and magnitude requires construction camps, which may entail laydown areas, as well as accommodation for the workforce. Given the nature and sensitivity of the surrounding environment, the proposed project will only entail the construction of laydown areas and this will be negotiated accordingly with the landowners utilizing the existing Eskom negotiation processes. Further, the laydown areas will be established in accordance with Eskom Transmission's standard for construction camps whilst the construction workforce will be housed in local B&Bs and lodging facilities to eliminate social risks and ills associated with projects of this nature.

3.3.3. Ground Clearance

The proposed 275Kv power line requires a forty seven (47) meter servitude. During construction vegetation will be cleared within the footprint of the construction area to allow for construction activities. Ground clearance will however continue as and when necessary as part of Eskom's servitude maintenance which should be done according to Eskom's standard as well as best practices.

3.3.4. Pylon footings

Civil works entails the setting out and construction of the concrete plinth to support the electrical apparatus that will be installed. Foundations will be laid for the footings of the pylons. Excavation for tower and anchor foundations are made by drilling-rig, and foundations are filled with concrete to form a concrete plinth on which to fix the towers. The size of the foundations varies depending on variables such as the type of tower and soil conditions. This work is usually undertaken by teams of between 10 and 15 people operating equipment such as drilling rigs and generators.

Insert Pics

3.3.5. Steelwork structures

The assembly of the steel structures commences shortly after the concrete has dried up. Steel will be delivered to the construction site by road and if the area is inaccessible (especially on steep mountain

slopes) delivery will be by helicopter and the segments of the pylon will be assembled on site. Access roads will be clearly marked to facilitate access to and between towers. Two tower design alternatives have been proposed for this project, the cross-rope suspension type and the self-supporting type. The selection of tower designs depends on topographical conditions. Where the line crosses mountainous terrains and when it changes direction at an angle, the preferred option is self-supporting towers. In areas where space is a limiting factor, narrow base towers may be utilised as depicted below.

3.3.6. Stringing

Stringing is the final stage of the construction process. The first phase of this process is the delivery of cable and equipment to site by road; following which, cable drums, are placed roughly 5 km apart and a winch will be positioned between the cable drums. The cable is positioned by hoisting the cable onto the pylons through a pulley system. In mountainous areas as is the case with this project, the pilot cables may be flown in by helicopter or shot across valleys. The line is generally strung in sections usually from bend to bend. In the final steps of the process correct tension is created and conductors are then clamped on the towers and any excess cable is cut off.

3.3.7. Other Infrastructure

Other infrastructure includes feeder bays which will be erected in the existing footprint of the Foskor and Merensky Substations in Phalaborwa and Steelpoort respectively. Underrated switchgear at Merensky Substation will be upgraded. A capacitor bank will be installed at Foskor Substation and Foskor Substation is to be extended. The Acornhoek-Foskor terminal tower will be relocated as well as the existing oil holding dam in both cases to accommodate the new power line.

3.3.8. Site Reinstatement

Following completion of each of the construction stages described above, site reinstatement and rehabilitation will take place as follows:

- Removal of excess building material, and waste;
- Repairing any damaged caused as part of the construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads and
- Replacing topsoil and re-vegetating as recommended.

3.4. OPERATIONAL PHASE

The transmission lines will be in operation immediately after completion of the construction activities and will remain operational. Subsequent maintenance and refurbishment would normally occur during the operational lifetime of the power line which would necessitate the utilisation of access roads that will be created along the servitude of the transmission power line. The new transmission line will ease the

pressure on the current system, where it is not possible to connect additional loads onto the existing 275 kV transmission lines as a result of a great demand of electricity within this region.

During the operational phase of the project general farming activities, such as the grazing of animals and the cultivation of crops, may continue within the servitude. However, the servitude will need to be kept clear of any vegetation, structures or activities that may interfere with the line. Eskom will also require access to the servitude in order to undertake maintenance and perform any necessary repair work.

4. LEGAL REQUIREMENTS

Documented in the subsequent section is a list of the current South African environmental legislation that is considered to be relevant to the construction and operation of the proposed power line and associated substation works. A description of legislation relevant to the project is summarized in the Table 2 below.

The Environmental Impact Assessment (EIA) process followed is in compliance with the National Environmental Management Act (Act 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations of 2010 (Government Notices No R543, R544 R546 and R546 of 18 June 2010). The proposed development involves 'listed activities', as defined by the Act, these activities are activities that may potentially have detrimental impacts on the environment and therefore require environmental authorization from the relevant authority. The proposed development occurs within Limpopo and thus the provincial authority is (Limpopo Economic Development, Environment and Tourism) LEDET, while the Department of Environmental Affairs (DEA) is the decision making authority due to the nature of the project.

This list is not intended as an exhaustive analysis of the applicable environmental legislation but provides a guideline to the relevant aspects of each Act.

Table 2 Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	National Environmental Management: Act, 1998 (Act No. 107 of 1998)	The overarching principles of sound environmental responsibility are reflected in the National Environmental Management Act (NEMA). The principles set out in the National Environmental Management Act (Act No. 107 of 1998), hereafter referred to as NEMA, applies to all listed projects.

Aspect	Relevant Legislation	Brief Description
		<p>Construction and operation have to be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors. The associated listed activities are outlined in the Table 3 below.</p>
Biodiversity	<p>National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)</p>	<p>The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed. The diversity of ecological processes for the application sites was determined through the specialist studies conducted by Eco-agent. The specialist studies has identified sensitive areas within the study area that may need to be avoided and further proposed mitigation measures in which the biodiversity on site is to be managed.</p>
Protected Areas	<p>National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)</p>	<p>The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes. The diversity of ecological processes was determined throughout the study. This Act will be read together with relevant policies and management plans.</p> <p>It was noted that the project area is dominated by conserved environments including game farms and other area of heritage, culture and recreational interests. The selection of the routes will attempt to avoid critically sensitive sites within the protected areas.</p>
Heritage Resources	National Heritage	The Act legislates the necessity for cultural and

Aspect	Relevant Legislation	Brief Description
	Resources Act, 1999 (Act No. 25 of 1999)	heritage impact assessments in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA). The sensitive nature of the projects warrants that a Heritage Assessment be conducted. Mr Jaco van der Walt, a specialist from Heritage Contracts was appointed to conduct the Heritage Impact Assessment for the project. His report forms part of the EIA report.
Air quality management and control	Atmospheric Pollution Prevention Act (Act 45 of 1965) National Environmental Management: Air Quality Act 39 of 2004	<p>The object of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air and to prevent pollution of air and ecological degradation.</p> <p>Part 6 of the Act makes provision for measures to control dust, noise and offensive odors.</p> <p>The assessment of impacts relating to air quality control and management, where appropriate, will form part of the environmental impact assessment report and environmental management plan. The Proposed Area has not been declared as a dust control area in terms of section 27 of the APPA. The proposed project may create minimal dust during excavations which is expected to be short term and site specific.</p>
Noise Management and Control	Noise Control Regulations in terms of the Environmental Conservation Act 73 of 1989	The assessment of impacts relating to noise pollution management and control, where appropriate, forms part of the environmental impact assessment report and environmental management plan. Applicable laws regarding noise management and control refers to the national noise control regulations issued in terms of the Environment Conservation Act 73 of 1989.

Aspect	Relevant Legislation	Brief Description
		<p>The inhibition of sites by contractors may generally increase the ambient noise levels in the area and this is expected to vary along the route. Additional noise may be expected from the increased heavy duty traffic as well as construction equipment.</p>
Water	National Water Act 36 of 1998	<p>This Act provides for fundamental reform of laws relating to water resources and use. The preamble to the Act recognizes that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users. The proposed project will cross rivers and riparian area and could potentially impact on water resources therefore compliance with the requirements of the National Water Act will be significant. Such compliance will entail obtaining the relevant licenses.</p>
Agricultural Resources	Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)	<p>The Act aims to provide for control over the utilization of natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act. The study area consists of areas of high agricultural potential, of which the economy is highly dependent on. The assessment of the impact on agriculture forms part of the EIR. An agricultural specialist was appointed to provide input and the findings form part of this report.</p>
Human	The Constitution of South Africa, 1996 (Act No. 108 of 1996)	<p>The Constitution of South Africa Act No. 108 of 1996 provides for an environmental right (contained in the Bill of Rights, Chapter 2). In terms of Section 7, the</p>

Aspect	Relevant Legislation	Brief Description
		<p>state has an obligation to respect, promote and fulfill the rights as defined in the Bill of Rights. The environmental right states that:</p> <p>“Everyone has the right -</p> <p>a) To an environment that is not harmful to their health or well-being; and</p> <p>b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -</p> <ul style="list-style-type: none"> • Prevent pollution and ecological degradation; • Promote conservation; and • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.” <p>The undertaking of the EIA is in line with the state’s obligations as outlined in the constitution in its effort to ensure sustainability.</p>

The Associated Listed activities are outline in Table 3 below:

Table 3: Listed Activities

Number and Date of relevant Notice	Activity Number	Description of activity as per project description
GNR 545 (Listing Notice 2) of 18 th June 2010	8	<p>The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275kilovolts or more outside an urban area or industrial complex.</p> <p><i>The proposed project entails the construction of a 275Kv power line outside an urban area.</i></p>
GNR 544 (Listing Notice 1) of 18 th June 2010	10	<p>The construction of facilities or infrastructure for the transmission and distribution of electricity:</p> <p>(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.</p>

		The proposed project entails the construction of a 275Kv power line outside an urban area.
	22	The construction of a road, outside urban areas, With a reserve wider than 13.5 meters or Where no reserve exists where the road is wider than 8 meters.
	24	The transformation of land bigger than 1000 square meters in size, to residential, retail, commercial, industrial or institutional use, where at the time of coming into effect of this schedule such land was zoned open space, conservation or had an equivalent zoning. <i>The proposed 131km power line with will transect various properties that are zoned as open space conservation.</i>
	26	Any process or activity identified in terms of section 53(1) if the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
	38	The expansion of facilities for the transformation and distribution of electricity where the expanded capacity will exceed 275kV and the development footprint will increase.
	47	The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275kV or more, outside an urban area or industrial complex.
GNR 546 of 18 th June 2010	4	The construction of a road wider than 4 meters with a reserve less than 13.5 meters In Eastern Cape, Free State , Kwazulu Natal, Limpopo , Mpumalanga and Northern Cape provinces: (ii)Outside urban areas in: (aa) A protected area identified in terms of NEMPAA excluding conservancies (bb) National Protected Area Expansion Strategy Focus areas (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;

		<p>(dd) Sites or areas identified in terms of the International Convention;</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(ff) Core areas in biosphere reserves;</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5kilometers from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve;</p> <p>In urban areas:</p> <p>(aa) Areas zoned as public open space</p>
	12	<p>The clearance of an area of 300 square meters or more of vegetation where 75% or more of the vegetation cover constitute indigenous vegetation</p> <p>Within a critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004</p> <p>Within critical biodiversity areas identified in bioregional plans</p>
	19	<p>The widening of a road by more than 4 meters, or lengthening by more than 1km</p> <p>In the Eastern Cape, Free State, Kwazulu Natal, Limpopo, Mpumalanga and Northern Cape provinces.</p> <p>(ii) Outside urban area in:</p> <p>(aa) A protected Area identified in terms of NEMPAA, excluding conservancies</p> <p>(bb) National Protected Area Expansion Strategy Focus areas</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority</p> <p>(dd) Sites or areas identified in terms of an International Convention</p>

		<p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</p> <p>(ff) Core areas in biosphere reserves</p> <p>(gg) Areas within 10 kilometres from the national parks or world heritage sites or 5 kilometres from any other protected areas identified in terms of NEMPAA or from the core area of a biosphere reserve.</p> <p>(ii) Areas on the watercourse side of the development setback line or within 100 meters from the edge of a water course where no such setbacks line has been determined</p> <p>Inside urban areas</p> <p>(aa) areas zoned as public open space</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.</p>
--	--	--

These Acts will be read together with the Local and Provincial Government Planning and Developmental policies, the Environmental Management Framework, the Provincial State of the Environment Report as well as other associated documents that bear relevance to the proposed project. It is generally understood that all documents listed borrow from the same principles as outlined by the National Environmental Management Principles as described in the LEDET Environmental Management Plan: Kruger to Canyon Biosphere.

The National Environmental Management Principles apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably. Development must be socially, environmentally and economically sustainable.

Sustainable development requires the consideration of all relevant factors including the following:

- That the disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- that pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied;
- that the disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or where it cannot be altogether avoided, is minimised and remedied;

- that waste is avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner;
- that the use and exploitation of non-renewable natural resources is responsible and equitable, and takes into account the consequences of the depletion of the resource;
- that the development, use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised;
- that a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and
- that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied.

Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option.

Environmental justice must be pursued so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons.

Equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being must be pursued and special measures may be taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination.

The participation of all interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.

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 Provincial Management Plan (K2C) identifies environmental control zones whose purpose is to identify areas of similar environmental values, determine the preferred land use, or rather those land uses that should not be considered for that zone, and finally, to provide guidelines to evaluate development proposals within that zone.

The Environmental Control Zones are based on environmental sensitivity on the one hand, and on the other, the views of stakeholders that were consulted during the public participation process. The report further identifies control zones and guidelines that provide guidance for developers during the planning and design phases of their proposed developments by identifying areas of potential conflict between development proposals and critical/sensitive environments and stipulates the extent of environmental assessment that would be required for specific application. The core zones identified includes:

- Critically Sensitive Environments (confirmed red data habitats, slopes steeper than 1:4, land within the flood line, confirmed danger of sinkholes, areas of cultural or archaeological significance)
- Highly Sensitive Environments (areas with northern mist belt forests, northern escarpment dolomite, grassland, Tzaneen sour bushveld, suspected red data habitats, dolomitic areas with suspected danger of sinkholes, areas with suspected areas of cultural, or archaeological significance); and
- Non Sensitive Environments

5. DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY

The proposed 275kV Foskor Merensky power line stretches a distance of approximately 130 kilometres across various farms between Phalaborwa and Steelpoort in the jurisdiction of Greater Sekhukhune, Capricorn and Mopani District municipalities in the Limpopo Province of South Africa.

The proposed power lines corridors will transverse various farms, predominantly game farms that are privately owned as well as tribal authorities and council-owned land. The details of the properties on which the proposed activity is to be undertaken is attached as Annexure B8 which includes details of game farms, tribal authorities and municipalities.

Four proposed alternatives of 3km wide corridors traverses the following towns: The proposed alternatives transverse the following towns:

- Class 1 town - Phalaborwa and Hoedspruit
- Class 2 towns – Gamarota, Burgersfort, Orighstad and Steelpoort
- Class 3 towns – Diphuti, Finale, Mica, Kromkloof and Brandraai

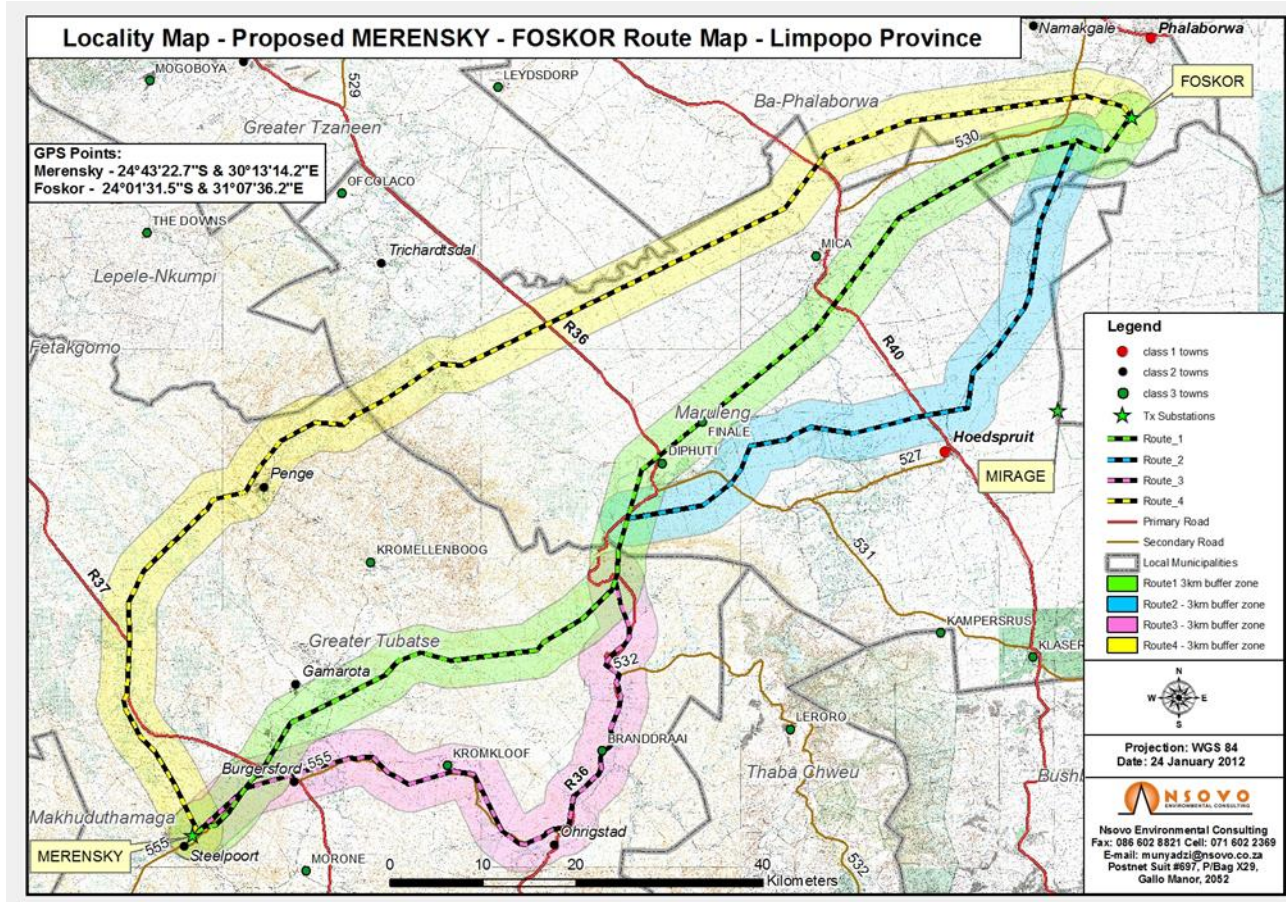


Figure 1: Locality Map

5.1. LOCAL AUTHORITY

The proposed development falls within the jurisdiction of various municipalities in the Limpopo Province and this includes:

- Ba-Phalaborwa Local Municipality
- Maruleng Local Municipality
- Greater Tubatse Local Municipality
- Lepelle Nkumpi Local Municipality
- Fetakgomo Local Municipality

The above listed municipalities are located within three main district municipalities namely:

- Sekhukhune
- Capricorn
- Mopani
- Surrounding Land Uses

5.2. LAND USES

The locality of the proposed project is vast and dynamic with various land uses which includes:

5.2.1. Mining and Industrial

Substantial mineral reserves include platinum group metals, diamonds, coal, chrome, iron ore and copper are found within the study area. Major international mining operations take place in the region especially around Phalaborwa with smaller mining operations around Mica and Gravelote. Mica is a very small Node within the Maruleng Local Municipality, however it is the center of Maruleng's fledgling mining center.

The region also offers a number of excellent manufacturing opportunities including

- Tanning;
- fruit, vegetable and meat processing;
- brick, jewellery and furniture making, and industrial chemicals; and
- light to medium engineering.

5.2.2. Farming

The proposed project transverses farm of various scales and purposes including game, crops, livestock, and lodging facilities. The region between the Orpen road and the Olifants and Selati Rivers predominantly consists of private nature reserves which have become part of the greater Kruger National Park. The latter includes the Sabi Sand Game Reserve and the so-called Associated Private Nature Reserves (APNR) - Timbavati Private Nature Reserve, Umbabat Private Nature Reserve, Klaserie Private Nature Reserve and the Balule Nature Reserve which was amalgamated into the APNR in 2005.

