PROPOSED DEVELOPMENT OF A 132 KV TRANSMISSION LINE (FROM THE EXISTING HARVARD 132 KV LINE TO NOORDSTAD) AS WELL AS 6 SUB-STATIONS, BLOEMFONTEIN, MANGAUNG METROPOLITAN MUNICIPALITY, FREE STATE PROVINCE

ECOLOGICAL IMPACT ASSESSMENT

May 2017

Prepared for:

CENTLEC

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EXECUTIVE SUMMARY

CENTLEC, the applicant, intends to develop new infrastructure in the city of Bloemfontein Registration Division, Free State Province. The proposed development entails two main sets of developments namely a new 132 kV transmission line and secondly six associated sub-stations. The transmission line route corridor, six sub-stations and the relevant properties associated with the development are discussed in detail under heading 5.

Enviroworks was appointed by the applicant as the independent Environmental Assessment Practitioner (EAP) to conduct the Basic Assessment process as well as the Ecological study for the proposed project. A site visit/assessment for the proposed transmission line route corridor and associated six sub-station footprints was conducted over a several day period along the landowner notification process in order to fulfil the project requirements. This took place on 10, 14, 15, 16, 18 February 2017 and 5 March 2017. The date forms part of the late summer season and the majority of plant species could therefore be successfully identified.

Study area

132 kV transmission line

Transmission line main loop

The proposed 132 kV transmission line to be constructed will tie into and commence from the existing Harvard transmission line which is associated with the Cecilia sub-station situated next to Koppie Road in the south-west of Bloemfontein. The commencement/tie in point of the proposed transmission line will be on the Remaining Extent of the Farm Kwaggafontein no 2300 (SG: F00300000000230000000). From the commencement point, the proposed transmission line will have a main loop which will loop around the western and northern boundaries of Bloemfontein and will be situated outside the urban edge. From the commencement point, the main loop will traverse a significant number of farm portions (see Appendix 5).

The new transmission line will run parallel alongside an existing Eskom transmission line for the initial 8 km portion up to where it traverses the Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000). From there it will split away on its own route to the east of the existing line.

The new transmission line will again join up and run parallel alongside the existing Eskom transmission line from Portion 4 of the Farm Mount Pleasant no 221 (SG: F00300000000022100004).

The new transmission line will then join up with an existing CENTLEC 33 kV transmission line on Portion 5 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500005) from where it will run mostly parallel alongside the existing line for approximately 4.5 km up to where it reaches its final tie in point at the existing Bayswater distribution centre on Portion 8 of the Farm Hillside no 2830 (SG: F00300000000283000008) situated in the north-east of Bloemfontein.

The linear length of the main loop of the proposed transmission will be approximately 35.4 km.

Transmission line first split-off

A short 132 kV line section is proposed to split off from the main loop of the transmission line on the Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000) in order to reach the position where the proposed Olivier distribution centre is to be built on Portion 12 of the Farm Groenvlei no 2844 (SG: F00300000000284400012). This entire split-off section of approximately 3.5 km to where it reaches the Olivier distribution centre position will be buried underground as this is located in the vicinity of the Tempe Military Base Airstrip. The reason for the underground section will be to ensure that all the above ground components of the entire transmission line are located outside a minimum 600 m distance from the airstrip. A maximum 1.5 m wide trench will be excavated to conceal the transmission line for the stated section after which the trench will be closed up again. The section will traverse a number of additional farm portions which are not part of the main loop list of farm portions.

Transmission line second split-off

A second 132 kV line section is also proposed to split off from the main loop of the transmission line in order to reach the position where the proposed Hillandale distribution centre is to be built on the Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000). Two line route alternatives namely Alternatives 1 and 2 are suggested by the applicant for the second section splitting off.

The linear length of Alternative 1 will be approximately 5.6 km.
The linear length of Alternative 2 will be approximately 2.4 km.