Consulted stakeholders and I&APs frequently point to the very obvious fact that Kruger, of which they maintain they are a part of, is the premier or flagship park in South Africa, which places certain obligations on this park towards the management of biodiversity and ecotourism. It is in many senses the pride and joy of an increasing percentage of South Africans, and tends to attract ongoing, often intense, interest by holidaying or concerned citizens, and from civil society. Kruger and adjacent farms have a certain value as a source of organisms for restocking other protected areas. Apart from its biodiversity value, it has cultural resource conservation obligations due to the presence of important archaeological relics.

The EIA process pre-identified farm owners during the scoping phase while others registered as I&APs in response to SANParks notice as directed by the EAP. Others were informed through word of mouth during the different phases of the project; however, they all had similar concerns with regards to their properties and potential impact anticipated from the proposed project.

5.2.3. Residential

The proposed line stretches across small towns and villages that are used for residential purposes as indicated in the Table below.

Table 4: List of Residential Areas along the Study Area

Town	Villages/Suburbs	General description
Phalaborwa	Phalaborwa	The residential settlement is located on the western side of the proposed power line
Maruleng	Finale Diphuti Die Oaks	The two villages are tribal owned and are located on the north eastern side of the proposed power line.
Greater Tubastse	Ga-Marota Ga Moraba Makgwareng	The three villages are under tribal authorities and are located on the south western side.
Burgersfort	Lebohang Monareng Ga-Sepaka	There are various villages that the line transverses in the Burgersfort area and are under tribal authorities.
Orighstad	Orighstad Town	The line transverses privately owned game farms.
Hoedspruit	Hoedspruit Town	The line transverses privately owned game farms.

Other land uses associated with residential includes schools, hospital facilities, cemeteries and shopping facilities. The proposed land uses include industries and other commercial properties that were also identified.

Stakeholders indicated that there are plans for residential developments in Burgersfort; which include the proposed Burgersfort X61 and Khumula Estate. The exact locality of the proposed developments have been assessed and determined during the EIA. Other proposed land uses within the study area include industrial operations such as the proposed premix plant on Farm Fraaiuitzitch 302 K-T Ptn 9. Alternative route 3 significantly impacts on these developments as indicated on the maps attached as Appendix A.

It is expected that the proposed line will impact on the various levels of significance on the identified land uses, however, effort will be made to avoid where possible such sites and sensitivities by the identification of less sensitive areas within the 3km buffer during the approved corridor walk down.

5.2.4. Agriculture

The study area is one of South-Africa's richest agricultural areas. Agriculture is one of the prevailing economic activities in terms of employment and land use in the region. Abundant orchards of subtropical fruit and nuts form the basis of a thriving agri-industrial sector. Large-scale commercial agriculture exists mainly in citrus, mangoes and vegetables for the export market. In the rural settlements, agriculture remains largely at subsistence or small-scale food-production level.

5.2.5. Tourism

The region offers a great variety of scenic contrasts with abundant wildlife, wide open spaces, and a portion of the Kruger National Park has the potential and has proven to be a major tourist destination in the region. The region is home to one of the largest concentration of exclusive private game lodges in the country. This is an area where tourism and agricultural activities overlap, resulting in increased returns on investment.

The stretch between Phalaborwa and Steelpoort (which is part of the proposed route) is scenic and thus considered a tourist destination, consequently various lodges and guesthouses were noted in the area. The scenic areas and natural phenomenon attracting tourism in the area includes among others:

- Game Reserves
- Bourkes Luck Potholes
- Prominent Rock Outcrop
- Blyderiver Canyon
- Majestic Drakensberg Mountains
- Waterfalls.

5.2.6. Sensitive Environments

The South eastern part of the proposed routes comprises of sensitive sites including Heritage sites and important bird habitat as well as sensitive flora. The proposed alternatives furthermore transverses river sensitive zones. Sensitive fauna in the area include the existence of the Cape Vultures particularly in the South Eastern part of the proposed alternatives.

Other known sensitive environments as highlighted by the K2C Biosphere and indicated in the Map below includes confirmed red data habitats, slopes steeper than 1:4, land within the flood line, confirmed danger of sinkholes, areas of cultural or archaeological significance as well as dolomite areas. These are areas that should be avoided as far as practically possible.

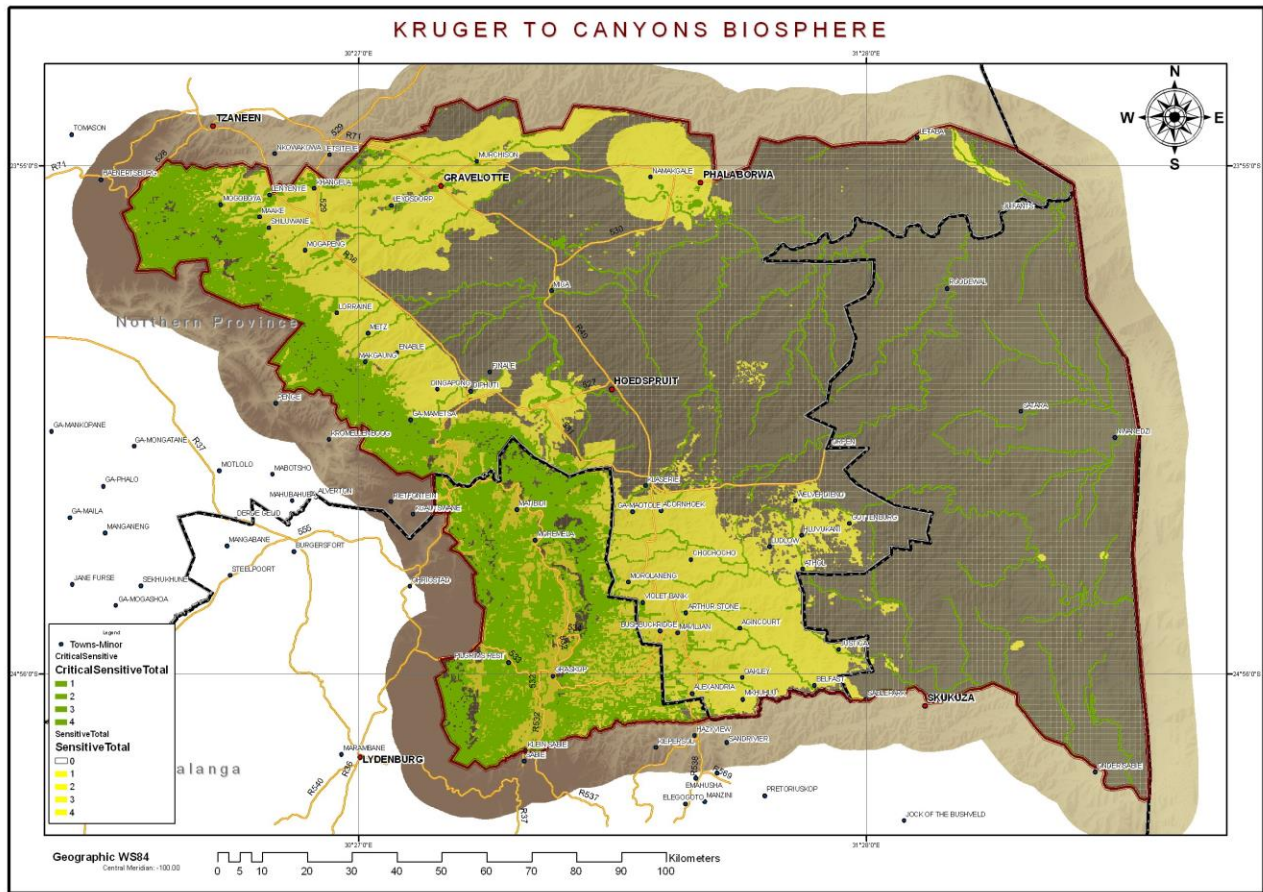


Figure 2: Kruger to Canyon Biosphere

5.3. SURFACE INFRASTRUCTURE

5.3.1. Roads

The primary roads that exist in close proximity to the proposed routes are the R71 to Phalaborwa, R40 to Hoedspruit and R36 to Orighstad which form the access backbone to the study area. The secondary roads include the R530, R531, R532, R536 and R555 linking class 2 towns; these roads provide access to the rural areas conservation and farms through which the proposed line will pass.

The proposed power line routes are accessible through the secondary and primary roads except for the area between Diphuti and Orighstad which is highly mountainous. It is envisaged that the routes that are currently used for maintenance of the existing line will be used for the construction phase of the proposed line and access may further need to be constructed where there are no existing roads.

Other roads in the area provide linkages between different rural settlements and are generally of a poor standard and are poorly maintained.

5.3.2. Power lines

There are several existing power lines in the study area, including an existing 275kV power line that runs from Foskor to Merensky; parallel to the proposed green alternative. The area already has existing Eskom Lines such as:

- The existing 275kV overhead power lines over a distance of 129km, with a total servitude width of 47m;
- The existing 132kV Eskom overhead power lines; and
- The existing 11/22kV distribution line.

5.3.3. Airports

Several airports and air force base airports and strips are present in the study area. Although some may be non-operational, the airfields must be avoided or relocated where appropriate to ensure utmost safety for the users. Therefore in selecting the appropriate alternative, effort was made to ensure the power line corridor avoid operational and registered airfields where possible. The airports noted within the study area are as follows:

- Phalaborwa Airport, located in Phalaborwa. The airport is currently operational and has 1 runway, which is 4491 feet (1369 meters) long.
- Burgersfort Airport, located in Greater Tubatse.
- East Gate Airport is a regional airport located outside Hoedspruit. The airport serves mainly the international tourist market, with connecting flights to and from Oliver Tambo International Airport Johannesburg
- Hoedspruit Air force Base Airport in Hoedspruit town along the R41 and located within the Gwala-Gwala Nature Reserve.
- Private air strips within the farms.

5.4. PHOTOS OF THE SITE

Photos of the site have been attached as Annexure A.

6. DESCRIPTION OF THE NEED AND DESIRABILITY OF THE PROJECT

As part of the long term solution, Eskom have undertaken a series of projects to upgrade the existing electricity infrastructure and to construct new infrastructure where there is a need in the country, of which the proposed project forms part of the new infrastructure that Eskom has planned. The Foskor-Merensky load center is driven by mines and rural development.

The proposed project will ensure the following:

- The power line will form part of the link to strengthen the supply network between Foskop and Merensky substations.
- Improvement in the reliability of electricity supply which will benefit users in the region and country at large.
- Improve the economic and developmental status of the country.

6.1. BENEFITS OF THE PROJECT

The proposed project is beneficial as it will allow for load growth in the region. At the local level, the benefits of the project would center on ensuring improved reliability of supply as well as entrench the reach of electricity into communities. It is envisaged that the proposed project would ensure that marginal communities in the region are supplied with electricity. This will indirectly have an added benefit as it may reduce the community's reliance on firewood as their primary energy source, thus allow for sustainable livelihoods.

Electrification has significant positive benefits from a socio-economic and ecological perspective. The provision of electricity leads to a number of social benefits for organs of state, individuals, industries and communities such as:

6.1.1. For organs of state:

- Electrification of educational and training facilities (schools).
- Electrification of health facilities (clinics, hospitals).
- Electrification of security facilities (police stations, courts).
- Electrification for the provision of essential services (water supply pumps).
- Electrification of religious and cultural facilities.
- Enables rural development.
- Enables the provision of lightning, thereby vastly improving the safety and security of communities.

6.1.2. For individuals and communities:

- Electrification of homes (for cooking, heating and lighting of homes which improves the lives of the individuals within the home).
- Encourages small and medium enterprise development, and as a result, contributes to a rise in disposable income.

- From an ecological perspective, the availability of electricity can lead to a decrease in the harvesting of firewood with resultant biodiversity benefits. This also leads to a decrease in respiratory disease due to a reduction of biomass burning. The relative efficiency of using electricity will reduce overall air emissions and can lead to an improved quality of life.

6.1.3. Supporting Strategies

- At the regional level, the project would contribute to reliability of power supply. There would also be a less tangible but nonetheless important benefit of positioning the municipalities on the lead in terms of sustainable energy supply.
- At the national level, the project would contribute to implementing South Africa's new energy policy as embodied in the White Paper on Energy (DME 1998). The priorities to which this project would contribute are laying the groundwork for promoting electrification and off-grid power supply.

7. DESCRIPTION OF ENVIRONMENT THAT MAY BE AFFECTED

This section outlines those parts of the socio-economic and biophysical environment that could be affected by the proposed development. Using the project description above, and knowledge of the existing environment, potential interactions between the project and the environment are identified in the next section (i.e. how, where and when could the project's activities affect various components of the environment). The potential effects of the project on the human environment, socio-economic conditions, physical and cultural resources are included.

Below is the description of the receiving environment.

7.1. GEOLOGY

The geology of the area forms part of the Achaean granite gneiss, which is responsible for most other features of the landscape such as landform, soil, topography and vegetation.

The gneiss, granite and iron formation occur in the northern part of the complex, which is the flatter side of the study area. The highly mountainous southern part of the study area consist of a geological complex dominated by shale, dolomite, sedimentary, quartzite, andesite and arenite as well as other formations as depicted in the geological map below.

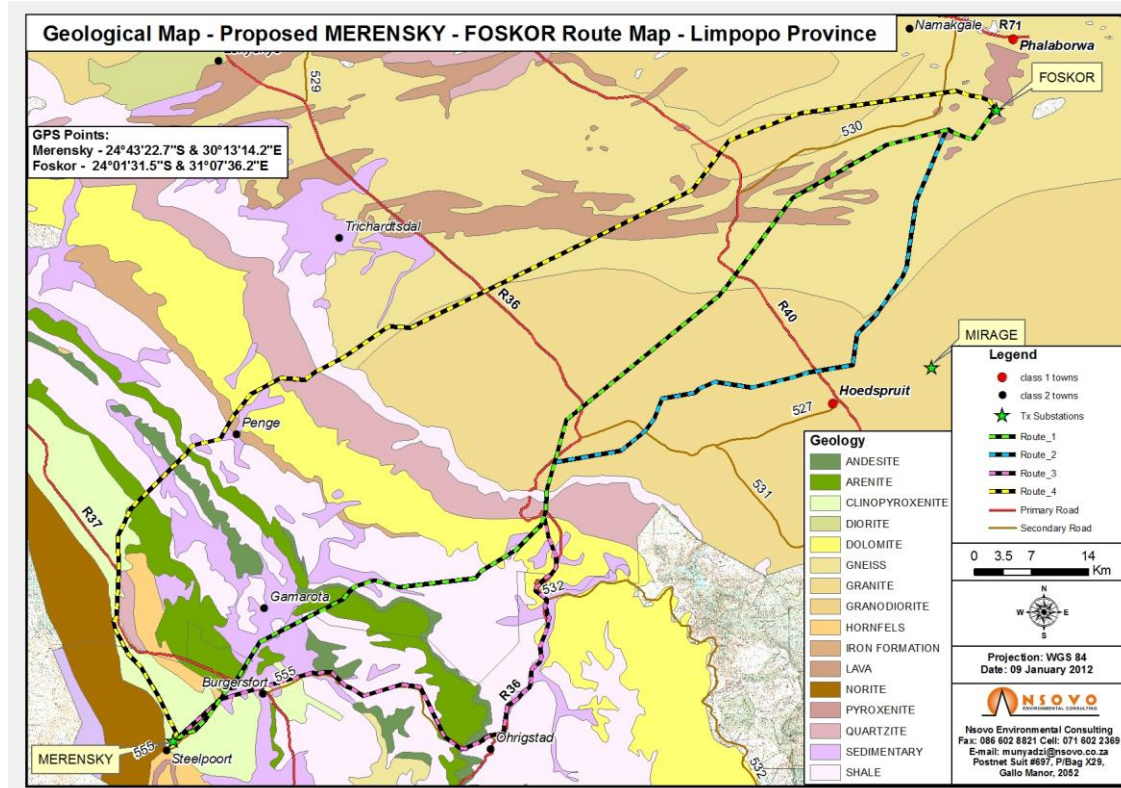


Figure 3: Geological Map of the Study area

The undulating geology of the area provides an environmentally challenging terrain, from a technical perspective especially within the proposed route; however, such challenges will be overcome by the use of suitable towers. The existence of dolomite as well as sinkholes at areas along the route has been confirmed in the Provincial Environmental Management Plan (DEDET, 2008) and has been recognised as critically sensitive environments that must be avoided. Such areas exist in the southern part of the proposed route i.e. the higher lying area.

7.2. CLIMATE

The area falls within the Limpopo Province's Lowveld Climatic Zone which experiences typical subtropical, summer rainfall climatic conditions with hot summers and relatively warm winters. The area can experience periods of high humidity, particularly in the first half of the year. The humidity averages between 80% and 85% from January to June and reduces to between 76% and 80% for the remainder of the year. Maximums of 97% have been recorded. The rainy season is from November to March with maximum rainfall in January. The area is characterised by relatively low rainfall and the mean annual rainfall is 513 mm. Rainfall varies from 250 mm – 700 mm per annum in low-lying areas and rapidly increases up to 2000 mm per annum as the altitude increases in the escarpment region of the Lowveld. The number of rainy days ranges from 63 days per year over low-lying land to over 120 days per year against

the escarpment. Most rain falls in the form of thunderstorms and heavy showers in the mornings or early evenings with infrequent hail incidences.

The proposed routes consist of highly mountainous areas which are prone to lightning. The climatic conditions of the area are expected to have minimal impacts on the proposed project.

7.3. TOPOGRAPHY

The study area is situated in the Lowveld region of the Limpopo Province between the Drakensberg escarpment and the Lebombo Mountains, on the eastern border of the province. The Lowveld area lies at approximately 360 meters above sea level. The area is characterised by a flat to gentle undulating Bushveld landscape, densely covered with indigenous trees and shrubs. In the vicinity of Phalaborwa the monotony is broken by the appearance of unevenly spread conical shaped hills, rising 50 to 90 meters above the Bushveld landscape. These are often referred to as “koppies”. They consist of syenitic rock that represents a separate phase in the geological history of the Phalaborwa Igneous Complex. The contours as indicated on the detailed layout plan (Appendix A) and Figure 6 below, slope from East to west.

Figure 7 depicts the undulating nature of the study area’s topography. The Northern part which is the Phalaborwa area consist of irregular plains while the mountainous southern part of the Lowveld consist of highly changing topography with escarpments, parallel hills and lowlands as well as low mountains.

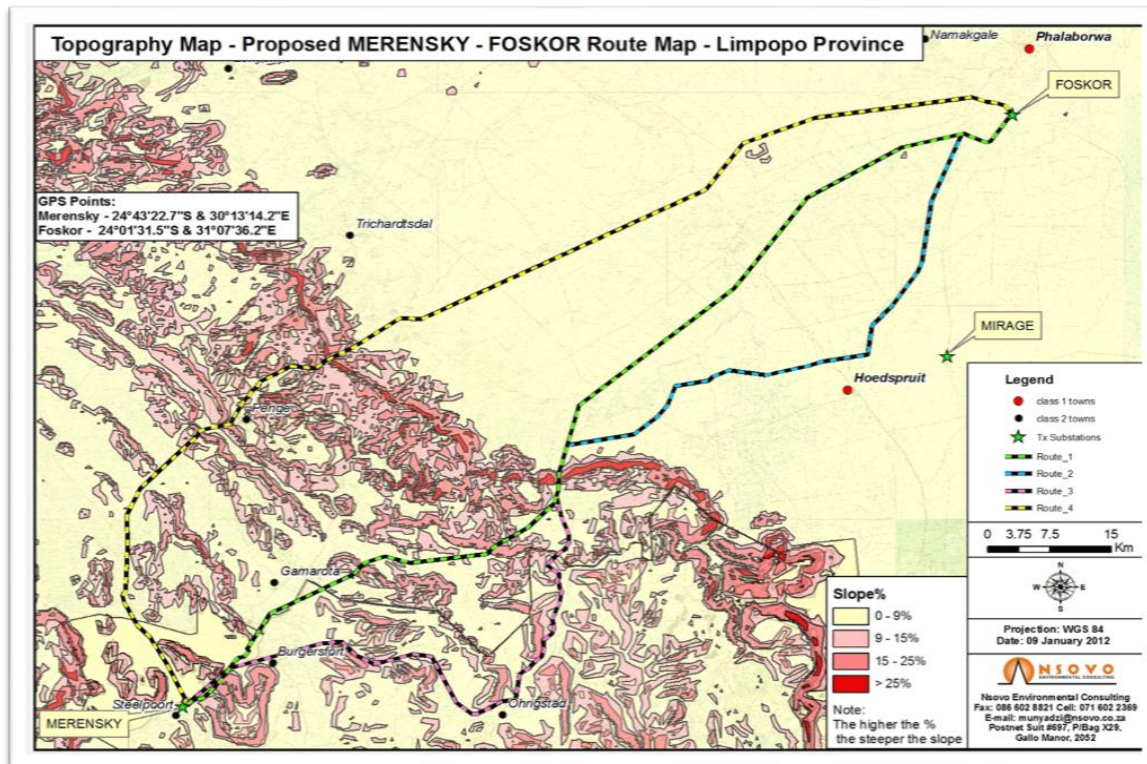


Figure 4: Topographical Map of the Study area.

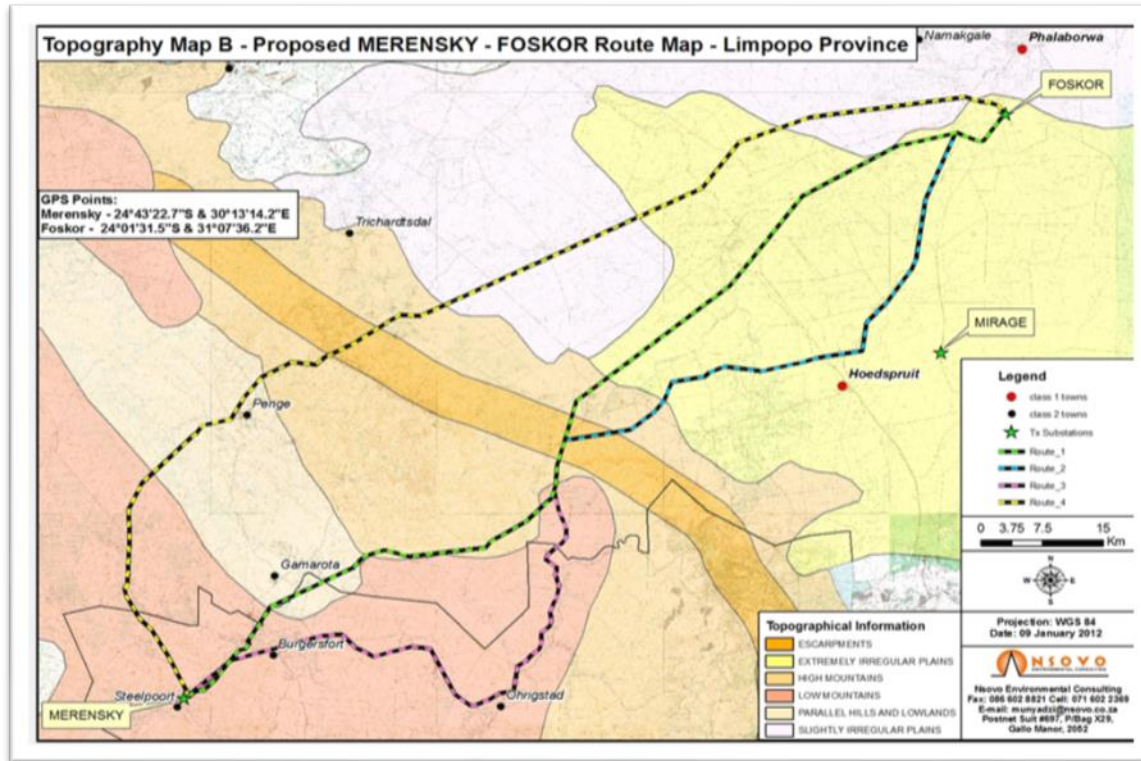


Figure 5: Topographical Map of Study Area

7.4. SOIL

The largest part of the Lowveld environment is covered by a shallow granite layer, referred to as mispah, and deeper weathered material of granite gneiss, dolerite and syenite. Polished granite gneiss outcrops are found next to river courses. Surface coverage of white calcrete on pyroxenite rock over large areas of the igneous complex shows a marked difference to the reddish-brown soil coverage found in the granite gneiss areas. The calcrete and surface lime coverage on the pyroxenite rock areas varies in thickness from zero to five meters below the surface. Erosion depths vary from zero to fifty meters below the surface. The Northern part of the study area which is the Phalaborwa and Hoedspruit area is covered by Glenrosa and Mispah soil while the southern part which is highly mountainous consist of rocky areas with miscellaneous soils as depicted in the map below.

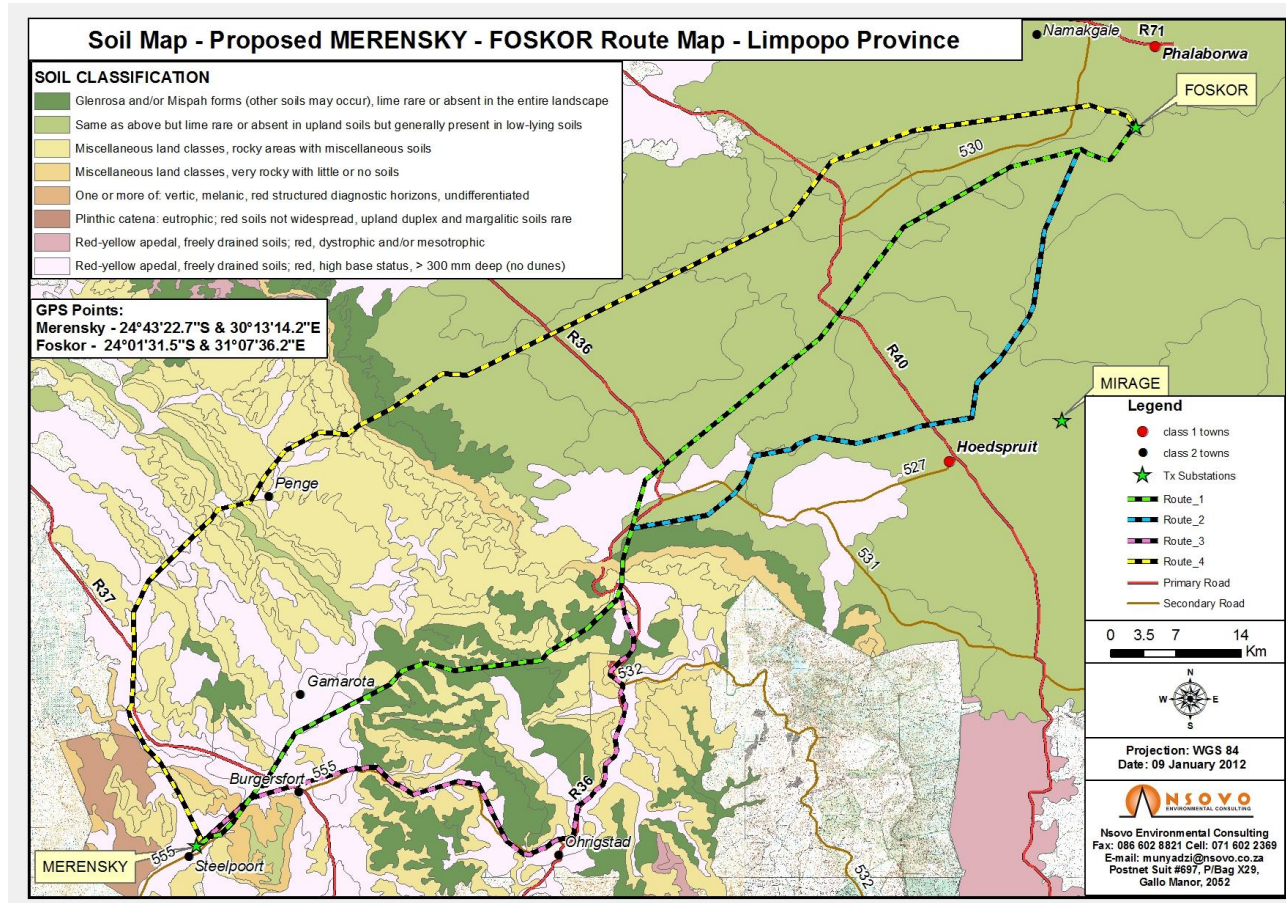


Figure 6: Soil Map of the Study Area

Projects of this nature have the potential to negatively impact on soil either through contamination during construction activities and/or increase of erosion potential due to disturbance of the soil profile. The greater part of the study area is not significantly susceptible to erosion. According to Paterson (2012) the higher lying areas are more prone to erosion as compared to the low-lying areas that have stable clay mineralogy. Unnecessary disturbance of the soil should be avoided as erosion increases sediment loads in the rivers and streams thereby decreasing habitat quality for aquatic organisms and decreasing the value of the water to downstream users.

7.5. FLORA

The area site is situated within a region of the Limpopo province that is classified as falling within the Savannah biome. The vegetation in this biome is tolerant of relatively low rainfall and hot climate. The Savannah biome consists of a grassy ground layer and woody vegetation on the upper layer. If the upper layer is very close to the ground layer it is referred to as shrub-land. Dense vegetation on the upper layer is referred to as woodland, whereas the intermediate stages are referred to as the Bushveld. Savannah

vegetation types are commonly used for the grazing of cattle and include the clay thorn Bushveld mixed Bushveld and sweet Lowveld bushveld.

According to Bredenkamp (2011) 12 primary vegetation types were identified in the proposed study area and classified accordingly as depicted in Table namely:

Table 5: Primary Vegetation Types

Vegetation Type	Route	Conservation status (Mucina & Rutherford 2006)	Threatened Ecosystems (SANBI & DEAT 2009)	Threatened Status
1. Sekhukhune Plains Bushveld	1, 3, 4	Vulnerable		
2. Sekhukhune Mountain Bushveld	4	Least Threatened	Sekhukhune Mountain lands Sekhukhune Norte Bushveld	Endangered Endangered
3. Ohrigstad Mountain Bushveld	1, 3, 4	Least Threatened	Sekhukhune Mountain lands	Endangered
4. Lydenburg Thornveld	1	Vulnerable		
5. Pong Dolomite Mountain Bushveld	1, 3, 4	Least Threatened	Malmani Karstlands	Endangered
6. Northern Escarpment Quartzite Sourveld	4	Vulnerable		
7. Northern Mistbelt Forest	4	Least Threatened		
8. Tzaneen Sour Bushveld	4 (1, 2)	Least Threatened	Tzaneen Sour Bushveld	Vulnerable
9. Granite Bushveld	1, 2, 4	Least Threatened		
10. Lowveld Rugged Mopaneveld	1, 2	Least Threatened		
11. Phalaborwa-Timbavati Mopaneveld	1, 4	Least Threatened		
12. River Crossings	all			

According to Mucina and Rutherford (2006) the vegetation types of the proposed project area are identified as Phalaborwa-timbavati Mopaneveld and Lowveld Rugged Mopaneveld. The vegetation starts

from Foskor as flat Mopani veld and continues to become the Lowveld Rugged Mopaniveld in the Rocky area, which consists of irregular plains interspersed with steep slopes and prominent hills. From the R40 towards Mica it becomes mixed bushveld to Hoedspruit. The Phalaborwa-timbavati Mopaneveld consists of undulating plains with Sandy uplands and open tree savannah dominated by *Combretum Apiculatum*, *Terminalia Sericea* and *Colophospermum Mopane*. In the clayey bottomlands the *Combretum Apiculatum* is being replaced by the *Acacia Nigrescens*. Slopes around the Olifants River are more dissected and steeper. In terms of bio-geomorphology, the rocky outcrops/'koppies' show the largest botanical diversity followed by the intermediate drainage lines.

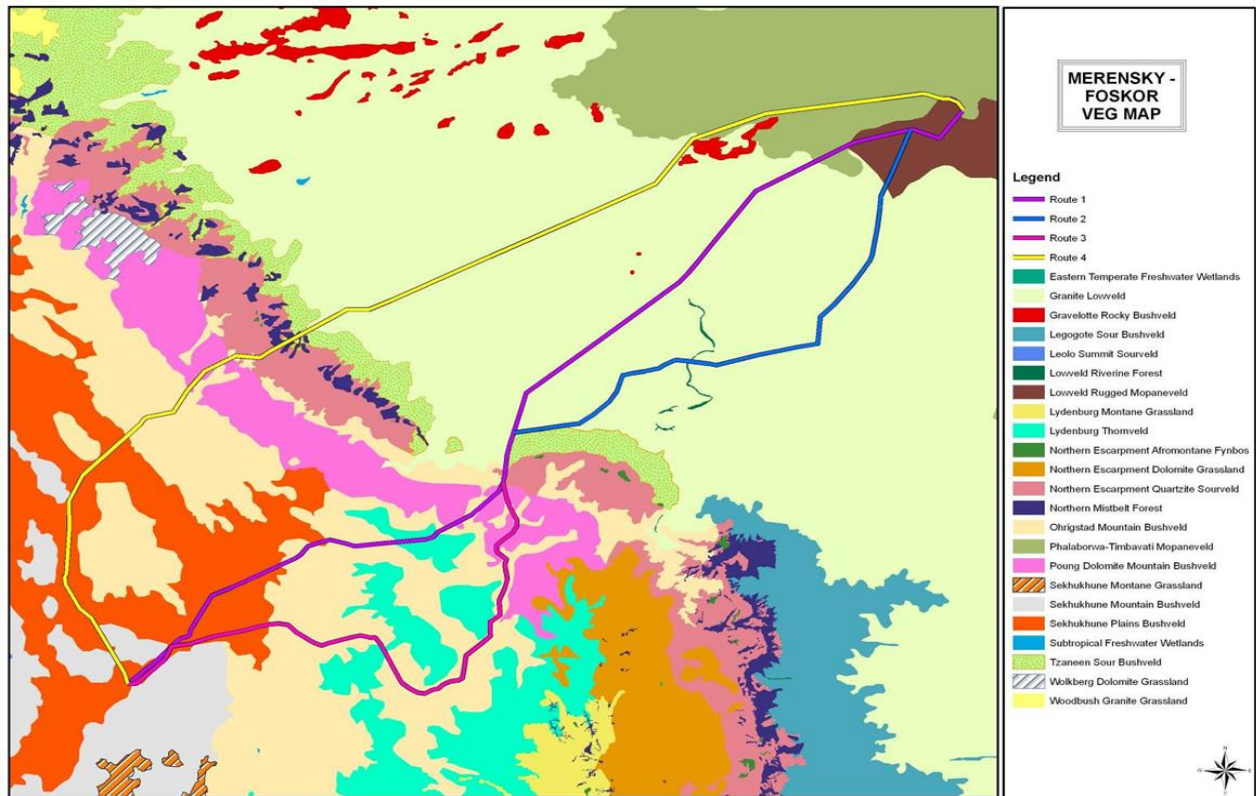


Figure 7: Vegetation Types along the Routes

The plant communities of most vegetation types include trees and shrubs, grasses, forms as well as several species of conservation concern primarily on the mountain areas. Nationally protected trees that were observed along the route include the *Balanites maughamii* and *Sclerocarya birrea*. Provincially protected species identified included the Aloe (Bredenkamp, 2011).

The vegetation within the plains is quite disturbed as there are often roads, tracks, current or old agricultural fields. The vegetation on the mountainous areas contains several red data, grassland and Tzaneen sour bushveld and protected plant species which are considered to be highly sensitive environments (DEDET, 2008) however, the proposed routes will seldom cross this sensitive vegetation.

7.6. FAUNA

Due to the fact that the site is located in the Savannah Biome, close to the game farms and the Selati River, there is a high diversity of fauna species found in the area.

Mammal species commonly in the area include:

- African Elephant (*Loxodonta Africana*);
- Buffalo (*Syncerus caffer*);
- Hippopotamus (*Hippopotamus amphibious*);
- Lion (*Panthera leo*);
- Giraffe (*Giraffa camelopardalis*);
- Impala (*Aepyceros melampus melampus*);
- Kudu (*Tragelaphus strepsiceros*);
- Waterbuck (*Kobus ellipsiprymnus*);
- Bushbuck (*Tragelaphus scriptus*);
- Grey/Common Duiker (*Sylvicapra Grimmia*);
- Steenbok (*Raphicerus campestris*);
- Chacma Baboon (*Papio cynocephalus ursinus*);
- Vervet Monkey (*Cercopithecus pygerythrus*);
- Warthog (*Phacochoerus africanis*); and
- Bushpig (*Potamochoerus porcus*).

Various reptile species, including the crocodile (*Crocodylus niloticus*) occur within the proposed project area. The rocky outcrops/'koppies' found in the area have a high fauna species diversity as they provide important habitat for spiders, lizards, snakes, birds and small mammal species. Furthermore the high plateaus are inhabited by mountain reedbuck, baboon troops and rock hyraxes. Hippo and crocodile are present in the rivers and dams in the area, while Impala, kudu, blue wildebeest, waterbuck and zebra roam the wooded lowveld area.

The public participation process confirmed the existence of white (*Ceratotherium simum*) and black (*Diceros bicornis*) rhinos in the area which are classified as Near Threatened and critically endangered respectively (IUCN Red List of Threatened Species, 2007). By the 17th July 2012 281 rhinos had already been killed in South Africa due to poaching which remains a threat (www.savingrhinos.org).

Further raised concerns regarding how power lines obstructs the free movement of animals in game reserves and the threats associated including fatalities in certain instances.

7.7. AVIFAUNA

The area is rich in bird (avifauna) biodiversity with species common to the Savanna biome. The South Eastern parts consist of sensitive fauna including Cape vultures. African fish eagle and African fin foot are found along the Blade River. The lowveld woodlands harbour purple-crested lourie, emerald cuckoo, red-backed mannikin, golden-tailed woodpecker, gorgeous bushshrike, white-faced owl and a number of raptors like white-backed vulture, gymnogene, black-chested snake eagle, Wahlberg's eagle and long-crested Eagle. A number of raptors frequent the mountains and cliffs, including cape vulture, black eagle, jackal buzzard, peregrine falcon, lanner falcon and rock kestrel.

Birds associated with flowering plants of the higher slopes include Gurney's sugarbird and malachite sunbird. A breeding colony of bald ibis occurs in the grassy uplands, besides small numbers of cape eagle-owl and red-breasted sparrow hawk. Forest birds include crowned eagle, cinnamon dove, olive bushshrike, green twin spot and wood owl.

According to Smallie (2012) the area is home to an exceptionally broad diversity of bird species, up to 423 species having been recorded by the first Southern African Bird Atlas Project (Harrison et al, 1997). A fair number of these (36 species) are Red Listed species (Barnes 2000), and many of these will in fact be at risk of interaction with the proposed power line. Most of the vulture and large eagle species identified as key for this study do not have healthy populations in South Africa outside of protected areas. The lowveld protected area complex, adjoining to the Kruger National Park, is therefore an extremely important refuge for these species. The same is true for some of the stork species. This makes it extremely important to protect these species from additional human induced threats within these areas to limit the risk of local extinction. In addition to the lowveld area, the escarpment is also extremely important, due to the presence of breeding Taita Falcons *Falco fasciinucha* and Cape Vultures *Gyps coprotheres*.