The proposed transmission line will consist of a linear series of pylons (towers) which will be situated approximately 100 m - 300 m apart. The exact locations and distance between the pylons will be dependent on site specific terrain and soil conditions. This will only be determined during the final

design stage. The main purpose of the pylons will be to ensure the transmission line maintains a minimum ground clearance height of 6.3 m. The transmission line servitude corridor will be a maximum of 30 m wide but the centre of the new line must also maintain a minimum distance of 50 m away from the centre of the existing Eskom line.

The tower type to be used will be determined during the final design stages of the powerline (based on load and other calculations). It is however envisaged that the bird friendly Steel Monopole tower type will mainly be used rather than the Steel Lattice tower type. The Steel Monopole tower type is also to be implemented in any identified environmentally sensitive or important areas such as Critical Biodiversity Areas (CBA) or heritage sites. The maximum surface area footprint per pylon of the Steel Monopole tower type will be 2 m x 2 m/4 m² while that of the Steel Lattice tower type will be 10 m x 10 m/100 m². Both the potential pylon designs will have a maximum height of 30 m.

The anticipated duration of the construction phase of the proposed transmission line will be a maximum of 6 months.

Six 132 kV sub-stations

The six individual 132 kV sub-stations to be constructed will be associated with the new transmission line and will assist with the transmission and distribution of the transmission line's electricity. They will be situated on the following farm portions:

- Outspan distribution centre
  - Remaining Extent of the Farm Outspan no 1960 (SG: F00300000000196000000)
- Rooidam distribution centre
  - Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000)
- Olivier distribution centre
  - Portion 12 of the farm Groenvlei no 2844 (SG: F00300000000284400012)
- Tevrede distribution centre
  - Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000)
- Mimosa distribution centre
  - Portion 7 of the Farm Fairview no 2845 (SG: F00300000000284500007)
- Hillandale distribution centre
  - Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000)

According to Mucina & Rutherford (2006) the proposed transmission line route corridor traverses four vegetation types. The majority of the route corridor is located within the Bloemfontein Dry Grassland (Gh 5) while a small portion forms part of the Winburg Grassy Shrubland (Gh 7), Bloemfontein Karroid Shrubland (Gh 8) and the Highveld Alluvial (Aza 5) vegetation types.

An approximately 3.3 km portion of the proposed transmission line route corridor will traverse a Critical Biodiversity Area 1 (CBA) as classified by the Provincial Spatial Biodiversity Plan, 2014. Critical Biodiversity Areas are areas which play an important role in conservation and reaching certain required biodiversity targets for ecosystem types, species or ecological processes (Collins, 2015). Pylons will be constructed within the CBA. Pylons will not be constructed within watercourses but may need to be placed within 32 metres of watercourses.

Methodology

The proposed project area was assessed by driving along the route corridor and traversing on foot at strategic areas. Visual observations/identifications of species and habitat conditions on the footprint areas were conducted. Species were listed and categorised as per the Red Data Species List; Protected Species List of the National Forests Act (Act 84 of 1998), Invasive Species List of the National Environmental Management: Biodiversity Act (Act 10 of 2004), Alien and Invasive Species Regulations, 2014 and the Free State's Nature Conservation Ordinance (No 8 of 1969).

Potential impacts of the proposed project on the surrounding natural environment were identified, evaluated and rated. The Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS) of the proposed project area were also assessed and rated.

Wetlands were identified and delineated on the proposed project area as per the methodology described below:

For the purposes of this investigation a wetland was defined according to the definition in the National Water Act (Act 36 of 1998) as: "land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which in normal circumstances supports or would support vegetation typically adapted to life in saturated soil."

In 2005 DWAF published a wetland delineation procedure in a guideline document titled “A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas”. Guidelines for the undertaking of biodiversity assessments exist. These guidelines contain a number of stipulations relating to the protection of wetlands and the undertaking of wetland assessments. These guidelines state that a wetland delineation procedure must identify the outer edge of the temporary zone of the wetland, which marks the boundary between the wetland and adjacent terrestrial areas and is that part of the wetland that remains flooded or saturated close to the soil surface for only a few weeks in the year, but long enough to develop anaerobic conditions and determine the nature of the plants growing in the soil.