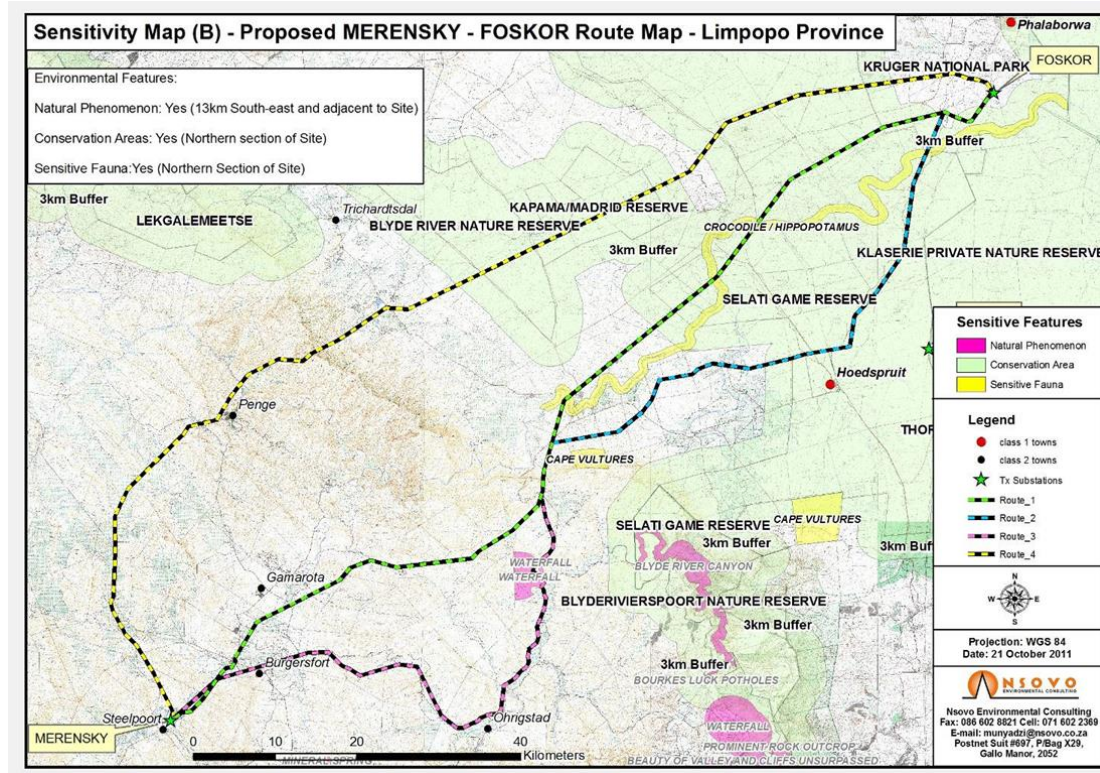


Figure 8: Areas of sensitive fauna

The importance of conservation of birds in the area came out strongly during the public participation process, where emphasis was placed on the need to protect and conserve the bird species, which is key in the attraction of tourist in the area. Page 19 of the Avifaunal specialist clearly indicates Important Bird areas within the proposed study area. The Olifants River is one of the key Bird Count areas and has records for African Fish Eagle and Pels Fishing Owl, and the PMC Wetlands site has records for African Fish Eagle, Pels Fishing Owl, Pink-backed, Pelican, Marabou Stork, Saddle-billed Stork, Woolly-necked Stork, Yellow-billed Stork, and Greater and Lesser Flamingo (Smallie, 2012).

7.8. SURFACE WATER

The Olifants and its tributaries form the primary surface water drainage of the proposed study area and it is the only Class 1 River while class two rivers include the Blyde, Orighstad Ga-Selati, Speckboom and Makutswi Rivers.

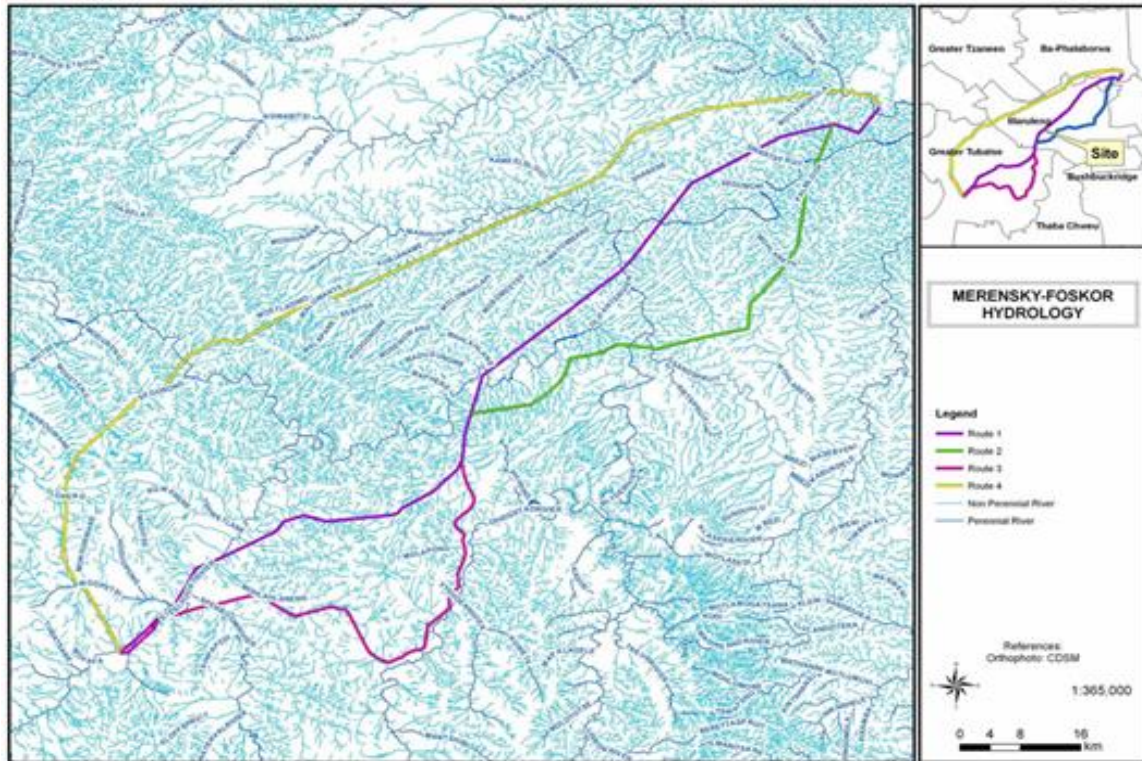


Figure 9: The hydrology along the routes

7.9. SITES OF ARCHAEOLOGICAL AND CULTURAL SIGNIFICANCE

The study area is located in the Limpopo province an area known to be rich in culture and heritage. Various monuments, heritage parks, rock art, shelters, caves burial grounds and other historical buildings are located in the study area representing various historical moments in South Africa's history.

The Foskor site is located in an area that has a rich cultural heritage marked by a number of heritage sites that date from the Iron Age (i.e. from the turn of the 19th century and the early 20th century). These heritage sites are associated with pre-historical and historical mining and metal works remains and are mainly located on the rocky outcrops ('koppies') in the area. Stone Age and Iron Age sites are also found in this area.

The existence of graves that could be negatively impacted upon was ascertained during the public participation process, while the specialist studies highlighted key sensitive areas that need to be avoided. Sites of heritage and cultural significance are indicated in the provincial control zones as critically sensitive environments and further propose that all efforts be made to avoid them.

7.10. VISUAL ASPECTS

Visual appreciation or dislike is subjective and thus what is aesthetically pleasing to some can be displeasing to others. The visual analysis of a landscape the impact, of new developments and structures tends to be complicated and it is evident from previous experience that when dealing with reaction to landscape changes, a large diversity of opinion exists.

The greater part of the study area is managed for purposes of conservation, agriculture, forestry or is communal land devoid of any imposing infrastructure such as transmission lines. The natural landscapes of the greater part of the study area are sensitive and important to preserve for their aesthetics. It is, thus, necessary to maintain a near natural visual landscape, with limited aesthetic affects, to enable the continuation of nature-based economic activities such as ecotourism.

The area currently has existing transmission lines; however it is an imperative that Eskom be sensitive from a visual impact perspective, to the requirements of the local people, notably rural communities, farmers, conservationists and operators involved in eco-tourism activities. Many topographical features influence this environment and these features will need to be utilised when selecting an alignment so as to minimise visual impacts and intrusions.

7.11. REGIONAL AND SOCIO ECONOMIC STRUCTURE

The proposed project transverse across three district municipalities namely:

Mopani District Municipality is found in the Lowveld and houses five municipalities of which two are within the proposed corridor which are:

- Ba-Phalaborwa Municipality is situated on the North-eastern part of South Africa in the Limpopo Province. It is one of the five local municipalities in the Mopani District. The Municipality serves as a convenient gateway to the Kruger National Park and the Trans frontier Park through the Mozambique Channel. The municipality has a population of 127308 with 33792 households.
- Maruleng Municipality was first established in 1997 under the name Hoedspruit/ Makutswi TLC. The Municipality is the home of Hoedspruit, known as the tourism Mecca of Limpopo. Hoedspruit lies in the heart of the central Lowveld and is conveniently situated to explore the many game lodges; game reserves and other attractions in the vicinity owing to the vast plains of marula, acacia, *combretum* and mopane woodlands accommodate a wealth of wildlife and stretch as far as the eye can see. The Municipality is also known for its agricultural strengths. The Blyde Valley sugar and Letsitele citrus plantations. The municipality has a population of 95779 with 24589 households.

Sekhukhune District Municipality is a cross-border municipality between Limpopo and Mpumalanga Province. It is a rural area with an economic base in the fields of mining and agriculture. With good soil, a

sub-tropical climate and the availability of reasonable quantities of water, the area boasts of a strong and prosperous farming industry which consists of citrus, grapes, tomatoes, sweet potatoes, cabbage, peppers, beans and pumpkins, wheat, maize, cotton and tobacco. The region is endowed with mineral resources like chrome, platinum and diamond deposits. The proposed study area transverse two of the five municipalities namely:

- Fetakgomo Local Municipality is a local municipality in the Sekhukhune District, which is blessed with mineral deposits, such as platinum, chromium and diamond. It is situated in the fertile soil alongside the rivers of Lepelle and Lepellane, offering great agricultural potential. The municipality has a population of 112232 with 21857 households.
- Greater Tubatse Local Municipality is a local municipality comprising of the Burgersfort town which is rapidly growing. The municipality has a population of 343468 with 66611 households.

Capricorn District Municipality also has five municipalities of which one forms part of the study area. The municipality that lies along the proposed corridor is:

- Lepelle-Nkumpi Local Municipality is one of the local municipalities within the Capricorn District Municipality in Limpopo Province. The municipality is located 55km south of the district and Polokwane city. The municipality is pre-dominantly rural with a population of 241414 and covers 3,454.78km, which is 20.4% of the district's total land area.

Social issues that may result from the project have been assessed as part of the specialist studies and this may include:

- Changes to quality of life and sense of place,
- Noise pollution,
- Influx of job seekers,
- Influx of construction workers,
- Crime and security,
- Impact on farm sizes and loss of farm land;
- Negative financial influence of properties.

These issues are assessed in detail in the impact Section 13.

8. DETAILS OF THE PUBLIC PARTICIPATION PROCESS CONDUCTED

The principle of public participation holds that those who are affected by a decision have a right to be involved in the decision-making process and as such believed that public participation may have an influence on decisions. One of the primary objectives of conducting EIA Public Participation Process is to provide Interested and Affected Parties (I&Aps) with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of Public participation are as follows:

- The public participation process communicates the interests and meets the process needs of all participants.
- The public participation process seeks and facilitates the involvement of those that would potentially be affected.
- The public participation process involves participants in defining how they participate.
- The public participation process provides participants with the information they needed to participate in a meaningful way.

To ensure that the public participation is as inclusive and transparent as possible, it was conducted in line with the requirements of Regulation 54 of NEMA (Act 107 of 1998) as amended.

As part of the public engagement strategy a background research was carried out to determine the key stakeholders in the study area. There was consultation with tribal authorities, municipalities, councilors, farm owners, residents as well as the provincial authorities that are potentially affected parties.

A registration process commenced during the Scoping phase of the project and it continues to be populated as and when people register.

The public participation for this phase of the project will continue to be aligned with the Act and will attempt to involve and include more affected parties in the area. The key activities will include:

- Placement of an advertisement to inform stakeholders of the availability of the draft report which will be made available for review and comment from the 06th August to the 12th September 2012. An advertisement will be placed on the National and local newspapers informing interested and affected parties of the availability of the report and places where the report could be accessed. Electronic reports and discs will also be made available on request. Comments received from I&APs on the Draft EIAR will be incorporated into the final report as far as reasonably possible.
- Announcement of the Public Meetings will also be done through advertisement and placement of notices. Furthermore letters will be sent to stakeholders via post, email and fax inviting them to meetings (Proof of such will be attached in the Final PPP report). Focus group and public meetings will be held with the different stakeholders in August at accessible venues within the community.

The meetings will seek to address issues raised during the scoping phase and news issues that become prominent as the project is progressing. The meeting will further provide findings of all the specialist studies that were commissioned as part of the EIA process.

Minutes of these meetings will form part of the final submission to the authorities.

9. DESCRIPTION OF THE IDENTIFIED ALTERNATIVES TO THE PROPOSED ACTIVITY (INCL. ADVANTAGES AND DISADVANTAGES)

The identification of alternatives is an important component of the EIA process. The various identified alternatives are assessed in terms of environmental acceptability as well as technical and economic feasibility wherein the preferred option will be highlighted and presented to the authorities.

Various alternatives were considered for the proposed project including the no-go alternative. The project has considered various technical options of which the proposed were found to be technically, economically and environmentally viable compared to the other options.

9.1. TECHNICAL ALTERNATIVE

The technical alternatives that were considered included above ground power lines as well as underground. Following which the option of constructing an underground cable was assessed and dismissed during the scoping phase of the project. The dismissal was based on the technical non-feasibility due to the geology and topography of the proposed routes as well as consideration of advantages and disadvantages as indicated in Table 6 below.

Table 6: Alternative Analysis

	Advantages	Disadvantages
Underground 275 kV power line	<ul style="list-style-type: none"> Minimal Visual Impact 	<ul style="list-style-type: none"> Increased ground disturbance, therefore increased impact on sensitive environments. High maintenance cost High construction costs; underground costs 4 times more than the above ground

		cables
Above Ground 275kV power line	<ul style="list-style-type: none"> Minimal ground disturbance therefore reduced impact on sensitive environments. Economically feasible as it offers a cost saving Easy maintenance and reduced maintenance cost 	<ul style="list-style-type: none"> Considerable Visual Impact

9.2. STRUCTURAL ALTERNATIVES

Two design alternatives have been proposed for this project, the Cross-Rope suspension type and the Self-supporting type. These are illustrated in Figure 4-1 and Figure 4-3. It is important to note that the topography will largely dictate the type of tower to be used. From this perspective, it should be noted that where the line crosses mountainous terrains and when it changes direction at an angle, there will be need to use self-supporting towers. Narrow base towers may be utilised on sections where space is a problem. These are illustrated in Figure 4-2.

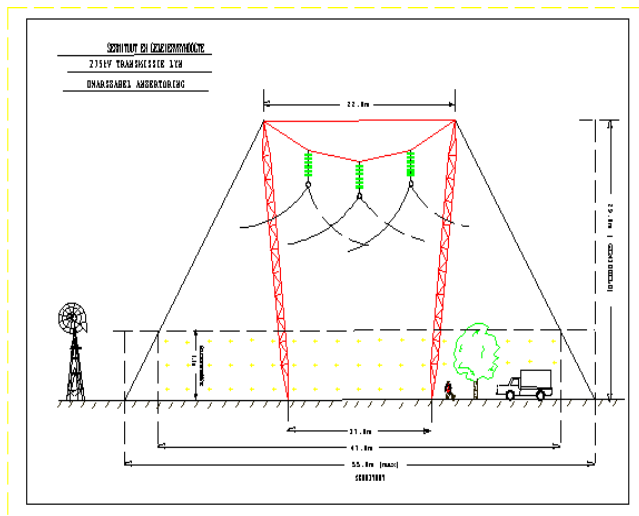


Figure 10: Cross Rope

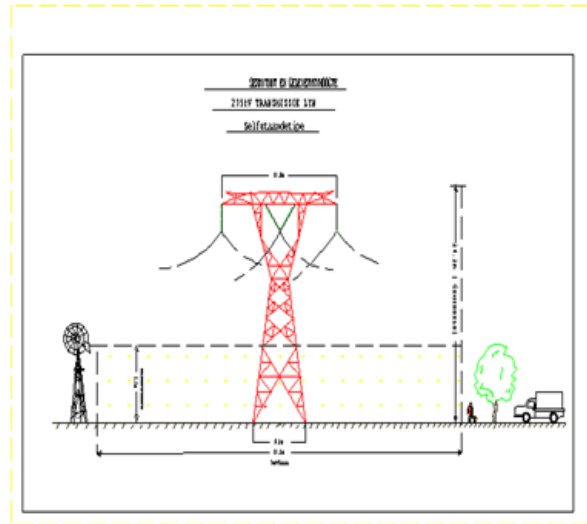


Figure 11: Self supporting tower

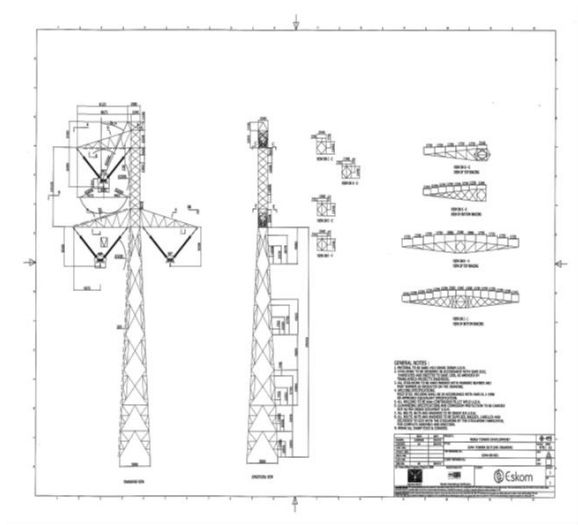


Figure 12: Narrow base tower

None of the above options have been dismissed and remain alternatives depending on the terrain and topography.

9.3. ROUTE ALTERNATIVES

9.3.1. Alternative 1 (Green Route)

This route loops out of the existing Foskop substation in Phalaborwa in a South Westerly direction along the secondary Road 530 towards Mica. It crosses the R40 and continues towards the same direction within the Phuza Moya Game Farm. It then transects the Diphuti and Finale villages in Maruleng eventually crossing the R36 towards Orchards. It crosses the R36 on two more occasions before entering the lightning prone mountainous area which it exits while descending in a south-westerly direction towards the low lying Burgersfort villages. It then crosses the R37 continuing into Burgersfort town where it continues along the Secondary Road 555 to Steelpoort, which it crosses before eventually entering the substation.

This line has approximately 15 bends and it crosses river sensitive zones approximately 7 times. The route stretches an area of sensitive flora and important bird species for approximately 15km.

9.3.2. Alternative 2 (Blue Route)

The line loops out of the existing Foskop substation in Phalaborwa in a South Westerly direction for approximately 5km. It bends westward for another 5km and then bends southward towards the town of Hoedspruit following the existing 132kV line. Just before Hoedspruit town the route crosses the R40 and bends westwards and moves between the existing 275kV and secondary road 527 on the eastern side of Diphuti and Finale villages. The route then crosses the secondary road 531 and heads for the lightning prone mountainous area which it eventually exit following the exact path of alternative 1 described above.

This line has approximately 23 bends and it crosses river sensitive zones approximately 5 times. The route stretches over an area of sensitive flora and important bird species for approximately 20 km.

9.3.3. Alternative 3 (Pink Route)

This route loops out of the existing Foskor substation following the same route as alternative 1, it exits the mountainous areas where it descends in a southerly direction towards Orighstad progressing along a river and bending westward along the secondary road 555. It passes Kromkloof rejoining Alternative 1 at Burgersfort until it enters the Merensky substation in Steelpoort.

This line has approximately 26 bends and it crosses river sensitive zones approximately 6 times and stretches a long distance along river sensitive zones. The route stretches over an area of sensitive flora and important bird species for approximately 15 km

9.3.4. Alternative 4 (Yellow Route)

This route loops out of the existing Foskor substation in Phalaborwa in a Northerly direction and bends towards a North-westerly direction along the secondary road 530. The route crosses the R40 15km north of Mica and transverses villages and farmlands until it crosses the R36, and entering the mountainous areas towards Penge a class 2 town in the western side of the study area. From Penge it bends southwards passing the R37 to Burgersfort and enters the Merensky substation on the Western side.

This route stretches for a long distance in mountainous areas, and crosses river sensitive zones 4 times. This route transverse area of sensitive flora for approximately 50km.

9.3.5. No-Go Alternative

In accordance with GNR 543, consideration must be given to the option not to develop. This option is usually considered when the proposed development is envisaged to have such significant negative environmental impacts that mitigation measures cannot ameliorate the identified impacts effectively.

The no-go alternative would be the option of not undertaking the construction of the proposed project. It will imply no improvement in reliability of electricity systems which would benefit electricity users in the various municipalities, the region and country at large. Should it be adopted the municipalities and communities will be deprived of a much needed essential service, particularly given the already existing problem with energy supply in the country.

Table 7: Route Alternative Analysis

Route Alternatives	Advantages	Disadvantages
Route 1	<ul style="list-style-type: none"> • Shortest Route • Relatively reduced impact on avifauna • Reduced visual impact due to the already existing alignment • Access roads already exist 	<ul style="list-style-type: none"> • Transverse game farms in the northern part.
Route 2		<ul style="list-style-type: none"> • Transverse game farms • Transect areas of high agricultural soil potential • Relatively higher visual impact
Route 3		<ul style="list-style-type: none"> • Longest Route • Transverse game farms • Directly impact on the proposed development in Burgersfort as well as Khumula Estate
Route 4	<ul style="list-style-type: none"> • Minimal impact on heritage 	<ul style="list-style-type: none"> • Transect critically sensitive environments for the longest distance
No-Go Alternative	<ul style="list-style-type: none"> • No disturbance of the physical environment • No expenditure 	<ul style="list-style-type: none"> • No construction cost but greater economic disadvantage • Unhappy communities • Stagnant economy

10. METHODOLOGY

The assessment of impacts was largely based on DEAT's (1998) Guideline Document: EIA Regulations. The assessment considered impacts arising from the construction and operation phases of the proposed project both before and after the implementation of appropriate mitigation measures.

The impacts were assessed according to the criteria outlined in this section. Each issue was ranked according to extent, duration, magnitude (intensity) and probability. From these criteria, a significance rating is obtained, the method and formula is described below.

Table 8: Impact Prediction Methodology

Status of Impact

The impacts are to be assessed as either having a:
negative effect (i.e. at a `cost' to the environment),
positive effect (i.e. a `benefit' to the environment), or
Neutral effect on the environment.

Extent of the Impact

- (1) Site (site only),
- (2) Local (site boundary and immediate surrounds),
- (3) Regional (within the City of Johannesburg),
- (4) National, or
- (5) International.

Duration of the Impact

The length that the impact will last for is described as either:

- (1) immediate (<1 year)
- (2) short term (1-5 years),
- (3) medium term (5-15 years),
- (4) long term (ceases after the operational life span of the project),
- (5) Permanent.

Magnitude of the Impact

The intensity or severity of the impacts is indicated as either:

- (0) none,
- (2) Minor,
- (4) Low,
- (6) Moderate (environmental functions altered but continue),
- (8) High (environmental functions temporarily cease), or
- (10) Very high / Unsure (environmental functions permanently cease).

Probability of Occurrence

The likelihood of the impact actually occurring is indicated as either:

- (0) None (the impact will not occur),
- (1) improbable (probability very low due to design or experience)

- (2) low probability (unlikely to occur),
- (3) medium probability (distinct probability that the impact will occur),
- (4) high probability (most likely to occur), or
- (5) Definite.

Significance of the Impact

Based on the information contained in the points above, the potential impacts are assigned a significance rating (S). This rating is formulated by adding the sum of the numbers assigned to extent (E), duration (D) and magnitude (M) and multiplying this sum by the probability (P) of the impact.

$$S=(E+D+M)P$$

The significance ratings are given below:

- (<30) low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- (30-60) medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- (>60) high (i.e. where the impact must have an influence on the decision process to develop in the area).

11. DESCRIPTION AND COMPARATIVE ASSESSMENT OF ALL ALTERNATIVES IDENTIFIED DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The identification of alternatives is an important component of the EIA process. Consideration of alternatives focused mostly on route alternatives as compared to activity alternatives. The various alternatives have been assessed in terms of both environmental acceptability as well as economic feasibility.

The selection of the preferred alternative is based on several factors:

- Public input, ascertained through the PPP
- Specialists' recommendations
- Environmental constraints
- Technical feasibility
- Economic cost-benefit analysis
- Best practicable environmental option i.e. the option that provides the most benefit or causes the least damage to the environment as a whole at a cost acceptable to society in both the long and short term.
- Optimisation of existing infrastructure, such as access roads

The Five alternatives which include the No-Go option are summarised below and further detailed in Section 8. The four alternatives discussed above have been considered and mapped on the attached Locality Map in Appendix A.

The key issues raised during the public participation process regarding the proposed alternatives included the following:

Alternatives 1, 2 and 4 all affect a number of properties within the Balule Nature Reserve and the management of the reserve believes that this will negatively impact the vision, mission and objectives of the reserve, thus having a negative effect on the future management of the value of properties in the reserve.

- It has become apparent that the northern part of the proposed routes including route 3 which is similar to route 1 is primarily within nature reserves and the baseline environment is fundamentally the same; therefore considering moving the line either east or west will have similar impacts. Consideration will be made to ensure that the line is strategically positioned within the 3km buffer to minimise the potential impact on the environment holistically.

The Olifants West Nature Reserve (OWNR) recommended that the Route 1 follows the R40 road.

- The scoping phase highlighted on several occasions that the current location of the routes is simply indicative, however the proposed routes have a 3 kilometer buffer that will be considered during the walkthrough with the specialist. The primary objective of the buffer is to avoid sensitive areas as far as practically possible. This may not mean that nature reserves will be avoided in their entirety.

The OWNR further stated that the visual impact of the proposed Route 1 must be considered as this will further reduce the values of adjacent properties. OWNR further stated that this is in contradiction with the Management Plan for the Associated Private Nature Reserves (Peel, 2007), which has been approved after extensive public participation. In addition Mr. Pretorius of *Khumula Game Lodge* highlighted that *the power line will obstruct the view distant mountains. From the lodge towards*

- With regards to the potential contradiction with the Management Plan, the undertaking of this EIA is aligned to the requirements of NEMA read together with the K2C Biosphere Environmental Management Plan which is relevant to the area; the plan identifies control zones in the area and classifies them accordingly as critically sensitive, highly sensitive and sensitive. The plan clearly states that in the event that the activity falls under highly sensitive and/or sensitive an EIA needs to be undertaken, thus the purpose of this study. It is highly unlikely that the approval of the approved Management Plan stipulated above suggests a halt in any form of development in the area; however, activities in such areas will have to take into consideration such sensitivities.
- Visual impact was identified during the Scoping phase as key given the nature of the area under study, hence the appointment of an independent specialist to undertake the study. The study indicated that the positioning of the proposed route along the existing route will cause the least

visual impact, the study recommended route 1. Accordingly the proposed mitigation measures will be put in place to reduce the impact.

The OOWNER represented by Craig Spencer highlighted that he represents 112 residents in the property, their main concern was the wildlife and the fauna (birds) within the property, should another line come inside the property, it will have a detrimental impacts on them as birds always get electrocuted and the wildlife always bumps the pylons as they move around the bush.” Similar concerns were raised regarding route 1 and 2 by the Blade Olifants Conservancy (BOC) chairman Dr Albert Zinn.

- An Avifaunal Impact Assessment was identified as primary so as to ensure completeness and well informed assessment. An independent avifaunal specialist was appointed to undertake the study, which highlighted and addressed Craig Spencers’ concerns of electrocution as well as other impacts such as faulting and collision. The study acknowledged that the proposed power line route passes through an area that is rich in avifauna, due to its varied geology and vegetation, and the protected status of much of the land (by virtue of game farming).The impact on avifauna was rated as been of medium significance, however with proper mitigation in place it can be reduced to low. He recommended the construction of the proposed line adjacent to the existing line i.e. Route It is however recommended that the more sensitive areas be avoided therefore is, recommended that the power line be moved as far from the river as the 3km corridor will permit.
- With specific regard to collision of wildlife with the pylons, the EIA has considered various pylon alternatives that could be used. It is highly likely that the various pylons do not pose impacts of same significance. It is therefore recommended that pylons that cause the least impact on wildlife be used particularly within game reserves so as to reduce the impact. Other measures will also be considered to reduce this impact.

In the village of Finale a pylon, associated with Alternative 1, 2 and 3, is positioned at the gate of a primary school and the transmission line will pass over a number of dwellings and will affect a number of burial sites. The village of Alverton also has a number of dwellings positioned directly under the transmission line and, at the village of Mashamthane, a law firm is situated directly under the proposed line.

- Two possibilities to overcome this challenges, would include considering resettlement of the affected properties along the route, which has been rated as considerably high, however, proper with recommended mitigation measures in place it can be manageable. Resettlement will be according to the Eskom standards. The other measure would be to consider avoiding obstacles and sensitivities, by identifying less sensitive areas within the 3 kilometer buffer for the positioning of the pylons.

11.1. COMPARATIVE ASSESSMENT

Following the public participation process, the undertaking of specialist studies and impact assessment of the proposed routes a comparative analysis was made as depicted in Table below.

Table 9: Comparative assessment of alternatives

	Route 1	Route 2	Route 3	Route 4
Distance	131 Shortest route therefore minimal disturbance.	138	154 Longest route Least preferred	145
	Preferred	Satisfactory	Least preferred	Satisfactory
Ecological	Large properties are game farms and lodges which are effectively conserved.	Same as route 1	High ecological sensitivity as it crosses sensitive mountain foot slopes and crosses rivers and roads several times.	Runs through nine vegetation types and over high steep mountains with two endangered ecosystems and several threatened ecosystems.
	Preferred route	Satisfactory	satisfactory	Least preferred
Agricultural	No fatal flaw	Route 2 crosses less of an area with steep rocky soils but more of an area with high potential soils. Least preferred due to high agricultural potential soil.	It crosses irrigated agricultural enterprises. No fatal flaw	No fatal flaw
Heritage	9 cultural and heritage sites identified. From an	3 cultural and heritage sites identified.	8 cultural and heritage sites identified.	7 cultural and heritage sites identified.

	Route 1	Route 2	Route 3	Route 4
	archaeological perspective the route is satisfactory.	From an archaeological perspective the route is satisfactory.	Sites identified are of high heritage value. High negative impact is anticipated.	Preferred route
	satisfactory	Satisfactory	Least preferred	Preferred route
Visual	Its alignment along existing lines causes the least impact. Advantage is that viewers are already exposed to a similar perception.	Least Preferred	Its alignment is along the existing line for a relatively longer distance.	Least preferred
	Preferred	Least Preferred	Satisfactory	Satisfactory
Avifauna	Based on key avifaunal scores which include the length of the route, the distance through important bird areas, distance from Kruger Park, length of line adjacent to existing line as well as major river crossed. Route 1 scored 22 which is the lowest.	Based on key avifaunal scores which include the length of the route, the distance through important bird areas, distance from Kruger Park, length of line adjacent to existing line as well as major river crossed. Route 2 scored 32	Based on key avifaunal scores which include the length of the route, the distance through important bird areas, distance from Kruger Park, length of line adjacent to existing line as well as major river crossed. Route 3 scored 27	Based on key avifaunal scores which include the length of the route, the distance through important bird areas, distance from Kruger Park, length of line adjacent to existing line as well as major river crossed. Route 3 scored 26
	Preferred	Least Preferred	Satisfactory	Satisfactory
Socioeconomic	At finale village	Impact on Balule	Impact on Balule	

	Route 1	Route 2	Route 3	Route 4
	alternative 1 is positioned at a school gate and passes over number of dwellings. Impact on Balule Nature reserve as indicated above	Nature reserve as indicated above	Nature reserve as indicated above	
	No fatal flaw	No fatal flaw	No fatal flaw	No fatal flaw

11.2. PREFERRED ROUTE

Based on the impacts assessment, specialist studies and issues raised during the public participation. Route 1 is the preferred for the following reasons:

- Technically alternative 1 follows an existing line, therefore most of the access roads exist, this are the roads that will be used during construction. Consequently the use of existing roads will limit destruction of vegetation, which is considered to be of high conservation value in some parts. Further this route is the shortest route, which offers a cost saving benefit and causes the least disturbance to the environment.
- Visually, alternative 1 follows an existing 275kV line and this alignment is considered to cause the least impact primarily because viewers are already exposed to a similar power line which has a less significant landscape and visual impact on tourist and residents as compared to the other alternatives.
- Based on analysis of the K2C biosphere, the preferred route has minimal impacts on the identified highly sensitive environments.
- This alternative has through detailed studies proved to be the one with the least impact on bird species which are a key concern for the attraction of tourists in the area.

11.3. No-Go

The No-go option is not preferred for the following reasons:

- Not proceeding with the proposed development means no improvement in reliability of electricity systems which would benefit electricity users in the municipality, the region and country at large.
- Should this option be considered, the municipality and community will be deprived of a much needed essential service, particularly given the already existing problem with energy supply in the country.

- As much as it has no cost to the environment it, however, poses major economic disadvantages to the region.

The national electricity supply grid would be compromised in that it would not be possible to supply any additional electricity through the existing transmission network;

Eventually there would be insufficient electricity to meet the demand of all Eskom's customers which would lead to the interruption of supply to certain areas resulting in load shedding;

The dependability and quality of supply would be compromised resulting in serious regional and possibly national economic consequences.

Given the above the no go alternative has been dismissed as a feasible alternative.

12. A SUMMARY OF FINDINGS AND RECOMMENDATION OF ANY SPECIALIST REPORT

Seven specialist studies were undertaken during the EIA process and this includes the Ecotourism and Agricultural Specialist Study which were requested by the Department. The table below is a list of Specialist and their contact details.

Table 10: Specialist Details

Specialist Studies	Organisation	Specialist	Contact
Heritage Impact Assessment	Heritage Contracts	Jaco van der Walt	Cell:082 373 8491 Fax: 086 691 6461 jaco.heritage@gmail.com
Ecological Specialist	Eco-Agent	George Bredenkamp	Cell:082 576 6746 Fax: 012 460 2525 ecoagent@mweb.co.za
Social Impact Assessment	Dr. Neville Bews and Associates	Neville Bews	Cell: 0834517006 Fax:0865652853 Email: bewsc@netactive.co.za
Avifauna	Wild Skies	Jon Smallie	Cell:0824448919 Email: jonsmallie@gmail.com
Soil and Agricultural Potential	Agricultural Research Council	Garry Paterson	Tel : 0123102500 Fax: 012 323 1157 Email: Garry@arc.agric.za

Eco Tourism	Seaton Thomson and Associates	Brian Gardner	Tel : 012 667 2107 Fax: 012 667 2109 Email: info@seaton.co.za
Visual Impact Assessment	Outline Landscape Architects	Kathrin Hammel-Louw	Cell : 0832719631 Fax: 012 323 1157 Email: kathrin@outlinela.co.za

12.1. ECOLOGICAL SPECIALIST

George Bredenkamp of ECO Agent was appointed to undertake the ecological specialist study for the proposed project.

Following the assessment Alternative 3, which runs from Burgersfort to Ohrigstad along the R555, was eliminated, primarily because the route along the R555 runs for most of the way in a narrow valley, with the Mabitsana River and the tarred R555 in this valley. The line will have to run for most of the way on the sensitive mountain foot slopes and cross the river and road several times. Furthermore, many irrigated agricultural enterprises occur in the Ohrigstad area, stretching all the way to Marapeng. This mosaic of narrow river valley, river, mountain slopes and agriculture where-ever the valley is a bit broader, causes the route to be unsuitable. From an ecological perspective both the riverine vegetation and the vegetation of the mountain slopes have a high ecological sensitivity. Therefore this entire valley forms an ecologically sensitive ecosystem. This is also a much longer route.

Furthermore, from the desktop study, confirmed by the field survey, option 4, was eliminated. The line of this option runs through nine vegetation types, and over very high and steep mountains of Sekhukhune Mountain Bushveld and Ohrigstad Mountain Bushveld with two endangered ecosystems (Sekhukhune Mountain lands and Sekhukhune Norite Bushveld, SANBI & DEAT 2009), Pong Dolomite Mountain Bushveld with endangered Malmani Karstland (SANBI & DEAT 2009), the vulnerable Northern Escarpment Quartzite Sourveld (Mucina & Rutherford (2006), Northern Mistbelt Forest area and the vulnerable Tzaneen Sour Bushveld (SANBI & DEAT 2009). Especially the Great Escarpment area consists of very rugged and high mountains, resulting in a very difficult route with several threatened ecosystems.

The most difficult part of the route is from the Merensky substation through Ohrigstad Mountain Bushveld which is an extremely mountainous area with sensitive vegetation. This part of the line transects quite sensitive vegetation and it is suggested that a walkthrough in this area is essential.

The most serious limitation on the Lowveld plains where the line transects the Granite Lowveld vegetation type is the abundance of the protected tree *Sclerocarya birrea*. It is certain that several of these trees will be in the way of the route

Locally there are also rivers and spruits crossings. None of the rivers or spruits is too wide, so it is anticipated that the lines can easily cross these rivers or spruit systems, however, care should be taken to place pylons adequately away from river or spruit banks, avoiding any damage to the banks or water courses. Erosion should be avoided at all times.

Another factor in this area is that large properties are game farms and lodges. These areas are effectively conserved by the owners, and it is realised that the public participation is an important issue. After approval of the corridor, a walkthrough will have to confirm any issues regarding vegetation.

The study concluded that from an ecological perspective, Alternative 1 is the preferred route and recommended a walkthrough to ensure that sensitive areas are excluded for the construction of pylons.

12.2. VISUAL IMPACT ASSESSMENT

The Visual Impact Assessment was prepared by Outline Landscape Architects and this specific study addressed the visual effects of the proposed line on the receiving environment.

On evaluation of the site and assessment of activities associated with the proposed project, the specialist highlighted the major elements that may cause visual impacts and this included the construction camp laydown area, access roads and the transmission line. The towers of the transmission line are expected to cause the greatest visual impact.

The study further highlighted that along the 130km stretch the landscape character changes considerably through the study area as it is divided into distinct types which are relatively homogenous in character. The landscape types are distinguished by difference in topographical features, vegetation communities, land use, and human settlement patterns.

It was clearly described in the study that Landscape impacts are alterations to the fabric, character, visual quality and/or visual value which will either positively or negatively affect the landscape character. During the construction and operational phases, the project components are expected to impact on the landscape character of the landscape types it traverses. The magnitude/severity of this intrusion is measured against the scale of the project, the permanence of the intrusion and the loss in visual quality. Further the study highlighted the primary visual receptors which include residents, tourists, game farm residents and visitors as well as motorist.

A detailed analysis of the extent of the impact of the four routes was undertaken the impacts during construction and operation were discussed as follows:

Construction is expected to be moderate to low for all the Alternatives. The impact will extend over the entire length of the different alignments and may vary in degrees of severity along the linear length as it transects landscape types of varying VAC. Surface disturbances are also minimised through, for example, utilising existing roads. The severity of the landscape impact can however be mitigated to a low severity for all the Alternatives. Sensitive placement of the construction camps, limited surface disturbance and prompt rehabilitation are prerequisite conditions if the severity of impact is to be reduced.

The operational phase will pose an additional impact as a result of the presence of the completed transmission line, i.e. that of the evenly spaced towers. The industrial character and the near monumental vertical scale of the towers will be absorbed into the mountainous landscape character that prevails through most of the study area. The mountainous character and relatively high vegetation allows for some absorption of the towers into the landscape. However the pristine character of part of the study area will need to be protected as it is vulnerable to human intervention. It is considered as a landscape amenity that provides the study area with a unique and valued sense of place. This quality of the landscape will be moderately affected with the presence of a transmission line of this scale and extent.

Considering the extent of the proposed alternatives, a great number of tourists may be affected during their visit to the area. The study highlighted that it would be difficult to pinpoint particular locations in the study area that are of specific value, however, the areas next to the roads were viewed as the most critical. The specialist emphasised that the presence of a transmission line in the existing pristine landscape areas would spoil the picturesque views that are experienced over the valleys and plains, especially when in close proximity to the power lines.

The study concluded that Route 2 and 4 will cause the greatest visual intrusion for tourists travelling through the study area because it proposes new power lines in the landscape whereas Route 1 only follows along an existing line. Route 3 is only a short deviation from the route that will run parallel to the existing line and runs along a main transportation route.

The presence of the transmission line in the field of the tourists, in the study area, will only have a high significance on tourists in near proximity to the power line, which will be mainly along main transportation routes. The high VAC of the landscape allows the power lines to be absorbed into the landscape. The severity of the visual impact of the power lines on tourists will be moderate, causing a moderately significant visual impact.

The specialist study proposed Route 1 as the most preferred alternative primarily because its alignment follows along the existing lines and servitudes and will cause the least impact on the landscape character due to the reduced sensitivity of the landscape along the roads and servitudes.

12.3. AVIFAUNAL

The Avifaunal specialist study was undertaken by Jon Smallie of Wild Skies. The study indicated that projects of this nature have the potential to impact on avifauna through: habitat destruction and disturbance of birds (both during construction and operation); and collision of birds with the overhead cables during the operational phase. Birds are also able to cause electrical faults on the power line through mechanisms that are detailed in the specialist report.

The study assessed the potential impacts and recommended mitigation measures. A summary of such impacts is as follows;

- The impact of collision of certain bird species with the overhead cables (in particular the earth wires) has been judged to be of medium significance. This can be reduced to low significance with mitigation. In order to implement effective mitigation it will be necessary to conduct an avifaunal walk through as part of the site specific EMP. This will identify those exact spans of the power line that require mitigation.
- Destruction and alteration of habitat will be of medium significance. Since this is difficult to mitigate for (a certain amount of vegetation has to be removed or altered), it is not possible to reduce this to low significance with mitigation.
- Disturbance of birds is judged to be of low significance. However, if breeding threatened raptors are found close to the alignment this would change.
- The risk of electrical faulting caused by birds is judged to be of medium significance. This is however an impact on the business, not the birds, and is best mitigated reactively if a problem is identified once the line is operational.
- This proposed power line route passes through an area that is rich in avifauna, due to its varied geology and vegetation, and the protected status of much of the land (by virtue of game farming). This means that the potential interactions of birds with the power line are likely to be significant, however, given that a power line of this size has to be built between these two substations (we assume that effective network planning has been conducted), the proposed routes do collectively provide opportunity to route the line as wisely as possible with respect to avifauna.

Following the impact assessment, the specialist highlighted that the preference is to build the proposed power line adjacent to the existing line. He emphasised the need to comply with the recommendation made in his study and included in the mitigation measures. He concluded that if the recommendations of this report are adhered to, this project can proceed.

12.4. HERITAGE

The Heritage specialist was undertaken by Jaco Vander Walt of Heritage Contracts. The study revealed that a range of heritage sites are present in the larger region and similar sites can be expected within the study area. In his report he highlighted that archaeological remains dating from the Stone Age and Late Iron Age as well as other historical finds can be expected in the study area. The study revealed that some sites on route option 3 might have conservation value. The following conclusions were made:

Archaeological sites - All sites could be mitigated either in the form of conservation of the sites within the development or by a Phase 2 study where the sites will be recorded and sampled before the client can apply for a destruction permit for these sites prior to development.

Historical finds and Cultural landscape - Route option 3 contains historical sites that might be of high heritage value. Depending on the preservation of the sites the proposed power line can have a high negative impact on option 3 of the power line. For the other route options it is not anticipated that the built environment will be severely impacted upon as very little structures occur directly under the power lines and these sites could be mitigated in the form of conservation of the sites with in the development or by a Phase 2 study where the sites will be recorded.

Burials and cemeteries - Formal and informal cemeteries as well as pre-colonial graves are present widely across Southern Africa and the existence of such is true for this particular alignment. It is generally recommended that these sites are preserved within a development. These sites can how ever be relocated if conservation is not possible, but this option must be seen as a last resort. The presence of graves has been confirmed during the field survey and the public consultation process.

The specialist identified possible impacts and proposed mitigation measures. The study identified sites of significance along each one of the proposed alternatives, where Route 1 had 9 significant sites, 2 had 3, route 3 had 8 while route 4 had 7 sites of significance along their stretch. The power line is expected to have a low to medium impact on a local scale and it will further have a Generally Protected A (GP.A) field rating.

In conclusion he highlighted that from an archaeological perspective, his order of preference would be Route 4, Route 2, Route 1 and then route 3 being the least preferred.

12.5. AGRICULTURAL SPECIALIST

The agricultural specialist study was recommended by the DEA and undertaken by D.G. Paterson of ARC Institute for Soil, Climate and Water. The study revealed that the northern eastern part of the route is

dominated by low agricultural potential while the area southward is predominantly rocky with a mix of low to high agricultural potential.

With regard to erodibility, the study indicated that the soil in the area is not highly erodible; however the erodibility varies according to topography. Furthermore the study indicated that the removal of vegetation for construction particularly on steeper slopes will accelerate erosion.

The report highlighted that the impacts of constructing a transmission line would be negative, as the natural environment will be disturbed. However, the specific significance on the potential loss of agricultural soil, as well as soil disturbance was assessed to be of low significance.

The specialist highlighted that there are no fatal flaws regarding the study area, however, there are a number of sensitive areas that should be avoided, namely wetlands soil along the river courses.

In his conclusion he stated that there is no preferred route as the differences between the various alternatives appear to be very minimal and to this end mitigation measures were recommended.

12.6. SOCIAL IMPACT ASSESSMENT

The Social Impact Assessment was undertaken by Dr. Neville Bews of Dr. Neville Bews & Associates. The study elaborated that the proposed alternatives traverse various farms, including game farms, nature and game reserves, residential and industrial areas. The area is characterised by high levels of poverty, unemployment and an unequal distribution of income with relatively low service delivery. The prevalence of HIV and AIDS amongst antenatal women in the area is at its highest in Mopani at 24.9% and lowest in Sekhukhune at 20.2% which is somewhat lower than the national average of 30.2%.

The study assessed 20 impacts associated with the project that were identified during the scoping phase, across each of the 4 alternative routes. In respect of both the construction and operational phases of the project, it highlighted that the generation and supply of electricity is associated with the following 3 somewhat contentious issues which include:

- Scarcity of suitable sites on which to place new infrastructure- This conflict emphasises the need to attempt to balance the national interest of securing a dependable electricity supply network against the interests and welfare of neighbouring communities.
- Exposure of people and animals to electromagnetic fields (EMFs) -these fears need to be noted and addressed in the light of this mounting evidence.
- Potential decline in property values associated with both EMFs and the visual impact of transmission lines. All of which are apparent with respect to this project.

In this regard a number of I&APs, north-east of Hoedspruit and to the east of the R40 between Hoedspruit and Phalaborwa, extending along both sides of the Olifants River for approximately 40 km, have raised their concerns.

In light of these impacts the study indicated that most impacts are related to the construction phase of the project and that many of these impacts could be reduced through appropriate mitigation measures being applied. Amongst the more serious impacts were those relating to the operational phase of the project and associated with health issues and property values.

Concerns that were identified are as follows:

- Alternatives 1, 2 and 4 all affect a number of properties within the Balule Nature Reserve and the management of the reserve believes that this will negatively impact the vision, mission and objectives of the reserve, thus having a negative effect on the future management of the value of properties in the reserve.
- In the village of Finale, a pylon associated with Alternative 1 is positioned at the gate of a primary school and the transmission line will pass over a number of dwellings and will affect a number of burial sites.
- The village of Alverton also has a number of dwellings positioned directly under the transmission line and, at the village of Mashamthane a law firm has been built directly under the proposed line.

The study further made the following consideration: the

- Considering the no-go alternative is likely to have even greater social consequences, particularly if the security of electricity supply is compromised. With the various developments, both industrial and residential, taking place in the country the need to secure a dependable electricity supply is of national importance and consequently the no-go alternative is not a viable option.
- Considering the social effects of this project and the clear need to strengthen the electricity grid in this region a compromise will need to be negotiated between project proponents and affected parties. Further to this, consideration will need to be given to the technical limitation that a project of this nature faces as well as to the broader environmental threats it poses in respect of such matters as fauna and flora and threats to sensitive natural areas.

In conclusion the study ascertained that the nature of the transmission line is such that it is possible to retain a route alternative while making more localised adjustments in an effort to accommodate local conditions. The study did not directly identify the preferred route but rather highlighted the challenges of all routes with the exception of Route 3 which the specialist did not elaborate on. The study therefore emphasised the need for localised adjustments which will only become evident during the corridor walk-down of the approved route, when the central line and footprint of the transmission line and towers will be pegged and any flaws to the initial route identified.

12.7. ECO-TOURISM

The Eco Tourism specialist study was undertaken by Brian Gardner of Seaton Thornton. The study was done in two phases; Phase 1 was a preliminary desktop study that identified Eco tourism facilities within the study area with specific focus on those along the proposed routes. Further the report highlighted the key issues that were raised from an Ecotourism perspective. Consequent to the consultation with the affected landowners the report proposed that the Green route be relocated slightly to the north to reduce the need to construct new tracks. Phase two of the study included field visit and interviews with the affected parties, highlighted the state of the tourism industry, assessment of the alternatives including an impact assessment.

According to the specialist’s impact assessment, of the four alternatives Route 3 i.e. the pink Route was considered to be one with the least impact from an ecotourism perspective. Further the additional route that was recommended by the I&As was considered to have the least impact. In his conclusion he highlighted the widespread concern regarding the proposed line and the importance of preserving large areas of land for sustainability. Recommendations were made to relocate the route as depicted in the map below.

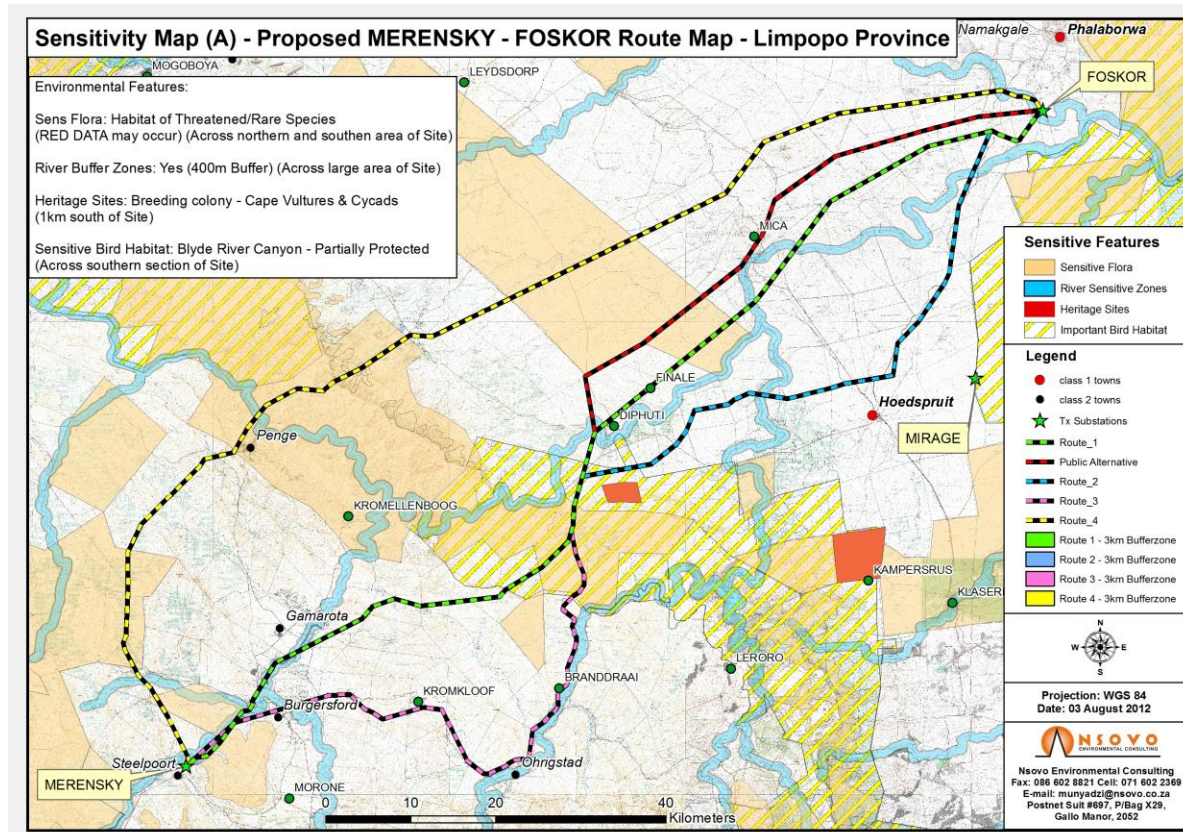


Figure 13: Map indicating recommendation by I&AP

13. DESCRIPTION OF THE ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS IDENTIFIED

This section of the Draft Environmental Impact Report describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified have been assessed based on the EAP's opinion after numerous visits to the area, specialist input, I&AP issues and comments ascertained through the public participation as well as previous experience on similar undertakings.

Table 11: Environmental Issues and potential impacts identified:

Issue	Rating	Description
Employment	Positive-No mitigation required	Job creation and investments into the project result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive.
Air Pollution	Neutral	The only potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Given the nature and magnitude of the proposed project it is anticipated that if not mitigated the impact may be local in extent, and short term. Mitigation measures such as regular dust suppression can reduce the impact to become site specific.
Visual Impact	Negative	The visual impact of the power lines would be at its maximum at distances of 500 m or less. However, the visual impact of an object in the landscape decreases quickly as the distance between the observer and the object increases. The visual impact at 1 km is approximately a

Issue	Rating	Description
		<p>quarter of the impact viewed from 500 m, and at 2 km, is one eighth of the impact viewed from 500 m. Therefore, objects appear insignificant in any landscape beyond 5 km.</p> <p>The visibility of the proposed structure and infrastructure would be a function of several factors, including: landform, vegetation, views and visibility, genius loci (or sense of place), visual quality, existing and future land use, landscape character and scale.</p> <p>The proposed activity will indeed change the visual character of the area particularly considering that the proposed route is located in an area that is undulating; the slightly elevated points of the line may be viewed from a distance, while the stretch that directly crosses communities will be viewed at a close range. Local variations in topography and man-made structures will cause local obstruction of views in certain parts of the view shed. Given the topography of the site and the exact location of the route the impact can be considered definite, long term, local in extent and low to medium in significance.</p> <p>A visual impact specialist was appointed to assess the extent of the impact and the findings form part of this report. The report is attached.</p>
Flora and Fauna	Negative	<p>Various plant and animal life were noted on site. As with most large scale infrastructure construction, vegetation clearance is a requirement which is a disturbance of the natural ecosystem and must be taken into consideration.</p> <p>The destruction of vegetation in preparation for construction activities of the proposed line will negatively impact on habitat, and consequently the faunal elements of the receiving environment.</p> <p>An Ecological specialist was appointed to assess the impact of the proposed project on ecology and the findings form part of this report. The report is attached.</p>

Issue	Rating	Description
Noise	Negative	<p>In South Africa, the assessment of noise levels in the environment is governed by the South African Bureau of Standards (SABS) noise standard 0103 – ‘The measurement and rating of environmental noise with respect to annoyance and to speech communication’ (SABS 1994). Additional SABS standards cover the measurement of noise over different distances from the source (SABS 0357 – ‘The calculation of sound propagation by the Concawe method’), and standards for different sectors (e.g. industry). SABS 0103 (SABS 1994) and SABS 0357 (SABS 2000) are used extensively in this report.</p> <p>An increase in noise is expected due to construction, which might have an impact especially on the surrounding lodging facilities, residential settlements as well as the adjacent schools in Finale and Diphuti. Noise associated with the construction activities can be mitigated by limiting the construction operation to business hours, during which noise will not be of such a big concern to surrounding residents. According to the SABS 103 acceptable noise levels at day time is 45DbA. A noise intrusion is disturbing if it exceeds 7DbA or more. Given the nature of the project it is highly unlikely that the stipulated noise levels will be exceeded at any given time. During the operational phase the impact of noise will also be reduced to almost insignificant levels</p> <p>Given the proximity of the line to some community facilities, noise during the construction phase may be a disturbance, however, given the short span of the construction phase it can be managed.</p>
Land Use	Negative	<p>The proposed study area has varying land uses ranging from mining to small scale farming. The primary uses identified are game and livestock farming as well as limited crop farming. The proposed project is expected to have a considerable impact particularly during construction while the extent and severity of the operational impact will be greatly reduced as the land uses will continue.</p>

Issue	Rating	Description
		<p>Given the sensitive nature of the area as well as its tourism potential, an Ecotourism study was commissioned and its findings form part of the report.</p>
Bird Population	Negative	<p>The interactions between birds and electrical infrastructure i.e. power lines can be divided into direct and indirect interactions. Direct interactions occur when birds collide with power lines, possibly because they fail to see the wires as they are focusing on something that lies beyond, e.g. a perch or food source. Birds might also be killed by striking power lines support structures. The likelihood of birds colliding with power lines depends on:</p> <ul style="list-style-type: none"> • The positioning of the power lines in the landscape - Differences in vegetation, topography, elevation and species composition can influence risk, as can proximity to food sources and roosting areas; power lines placed in valleys, on ridges, near water or on steep hillsides are dangerous to birds. • Land use - Agriculture (e.g. crop types, harvest times and methods) can have a large influence on bird abundance and behaviour; a high abundance of birds may be associated with seeding, cultivation and harvesting. • The type of birds being considered are medium to large birds that are generally at higher risk; day flying raptors, especially buzzards, eagles, griffons and kestrels, certain pigeons, owls, and (possibly) coots are higher risk. Particular species may be more at risk, as their flight characteristics differ. • The type of flight - Birds undertaking local flights tend to fly lower than birds on migratory flights, and migrants are generally only at risk near roosts. • Weather conditions - Rain, fog and wind may increase the risk of birds flying into turbines; birds tend to fly lower during strong headwinds, but slow winds can prompt large soaring birds to fly lower. <p>Indirect interactions occur when wind turbines cause changes in the environment, which in turn</p>

Issue	Rating	Description
		<p>cause some birds to interact more strongly with the turbines. For example, disturbance of the soil during construction may cause an increase in the number of rodents in the area, which then attract birds of prey to the area. Similarly, seed eating birds may be attracted to construction sites in the short term. Disturbance and habitat loss could also cause some bird species to abandon the area.</p> <p>For the proposed project major risks to wild and domestic birds may be caused by construction activities (temporary), on-going disturbance during operation phase (semi-permanent), collision wires, collision with supporting power line and electrocution on associated power line.</p> <p>This impact is local, long term, high probability and significant. If proper measures are in place the impact can be reduced to medium or low in significance.</p> <p>An avifaunal specialist study was undertaken and the findings and recommendation forms part of this report. The specialist report is attached.</p>
Soil Erosion	Negative	<p>Movement of heavy machinery across the land as well as vegetation clearance may cause destabilisation of soils which then become susceptible to erosion. Continuous movement of vehicles over the land during the construction phase may leave it susceptible to erosion.</p>
Heritage	Negative	<p>The heritage significance of each site has been assessed in terms of the National Heritage Resources Act. During the scoping phase cemeteries and private burials within households were noted particularly in Finale. The existence of these graves along the corridor requires specialist attention, hence a specialist HIA was appointed to identify and assess the extent of the impact of the proposed project on heritage resources and the specialist findings and recommendation</p>

Issue	Rating	Description
		forms part of this report.
Surface and Ground Water Pollution	Negative	<p>The proposed alternatives cross water resources and the potential impact would include water decreased in water quality, impediment or diversion of flow, altering the banks or bed of a river and potential contamination of surface and ground water due to construction activities. This could result from fuel spillages, sewer systems etc. The impact on water is site specific but can be local or regional if proper measures are not put in place.</p> <p>There will be a need to apply for a water use license with DWA considering the number of crossings and proximity of the line to water resources.</p>
Climate	Neutral	<p>Local climate conditions do not appear to be of a significant concern to the proposed project. The stretch between the Greater Tubatse areas is highly mountainous, hence prone to lightning. Measures will have to be put in place during the design of the structures to ensure diversion. In a broader scale the project will have no impact on the local and/or global climate change.</p>
Social Environment		<p>The construction phase may have an impact on the surrounding residents if not properly managed. It could result in the disturbance of residents due to construction related activities. Other impacts may be safety, considering the proximity of the primary schools to the proposed line. The potential increase in traffic may pose a safety risk to surrounding residents, particularly scholars. Other social related issues may include theft; however, this will be local.</p> <p>Traffic</p> <p>During the construction phase increased heavy vehicle traffic should be expected. Without management, such increased traffic loads may negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users and uncontrolled movement of construction vehicles may result in unnecessary impacts to the</p>

Issue	Rating	Description
		<p>environment through vegetation and habitat destruction.</p> <p>Employment and Community Related Impacts</p> <ul style="list-style-type: none"> • The likelihood of employment opportunities may result in an influx of workers to the area, thereby impacting existing community networks and perceptions of safety and crime levels. • Unmanaged workforce may result in illegal township establishment and increased numbers of informal settlements which may negatively impact a range of environmental elements.

14. AN ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT

14.1. IMPACTS THAT ARE LIKELY TO RESULT FROM THE PLANNING AND DESIGN

Kindly note that the impacts identified are similar for alternative 1, 2, 3 and 4

Direct Impacts:

14.1.1. Employment Creation

The planning and design of the development requires input from various individuals, resulting in employment opportunities for such persons. This employment would include both direct (e.g. Environmental Consultants, Engineers, Project Managers, Planners, etc.) and indirect (e.g. reviewing and commenting authorities such as the local authority planning authorities and the environmental authorities). The extent and magnitude of this impact is relatively low and short term in duration compared to the other economic impacts, and is typically restricted to a limited number of professionals. The

significance is rated as medium and no mitigations were identified for this project.

All the identified alternatives are likely to result in the same level of significance for this impact. Only the No-go Alternative would differ in that this impact would not occur.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Employment Creation	No	Positive	3	2	8	4	(30-60) Medium
	Yes						
Corrective Actions	No mitigation measures have been identified.						

Indirect Impacts: None identified

Cumulative Impacts: None identified

No-go alternative

Direct Impacts: The no-go alternative would result in the benefit of additional employment opportunities not occurring. None of the impacts identified for the proposed activity will occur (including positive and negative impacts) if the proposed activity does not proceed.

Indirect Impacts: None identified

Cumulative Impacts: None identified

14.2. CONSTRUCTION PHASE IMPACTS

Kindly note that the impacts identified are similar for alternative 1, 2, 3 and 4

Direct Impacts:

14.2.1. Change in land use

It is expected that the proposed 275Kv line would form a focal point in the area, which might lead to a change in land use in the surrounding areas. The proposed study area is currently used for mining, game farming, agriculture, residential, recreational purposes as well as transmission of electricity. The proposed activity may have an impact on the land use character of the site although insignificant. However, the size of the area that will be used for the proposed project will be relatively small as compared to the area that can still be used to fulfill other societal and socioeconomic needs.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Change in land use	No	Negative	1	4	4	5	(30-60)= Medium
	Yes	Negative	1	4	2	2	(<30)=Low
Corrective Actions	<ul style="list-style-type: none"> Care must be taken to ensure that land is not contaminated and destroyed as a result of construction activities. Where damaged, land must be rehabilitated immediately to return it to its previous/original state. Activities must be restricted to the demarcated construction site 						

14.2.2. Impact on Biodiversity

During construction some plants species will be removed on the proposed site footprint. The study area has 11 vegetation types whose conservation value and sensitivity ranges from medium to high. The footprint of each pylon is relatively small, therefore it can be concluded that the impact on vegetation will be medium. The fauna identified were birds, rodents, and other small flying and crawling insects. The impact on flora and fauna will be manageable as very little vegetation will be removed to clear the site for construction. The following potential impacts on fauna and flora might occur as a result of the proposed project:

- Vegetation clearing could result in loss of vegetation from the construction footprint.
- Loss of habitat for animal species from the construction footprint.

Every effort should be made to minimize the disturbance to the surrounding vegetation. It is anticipated that the loss of biodiversity for the proposed site and its surroundings will be of a medium negative significance due to the scale of the proposed development. Implementation of the suggested corrective measures will ensure that this impact has a low level of significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Loss of biodiversity and habitat	No	Negative	1	5	3	5	(30-60) Med
	Yes	Negative	1	5	2	5	(0-30) Low
Corrective Actions	<ul style="list-style-type: none"> • Vegetation clearing should be limited to areas that will be occupied by the development footprint. • The identified threatened species must be rescued and replanted in a suitable area. • Where possible large trees should be left intact. • Special care will be needed in the crossing of the spruit systems. • Hunting and killing of fauna for any reason should not be allowed. • No indigenous fauna to be hunted or killed on the site • The Environmental Control Officers are to be informed if any endangered species are observed during construction; relevant specialists should be called. • Only indigenous plant species should be planted in areas where rehabilitation is required. • Prevent the establishment and spread of alien invasive species and weeds during the construction phase. 						

14.2.3. Fauna (Avifauna)

The construction phase will warrant the removal of vegetation to clear the way for construction activities. This destruction of habitat will have which will be site specific and given the length of the line it’s most likely going to be local. Although the construction phase will be short term the impact will be long terms as maintenance and bush clearing will continue while operation has ceased. This impact is negative and of minimum significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Habitat destruction and alteration during construction	No	Negative	2	4	3	4	36 Medium
	Yes	Negative	1	4	3	4	32 Medium
Disturbance of Bird during construction	No	Negative	1	2	4	3	21 Low
	Yes	Negative	1	2	4	2	21ow
Corrective Actions	<ul style="list-style-type: none"> • Standard Construction best practice must be followed • Care must be taken if any breeding sensitive species are encountered close to the servitude. • Case specific advice should be sought from the avifaunal specialist when and as required. • Key sensitive areas must be avoided as far as practically possible. 						

14.2.4. Soils and erosion

The loss of topsoil in South Africa is a national concern and thus erosion control should be taken seriously. Soil erosion may occur during the construction phase due to:

- Excavations particularly on steep slopes.
- Ineffective storm water management
- Excessive use of gravel roads

The impact will be limited due to the fact that has already been cleared due to past agricultural and or mining activities; therefore any additional erosion is expected to be minimal. Provided that adequate soil erosion measures are implemented during the construction phase of the proposed activity, this impact can be deemed to be of low significance. Where soils are highly erodible, adequate measures must be implemented to prevent undue soil erosion.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Soils and erosion	No	Negative	2	2	6	2	(0-30) Low
	Yes	Negative	1	1	4	1	6 Low
Corrective Actions	<ul style="list-style-type: none"> Implementation of anti-erosion measures such as the construction of berms to reduce the water velocity is essential. Storm water runoff shall be considered and its flow controlled on the construction site. Foundation excavations for each structure must be inspected by a competent person during construction. In the event of significant erosion occurring, adequate corrective measures must be implemented to prevent any further soil loss. Care should be taken to place pylons adequately away from river or spruit banks avoiding any damage to the banks or water courses. 						

14.2.5. Impact on Traffic

During construction, increase in traffic is likely to result from delivery of construction materials to and from the construction site. The proposed routes crosses a number of regional roads therefore there is a likelihood that during stringing some traffic disruption would occur. However, construction techniques are available that will keep this disruptions to a minimal level. The impact of increased traffic can be considered negative short term and medium in significance. With the implementation of proper mitigation measures, it can be reduced to low significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Traffic	No	Negative	2	3	6	4	44 Medium
	Yes	Negative	2	2	4	3	24 Low
Corrective Actions	<ul style="list-style-type: none"> The delivery of construction material and equipment should be limited to hours outside peak traffic times (including weekends) prevailing on the surrounding roads. 						

- Delivery vehicles must comply with all traffic laws and by laws;

14.2.6. Air pollution

Construction activities on the site will lead to land clearing and disturbance to the soil resulting in dust creation. The one direct potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Furthermore movement of construction vehicles also represents temporary, but important sources of particulates and dust deposition that can be respired. Given the nature and magnitude of the proposed project it is anticipated that minor dust will be generated from the construction activities. The potential impact on air quality will be short term and can be controlled. Proper implementation of recommended corrective measures will reduce the impact to become insignificant and of very low probability. It is therefore anticipated that this impact will be limited and of low negative significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Air pollution	No	Negative	2	1	4	4	28 Low
	Yes	Negative	2	1	3	3	21 Low
Corrective Actions	<ul style="list-style-type: none"> • Unnecessary clearing of vegetation must be avoided. • All exposed surfaces subjected to dust generation must be managed with appropriate dust suppression methods including amongst others, the use of water tankers etc. • Vehicles speed limit should be imposed to reduce potential dust • Unnecessarily exposed surfaces should be rehabilitated after the construction period. • The amount of exposed soil at a particular time must be limited. • Vehicles transporting load beds must be covered to prevent them from being blown by wind when transported. 						

14.2.7. Surface and groundwater pollution

Given the existence of several rivers and spruit crossings along the transect routes there is a risk that construction material may pollute the surface and/or ground water on site. Substances such as cement residue, bio fuels, and paints must be adequately controlled. In addition exposed surfaces during construction would provide a source of sediments to be taken up by storm water and resulting in down-stream sedimentation of water resources. Care must be taken during construction to prevent leaks and spillage of materials that may detrimentally affect water quality (especially fuels and chemicals). Adequate measures must be put in place to prevent runoff of construction debris to nearby streams or water bodies. If construction takes place during the rainy season, storm water will have to be managed appropriately to reduce the opportunities of construction debris being washed off. This impact is of medium negative significance and can be reduced to a low significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Surface and ground water pollution	No	Negative	3	3	6	3	3 6 Medium
	Yes	Negative	2	2	4	2	1 6 Low
Corrective Actions	<ul style="list-style-type: none"> • Adequate measures must be taken during construction to manage storm water runoff. • Storage of fuel on site must be in bunded areas. • Care must take not to spill fuels or oil during service or re-fuelling of construction equipment. • In the event of a spillage of a hazardous substance the requirements of the EMP must be implemented. • Attempt should be made to schedule construction during the winter months (dry season). • Possible leaks and spills of hazardous substances into the ground should be avoided at all times. • In the event of a spillage of a hazardous substance the requirements of the EMP must be implemented. • Obtain Water Use License as appropriate and ensure compliance with the conditions 						

14.2.8. Waste Management

During the construction phase there will be a variety of waste materials produced. The building contractors must adhere to all proposed measures and provide adequate waste skips and bins around the site. Waste must be regularly removed from site and disposed of at appropriate waste disposal sites.

Issue	Corrective measures	Impact rating criteria					Significance	
		Nature	Extent	Duration	Magnitude	Probability		
Waste generation and management	No	Negative	2	3	8	2	26	Low
	Yes	Negative	1	2	6	2	18	Low
Corrective Actions	<ul style="list-style-type: none"> • No waste should be buried on site or incorporated into the foundation trenches. • The work force must be encouraged to sort waste into recyclable and non-recyclable waste. • No burning of waste is allowed on site. • Waste must be regularly removed from site and disposed of at a registered waste disposal facility. • Where permits are required, it must be obtained from the relevant authority. 							

14.2.9. Noise pollution

The study area consists of primarily farms which are used for agriculture, game as well as for residential purposes. The potential impact of noise will vary from area to area, wherein some areas are more remote and not habitable while some areas are inhabited. The impact of noise on the northern part of the proposed routes would be more significant given the ambient noise levels, however it will pose a lower impact as the area is less populated. While the southern part of the proposed route consist of primarily residential settlements and commercial, wherein given the ambient noise levels and the activities in the area the additional noise from the proposed project may not be significant. There are no major sources of noise adjacent to the route alignment; however the construction process is likely to result in an increase in noise levels due to construction vehicles, machinery which can be a nuisance during the construction. The level of noise and the distance it will travel will depend entirely on the prevailing construction activities within the site which will include groundwork, foundations, hauling of building material to and from specific area assembling of equipment. The additional noise will be local, short term in duration and low in significance. Noise associated with the construction activities can be mitigated by limiting the construction operation to business hours, during which noise will not be of such a big concern to surrounding residents.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Noise pollution	No	Negative	2	1	4	3	21 Low
	Yes	Negative	1	1	2	2	12 Low
Corrective Actions	<ul style="list-style-type: none"> It must be ensured that all vehicles used during construction are appropriately maintained. Surrounding residents should be notified in advance of construction schedules. Working hours must be restricted to daytime only (8am – 5pm). Selecting equipment with lower sound power levels which is in accordance with the IFC'S Health and Safety Regulations Taking advantage during the design stage of using natural topography as a noise buffer 						

14.2.10. Safety and security

The proposed routes transverse game farm that are privately owned and managed these game farms are home to an array of wild animals including predators, therefore the safety and security of the construction workforce is a concern similarly the safety of wild animals such as the white and black rhino is also an issue of concern. Furthermore people and animals in the area may be at risk as a result of on-site activities (e.g. falling into holes, being knocked over by vehicles etc.). The presence of the construction workforce within these private properties is a potential risk to the surrounding landowners in terms of safety, crime and security. The significance of the potential impacts without the corrective actions (adequate safety measures in dangerous areas) is considered to be of high significance. The implementation of corrective actions could reduce the impacts to a low level of significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Safety and security	No	Negative	3	2	8	5	65 High
	Yes	Negative	1	2	6	3	27 Low
Corrective Actions	<ul style="list-style-type: none"> Liaison with landowners prior to entering their properties Access to the construction site should be controlled. 						

- Warning signs should be placed on site to make people aware of the dangers.
- No-go area should be clearly demarcated, marked and visible.
- Where necessary, particularly where there is a threat to wild life due to poaching, additional security should be provided
- Landowners must be kept abreast with movements in and around their properties
- Health and safety standards and guidelines must be implemented.
- The construction site must be delineated and properly fenced off particularly within the game farms. Fencing must be inspected weekly and ensure it is properly maintained by the contractor until completion.
- It must be ensured that personnel undertaking the construction work do so when conditions are safe (i.e. no work at night, no work during unfavorable weather conditions, etc.).
- Consequently, the time spent by construction crews on site permanently must be kept to a minimum.
- The construction crew should be clearly visible and identifiable so that they can be differentiated from ordinary members of the public.
- There should be warning signs that are clear and visible on the site.
- Construction vehicles should be fitted with warning signs and devices to warn personnel in case of dangerous maneuvers (e.g. reversing).
- No construction personnel may be allowed to stay overnight on site except for the security personnel.
- The construction site must be clearly demarcated and indicated by barrier tape and/or proper fence.
- The gate around the construction site must be closed at all times.
- No hunting of any form shall be allowed.

14.2.11. Fire hazards

There may be some increase in the risk of veld fires as a result of construction activities and these would result from activities such as smoking and cooking food, storage of fuel and other flammable solvents on site. These uncontrolled fires on site could cause damage to infrastructure and the biophysical environment and impact on the working environment. This impact is considered to be of medium significance. Should the recommended mitigation measures be implemented, the significance of the impact will be even lower and negative.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Fire hazards	No	Negative	2	2	4	4	32 medium
	Yes	Negative	2	2	4	2	16 Low
Corrective Actions	<ul style="list-style-type: none"> • Camp sites and laydown areas will not be allowed within the nature reserves and sensitive sites • Areas where flammable substances are kept must have proper warning signs on display (highly flammable, No smoking etc.) to warn personnel on site of risk associated with such areas. • No burning of waste and cooking will be allowed on site. • Contracting personnel must be well versed in the relevant existing fire and safety management procedures and activities on site. • Implement fire hazard sensitive on- and offloading procedures; • Designate a site safety official and ensure that personnel are adequately trained regarding fire hazards and procedures. 						

14.2.12. Visual Impact

The temporary duration of the construction phase is not expected to cause major visual impacts. The regulation of the severity of this impact highly depends on the location, number and size of the construction camps. During construction the visual impact will primarily be from the access roads, construction camp and laydown areas as well as cleared servitudes. These impacts will be site specific and of medium significance, with mitigation measure in place the impact will be low.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Cultural and heritage resources	No	Negative	2	2	6	4	40 Medium
	Yes	Negative	1	2	4	3	21 Low

Corrective Actions	<p><u>Access Routes</u></p> <ul style="list-style-type: none"> • Make use of existing access roads where possible; • Where new access roads are required, the disturbance area should be kept to a minimum. A two track dirt road will be the most preferred option; • Locate access routes so as to limit modification to the topography and to avoid the removal of established vegetation; • Avoid crossing over or through ridges, rivers, pans or any natural features that have visual value. This also includes centers of floral endemism and areas where vegetation is not resilient and takes extended periods to recover; • Maintain no or minimum cleared road verges; <ul style="list-style-type: none"> • Access routes should be located on the perimeter of disturbed areas such as cultivated/fallow lands as not to fragment intact vegetated areas; and • If it is necessary to clear vegetation for a road, avoid doing so in a continuous straight line. Alternatively, curve the road in order to reduce the visible extent of the cleared corridor. <p><u>Construction camp Laydown area</u></p> <ul style="list-style-type: none"> • If practically possible, locate construction camps in areas that are already disturbed or where it isn't necessary to remove established vegetation like for example naturally bare areas; • Utilise existing screening features such as dense vegetation stands or topographical features to place the construction camps and lay-down yards out of the view of sensitivity visual receptors; • Keep the construction sites and camps neat, clean and organised in order to portray a tidy appearance; and • Screen the construction camp and lay-down yards by enclosing the entire area with a dark green or black shade cloth of no less than 2m height. • Keep the construction camps away from existing residents and especially lodges and tourist venues. <p><u>Cleared Servitudes</u></p> <ul style="list-style-type: none"> • Locate the alignment and the associated cleared servitude so as to avoid the removal of established vegetation; and
--------------------	---

- Avoid a continuous linear path of cleared vegetation that would strongly contrast with the surrounding landscape character. Feather the edges of the cleared corridor to avoid a clearly defined line through the landscape.

14.2.13. Job creation

The proposed development will have the capacity to produce considerable opportunities of employment during the construction phase, the job opportunities will however, be limited as the construction process is put out to tender and contractors who usually have their own skilled workforce are appointed to undertake the construction. The construction activities will also result in a demand for equipment, building material and labour. The use of local labour would have a positive impact on the local economy and promote skills transfer. The significance of this impact is anticipated to be medium positive.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Employment creation	No	Positive	3	4	6	3	39 Medium
	Yes						
Corrective Actions	<ul style="list-style-type: none"> • Ensure the prioritisation of locals as and when opportunities arise • Utilise local labour where possible • Create opportunities for the employment of women • Where possible use labour intensive methods of construction • Go beyond the minimum wage rate and invest in local staff 						

14.2.14. Influx of job seekers

Construction activities will require a well-established work force. The workmanship required may not necessarily be available from the local communities and result in workers being sourced from other communities. In addition there may be a likelihood of migrant workers (including unskilled labourers) moving into the area in search of employment. These workers could have an impact on the social structures present in the local communities due to the

lengthy period of construction.

- The threat of HIV/Aids and other STI’s may also have an impact on the local community resulting from an influx of migrant labourers to the areas surrounding the site.
- Increased risk of criminal activities due to influx of workers.
- Social instability on existing families

With the implementation of the suggested mitigation measures the significance of the impact can be reduced from medium negative to low negative.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Influx of job seekers	No	Negative	3	4	4	3	36 Medium
	Yes	Negative	2	3	2	2	21 Low
Corrective Actions	<ul style="list-style-type: none"> • Ensure that employment procedures and policies are communicated to local stakeholders, especially community representative organisations and ward councilors. • Raise awareness amongst construction workers about local traditions and practices. • Ensure that the local community communicates their expectations of construction workers’ behaviour with them. • Have clear rules and regulations for access to the camp / site office to control loitering. Consult with the local SAPS to establish standard operating procedures for the control of the workforce • Make condoms and other forms of contraceptives readily accessible to workers • Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Where possible, construction workers could also be issued with identification tags to enable them to be visible and distinguishable within the community. • An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at construction workers but also at the community as a whole. 						

14.2.15. Resettlement

The proposed power line may warrant resettlement of family dwellings, graves, businesses, however the extent will only be determined once the route has been approved and during pegging. The SIA indicated that resettlement exposes affected people to a range of risks which include landlessness, homelessness, joblessness, economic and social marginalisation, increased morbidity and mortality, food insecurity loss of access to common property resources. The resettlement impact on communities does at times yield positive benefits, however from a social perspective it can be viewed as a high negative impact which is long term but with proper mitigation in place the impact can be reduced to medium.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Resettlement	No	Negative	2	5	6	5	65 High
	Yes	Negative	2	5	4	4	44 Medium
Corrective Actions	<ul style="list-style-type: none"> • Involuntary resettlement should be avoided, or minimised where unavoidable. • Where resettlement is unavoidable, resettlement plans and activities should be seen and executed as development programmes. • Resettled persons should be provided with sufficient investment resources and opportunities to share in project benefits. • Displaced persons should be meaningfully consulted, and should participate in the planning and implementation of resettlement programmes. • Displaced persons should be compensated, prior to the move, for their losses at full replacement cost. • Resettled persons should be assisted with the move and provided with support during the transition period. • Eskom's resettlement standard must be put in place to ensure minimal impact 						

14.2.16. Impact on Agriculture

The proposed transmission line will have a negative impact on the agricultural potential, however, the isolated nature of transmission towers will result in a minimal impact on the soil and furthermore agricultural activities can continue next or underneath the line. The overall impact on agriculture without mitigation is medium; however with proper mitigation in place the impact will be low in significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Traffic	No	Negative	2	4	4	4	40 Medium
	Yes	Negative	1	4	2	3	21 Low
Corrective Actions	<ul style="list-style-type: none"> • Effort must be made to avoid areas where overhead sprayers are used. • Disturbance must be reduced to the footprint of the construction activities 						

Indirect Impacts: None Identified

Cumulative Impacts: None identified

No-go Alternative

Direct Impacts: Should the proposed development not continue, none of the identified impacts would result.

Indirect Impacts: The threat of HIV and spread of STI's is one of indirect impact associated with the development however; the No-go alternative would remove the need for construction workers and thereby remove the associated social impacts identified above.

Cumulative Impacts: None identified

14.3. OPERATIONAL PHASE IMPACTS

Direct Impacts:

14.3.1. Bird collision, electrocutions and Faulting

Direct interactions occur when birds collide with power lines, possibly because they fail to see the wires as they are focusing on something that lies beyond, e.g. a perch or food source. Birds might also be killed by striking power lines support structures. The likelihood of birds colliding with power lines depends on various aspects. Bird collision and electrocution at substation yard has been rated as low for this project, while faulting which is caused by bird on power lines was rated medium. With proper mitigation in place, the potential impact of faulting is one that can be reduced to low significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Bird Faulting	No	Negative	1	4	4	4	36 Medium
	Yes	Negative	1	4	3	2	16 Low
Bird Collision	No	Negative	2	4	4	4	40 Medium
	Yes	Negative	2	4	4	2	20Low
Corrective Actions	<ul style="list-style-type: none"> • Installation of bird guards to reduce faulting • Installation of mitigation devices to insulate different live components, recommended to fit this only if electrocution occurs after construction 						

14.3.2. Visual Impact

It is highly likely that the construction of transmission lines could change the atmosphere and pose a negative visual impact and effect on the sense of place for some residents. Furthermore this can also negatively impact the tourist potential of the area and in this particular case game farms and private nature reserves. A negative visual impact is expected during the operational phase as the pylons will be intruding on existing landscape views.

This will impact on game lodges, game farms, residential areas as well as other tourist attraction sites. Route 2 and 4 will cause the greatest visual intrusion for tourist travelling through the study area, while route 1 only forms part of the existing lines. The impact will be definite, local in extent, long term and of high significance.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual Impact	No	Negative	2	5	6	5	75 High
	Yes	Negative	1	5	4	3	27 Low
Corrective Actions							

14.3.3. Economic

The construction of the proposed transmission line has become necessary as part of Eskom's strategy to upgrade the country's existing electricity infrastructure. The proposed development could potentially add to the current energy supply within the area and surrounding settlements.

Issue	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Energy Supply	No	Positive	3	4	6	5	>60 High
	Yes	Positive	3	4	6	5	>60 High
Corrective Actions	<ul style="list-style-type: none"> Regular maintenance of the facility should be done continuously to ensure uninterrupted supply of energy. Ensure that the project is run in a responsible manner and that the environment is adequately protected from negative impacts. Put adequate monitoring systems in place throughout the duration of the project and beyond. Ensure that the value of the project is balanced against cost related to both the negative environmental and social impacts in the region. 						

14.3.4. Employment creation

The proposed development will have the capacity to produce considerable opportunities of employment only during the construction phase. During operation, employment opportunities will arise as a result of the actual maintenance work required to keep the facility running. The significance of this impact is anticipated to be low and positive.

Issue	Corrective measures	Impact rating criteria					Significance	
		Nature	Extent	Duration	Magnitude	Probability		
Employment creation	No	Positive	1	4	6	2	22	Low
	Yes	Positive	1	4	6	2	22	Low
Corrective Actions	Employment of locals should be encouraged during construction.							

Indirect Impacts: None identified.

Cumulative Impacts:

Cumulative impact of power lines on bird species will be significant if not managed, since the species already suffer from significant power line mortalities.

No-go alternative

Direct Impacts: None of the impacts identified for the proposed activity will occur (including positive and negative impacts) if the proposed activity does not proceed.

Indirect Impacts: None identified

Cumulative Impacts:

14.4. DECOMMISSIONING PHASE IMPACTS

On-going maintenance and upgrades, where necessary, will be carried out. Decommissioning will be subjected to an EIA, however potential impacts are assessed hereunder.

Direct Impacts:

14.4.1. Dust generation

Decommissioning of the facility and other infrastructure may lead to an increased amount of airborne particles in the local atmosphere as the infrastructure is dismantled and transported to the disposal site. The significance of this impact will be of low negative significance.

Issue	Corrective measures	Impact					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Dust generation	No	Negative	2	1	4	4	28 Low
	Yes	Negative	2	1	4	3	21 Low
Corrective Actions	<ul style="list-style-type: none"> Personnel must be well versed in the relevant existing waste management procedures and activities on site. This will include sorting of waste types and correct disposal to either recycling facilities, local registered waste disposal sites, and in extreme cases to registered hazardous waste disposal sites. 						

14.4.2. Loss of flora

The disturbances created during the decommissioning phase will likely lead to a loss of floral species within the development footprint. However, due to the site being surrounded by large areas of natural vegetation, as well as the fact that no sensitive species were recorded on site, it is anticipated that the loss of flora within the development footprint will not result in a disruption to the ecological functioning of the site and surroundings. Due to the loss of species diversity within the development footprint, it is recommended that the disturbed areas be rehabilitated with indigenous species as far as possible and that a weed eradication program is implemented to curb the spread of weedy species following decommissioning. It is anticipated that the impact on loss of flora (natural vegetation) will be of low negative significance.

14.4.3. Surface and Groundwater Pollution

During the decommissioning phase spillages from construction vehicles and machinery may occur when existing facility is removed from the site. Potential sources of pollution to this resource result from surface and sub-surface activities that could possibly leak and or spill hazardous substances onto the surface that are then transported to the groundwater body through the underlying soils. It is anticipated that the significance rating can be reduced with the implementation of mitigation measures; however the significance will remain medium negative.

Issue	Corrective measures	Impact					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Surface and groundwater pollution	No	Negative	3	3	6	3	36 Medium
	Yes	Negative	2	2	4	2	16 Low
Corrective Actions	Possible leaks and spills of hazardous substances into the ground should be avoided at all times. In the event of a spillage of a hazardous substance the requirements of the EMP must be implemented.						

14.4.4. Soil Erosion

The clearing of vegetation, as well as the exposing of soil during decommissioning of the facilities may lead to erosion of these surfaces due to rain and wind. It is anticipated that the significance of this impact can be reduced from medium negative to low negative significance with the implementation of the recommended mitigation measures.

No-go alternative

Direct Impacts: None of the impacts identified for the proposed activity will occur

Indirect Impacts: None identified

Cumulative Impacts: None identified

15. DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

15.1. ASSUMPTIONS

- It is assumed that technical data supplied by the client was correct and valid at the time of compilation of specialist studies and the main report.
- It is assumed that all information provided by the client is true and correct.
- It is furthermore assumed that the alternatives presented by the client are feasible alternatives.

15.2. LIMITATIONS

15.2.1. Public participation process

Given the magnitude of the project and the various extent of ervens and portions of farms in the area of which some are private and not easily accessible, it is highly likely that some I&APs were not reached. However, efforts were made as part of the process to advertise on local media as well as placing of notices at noticeable places within the communities. Further, given the aforementioned challenges, SANParks was approached to assist with the notification of landowners who are on their register.

15.2.2. Literature reviewed is viewed as correct

The compilation of the reports was based on various literature reviews which are viewed as correct at the time. However, it is acknowledged that there might be some gaps in knowledge with regards to the literature reviewed although concerted efforts were made to attain as much information as possible.

15.2.3. Heritage

It is possible that the Phase 1 HIA may have missed heritage resources in the project area, as some heritage sites may occur in thick clumps of vegetation while others may lie below the surface of the earth and may only be exposed once development commence.

15.2.4. Ecology

The ecology assessment was based on information collected during a site visit during October 24 and 25 2011. The study did not look into detailed soil, geological or geotechnical information. In order to obtain a comprehensive understanding of the dynamics of communities and the status of endemic, rare or

threatened species in any area, vegetation and faunal assessments should consider investigations at different time scales (across seasons/years) and through repetition.

15.2.5. Socioeconomic

The most recent data at municipal ward level, that was available from Statistics South Africa (Stats SA), dates back to that gathered during Census 2001, which makes it rather outdated. The situation is not much better at the local and district levels as the most recent data available from Stats SA was gathered during Community Survey, 2007, some 5 years ago. Consequently there are certain limitations attached to the data available from Statistics South Africa that were reflected in this study. An effort was made to gather data from a wide range of sources; however, much of the data in the report was made available by the Environmental Impact Assessment (EIA) consultants, Nsovo Environmental Consulting, and relies on the accuracy of the data made available. As is the nature of social research, the results of socioeconomic study cannot be generalised and applied to the entire population across the whole area and is restricted to the specific study area.

16. A REASONED OPINION AS TO WHETHER THE ACTIVITY SHOULD OR SHOULD NOT CONTINUE

The Scoping study, the EIA and associated public participation process was performed as dictated by the requirements of the NEMA and associated regulations.

The proposed routes have been under detailed assessment, the primary objective been to assess the suitability of the proposed study area for the intended use from an environmental perspective. This thorough investigation was furthermore enhanced by input from ecologist, archaeologist, social impact assessor, avifauna and visual, socioeconomic and ecotourism specialist.

The findings of the investigations from specialists input from interested and affected parties and findings of the EAP have been comprehensively documented in this report together with the specified recommendation. Based on the investigations, no fatal flaws or highly significant impacts that would impede the proposed development or necessitate redesign or termination of the project have been identified.

Based on the reasons highlighted above it is recommended that Alternative 1 be approved and all management and mitigation measure put it place to reduce the environmental impact and particularly the heritage, ecological, visual, avifaunal, agricultural and socioeconomic impacts.

The no-go alternative was assessed and consideration of this option will have even greater social consequences particularly if the security of electricity supply is compromised. Therefore given the various development, both industrial and residential taking place across the country the need to secure a dependable electricity supply is of national importance and consequently the no go option is dismissed.

The key issues identified during the Scoping phase and assessed further during the EIA were investigated further in seven specialist studies. The following is therefore recommended:

- Compliance with the recommendations set out in the specialist reports;
- Compliance with the Environmental Management Plan Report; and
- Consideration should be given to sensitivities during the walkthrough to ensure the least disturbance of the environment.

With the proposed mitigation measures in place the construction, operational and decommissioning phases for the proposed development is not likely to pose any significant risks to the local and surrounding environment.

It is therefore recommended that the development be approved with Alternative 1 as the preferred route alternative.

17. ENVIRONMENTAL IMPACT STATEMENT

This EIR serves to primarily assess the likely impact the development may have on the surrounding environment and to provide recommendations regarding available alternatives, mitigation and management measures. The process aims to ensure that impacts are identified and where negative impacts are anticipated that these are prevented, and minimised and remedied (should these be unavoidable) and where positive impacts are identified that these are enhanced as far as possible.

The EIR presents the relevant information to the Competent Authority for the purposes of decision making. In making a decision regarding this application the key findings must be considered as well as

the other information contained within this report. The suggested mitigation measures must also be considered and compliance therewith should form a condition of any decision made to proceed with the development. In addition these conditions should be incorporated into a Construction Phase Environmental Management Plan which serves to guide and inform sustainable environmental practices during the construction process. The complete identified management and mitigation measures are listed in the EMP. These measures include those listed in this report.

17.1. PLANNING AND DEVELOPMENT PHASE

Impacts associated with the planning and development phase of the proposed activity includes the creation of job opportunities for skilled engineers and planning professionals. This positive impact will be definite and short term in duration. No significant negative impact has been associated with this phase and the proposed activity.

17.2. CONSTRUCTION PHASE

The positive impacts identified for this phase include job creation and a positive economic outlook for local communities, the province and the country at large, these impacts will be enhanced in order to maximize the benefits. The impacts of medium significance include the following:

- Impact on biodiversity
- Impact on fauna
- Impact on traffic
- Impact on ground and surface water
- Fire
- Visual Impact
- Impact on agriculture

Impacts of high significance includes the following

- Safety and security
- Resettlement

With mitigation measures proposed as well as recommendations made by the specialist the impacts are manageable.

17.3. OPERATIONAL PHASE

Negative impacts identified for the operational phase include bird electrocution, visual impact and noise. These impacts are rated as medium before mitigation, with proper mitigation in place the impacts are considered to be of low significance. Other impacts identified included visual impacts and bird collisions and electrocution which are rated high and medium respectively.

The positive impacts associated with the operational phase include job creation for the locals and most importantly reliable power supply.

17.4. DECOMMISSIONING PHASE

No significant impacts have been identified for the decommissioning phase of the proposed activity since decommissioning will not take place for the proposed activity in the foreseeable future. However, if decommissioning were to take place it will have a negative impact due to job losses and waste generation and will be subjected to the relevant regulations and approvals.

18. DRAFT ENVIRONMENTAL MANAGEMENT PROGRAM

The Draft Environmental Management Program is attached as Appendix D.

19. CONCLUSION AND RECOMMENDATIONS

The Environmental Impact Assessment was performed as dictated by the National Environmental Management Act and associated regulations as well as the EIA regulation as published by the National Department of Environmental Affairs.

The alternative routes have been scrutinized and detailed assessment conducted; the primary objective being to assess the suitability of the site for the intended use as well as to assess the impact of the proposed development on the environment. This report has comprehensively addressed the baseline environment which formed the backdrop of the impact assessment. Information provided has been supported by Specialist studies that were undertaken. The findings of the investigations, comments from affected and interested stakeholders are documented in this report together with the specified recommendations. Based on the investigations, no critical flaws that would impede the development have been identified.

No fatal flaws or highly significant impacts were identified during the scoping phase and EIA phases of the project that would necessitate substantial redesign or termination of the project. The main impacts have been discussed and mitigation measures have been identified that will serve to mitigate the scale,

intensity and significance of the impacts that have high or medium rating. The EMP contains more detailed mitigation measures.

The mitigations measures and recommendations made in the following specialist studies must be adhered to:

- Ecological
- Visual Impact Assessment
- Heritage Impact Assessment
- Avifaunal Assessment
- Social Impact Assessment
- Ecotourism
- Soil and Agricultural Potential

Further the following is therefore recommended by the EAP:

1. That given all the reasons discussed above Alternative 1 is supported.
2. That a final walkthrough of the approved corridor must take place to identify sensitivities and assist in identifying areas that require conservation within the 3km buffer of the route.
3. That all necessary permits from the national and/or provincial heritage resources be obtained as recommended by the Heritage Specialist.
4. That all mitigation measures made by the specialist are taken into consideration during both the construction and operational phase.
5. That all necessary permits and licenses required by any Act, Policy, Law or By-Law be obtained prior construction.
6. That the Environmental Management Plan attached hereto be a living document that guides the construction and operational phases of the proposed project.
7. An integrated waste management approach be implemented that is based on waste minimisation and must incorporate reduction, reuse, recycling and disposal where appropriate.
8. That all Water Use Licenses are obtained as applicable from the Department of Water Affairs
9. That issue of landownership is dealt with prior to construction.
10. Detailed geological studies of the preferred route must be undertaken to determine the exact location of sinkholes and dolomites so as to ensure recommendation of appropriate foundation.
11. A detailed phase 1 Archaeological survey of the preferred corridor must take place in accordance with the requirements of Section 38 (3) of the National Heritage Resources Act (Act 25 of 1999).
12. The National Environmental Management principles must be adopted and strict adherence maintained.
13. The proposed line must be placed as close as possible to the existing transmission line.

14. Sensitive seepage zones and wetlands must be avoided for pylon placement. This must be identified by an ecologist during the walk down assessment.
15. No movement of heavy construction vehicles is allowed in the seepage zones and the wetlands.
16. The applicant must ensure that the following takes place with regard to the power line to reduce the identified impacts
 - Sections of the power line crossing adjacent to dams, rivers, drainage lines and watercourses are marked with bird flappers on the earth wires to reduce the impact on avifauna.
 - Where power lines runs parallel to riverine, riparian and wetland areas, the design should be in accordance with the requirement of the National Water Act (Act 36 of 1998).
 - The identified areas of red data floral and other sensitive vegetation be avoided at all times.
 - The spans between the towers must be increased to the maximum necessary to meet technical and safety requirements in order to limit the impact on sensitive areas.
 - Specialist report must inform the nature and positioning of the power lines to ensure that no sensitive environments are impacted upon.

The undertaking of this EIA has fully complied with the requirements of the NEMA (Act 107 of 1998) and associated regulations. It is therefore recommended that the proposed project proceed.

CITED LITERATURE

- Acocks, J.P.H. 1988. Veld types of South Africa 3rd Ed. Memoirs of the Botanical Survey of South Africa. No 57. National Botanical Gardens/Botanical Research Institute. Pretoria.
- Amery, L.S. (ed.) 1906. Times history of the war in South Africa 1899-1902. London: Sampson Low Marston & Co. Anonymous 1970. Fochville 50, 1920-1970: Gedenkuitgawe.
- BARNES, K.N. (ED.) 2000. The Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland.
- DEAT. 1998. A National Strategy for Integrated Environmental Management in South Africa. Compiled by Environomics.
- DEAT 2003. Draft: National Guidelines for Cultural Heritage Resources Management for Tourism Projects. Pretoria: The Department
- Ferguson, C. (2012, February 15). Letter from Balule Nature Reserve.
- Grant Thornton SA, 2010. Airlift Strategy and Implementation Plan Report IUCN Red , 2007, List of Threatened Species
- International Association for Impact Assessment [IAIA]. 2003. Social Impact Assessment: International Principles. Special Publication Series No. 2. IAIA. Fargo. Interorganisational Committee on Principles and Guidelines for Social Impact Assessment. US Principles and Guidelines – Principles and Guidelines for Social Impact Assessments in the USA: Impact Assessment and Project Appraisal. 21(3): 231-250.
- Johnson, B. J. 2006. Out of Sight, Out of Mind? A study on the costs and benefits of undergrounding overhead power lines. Edison Electric Institute. Washington D.C. United States of America.
- Low , A. D., Rebelo, G. (Editors) 1996. Vegetation of South Africa, Lesotho and Swaziland. A companion to the Vegetation Map of South Africa, Lesotho and Swaziland. Pretoria.
- Mucina, L. & Rutherford, M. C. 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19., Pretoria: South African National Biodiversity Institute.
- National Department of Agriculture. 2002. Development and Application of a Land Capability Classification System for South Africa. Report GW/A/2000/57. Pretoria.
- Kampinga, K. E. (2012, February 12). Letter form Olifants River Game Reserve Share Block Ltd.
- Schoeman, J. L., Bruce, R. W., Verster, E., Fitzpatrick, R. W., Meldal-Johnson, A. 1987. Land Type Map 2528 Pretoria. Agricultural Research Council. Pretoria.
- Spencer, C. (2012, January 31). Letter from Olifants West Game Reserve.
- Van Riet et al (1997), Environmental Potential Atlas for South Africa, JL van Schaik Publishers, Pretoria, RSA
- www.dpw.limpopo.gov.za: December 2009, Greening Limpopo Provincial Administration Business Case