The guidelines also state that locating the outer edge of the temporary zone must make use of four specific indicators namely:

- the terrain unit indicator,
- the soil form indicator,
- the soil wetness indicator and
- the vegetative indicator.

Results and Conclusion

The proposed project area can roughly be divided into the following sections based on landscape structure, land use, composition and condition of vegetation:

- Pre-existing transformed and disturbed cultivated lands and road servitudes associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type
- Semi-natural urbanised and cultivated areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type
- Natural, currently undeveloped rural areas associated with all three relevant vegetation types
- Critical Biodiversity Area associated with the Winburg Grassy Shrubland (Gh 7) and Bloemfontein Karroid Shrubland (Gh 8) vegetation types
- Watercourses/drainage areas
- Six sub-station footprints

Each of these identified areas is discussed in detail in the report to follow.

More than half of the transmission line route corridor (approximately 20.6 km) and four of the sub-station footprints are situated in pre-existing transformed and disturbed areas with little to no natural vegetation remaining. These areas therefore don’t play a significant role in the ecological

functionality of the natural surrounding ecosystem and vegetation and have a low conversation value. It is in the opinion of the specialist that the construction of the proposed transmission line and associated sub-stations in such transformed areas will therefore not pose any significant additional ecological impacts and the project should be allowed to continue.

Although the proposed transmission line route corridor crosses a number of watercourses and also traverses semi-natural and natural areas forming part of an endangered vegetation type as well as a Critical Biodiversity Area (CBA), the majority of the transmission line will have a small actual surface footprint impact on vegetation; impact will mainly be restricted to pylon construction footprints. The presence of an existing line has also slightly reduced the local pristineness in its immediate vicinity. The significance of the impact on the CBA will thereof be lower than it would have been if the line had to traverse another portion of the CBA on its own. The two remaining sub-stations will also be situated within natural areas but their impacts will be restricted to their physical surface footprints.

Although Alternative 1 will also be an acceptable route to follow due to the low level of the actual impacts on the natural vegetation, it is recommended that **Alternative 2** for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type. It is also recommended that the **Steel Monopole tower type** be implemented rather than the Steel Lattice tower type as far as practicably possible due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.

Only one Red Data Listed species (*Boophone disticha*; Declining) and number of provincially protected species were identified within the proposed transmission line route corridor and associated sub-station footprints. The development of the transmission line and associated sub-stations will inevitably destroy or damage such individuals. The physical impacts relating to the transmission line will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. Although a Red Data Listed species was identified, the presence and distribution extent is low.

It is in the opinion of the specialist that all identified potential ecological impacts in such important areas can be suitably reduced to within acceptable levels and that the project should therefore be allowed to continue. The proposed project may however only continue if all recommended mitigations measures as per this ecological report are adequately implemented and managed for

both the construction and operational phases of the proposed project. All necessary authorisations and permits must also be obtained prior to any commencement.

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ABBREVIATIONS

BA	Basic Assessment
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Ecological Support Area
MAP	Mean Annual Precipitation
MAT	Mean Annual Temperature
NEMBA	National Environmental Management: Biodiversity Act (Act 10 of 2004)
NEMA	National Environmental Management Act (Act 107 of 1998)
NFA	National Forests Act (Act 84 of 1998)
NHRA	National Heritage Resources Act (Act 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
WULA	Water Use License Application

DETAILS OF THE SPECIALIST

Adriaan Johannes Hendrikus Lamprecht

M.Env.Sci. Ecological remediation and sustainable utilisation (NWU: Potchefstroom)

South African Council for Natural Scientific Professions (SACNASP): Professional Ecological Scientist (No 115601)

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SHORT CV

Rikus Lamprecht was employed by Enviroworks in 2016 as a Senior Environmental Consultant. Rikus was previously employed by Fraser Alexander Tailings from 2011 to 2015 as an Environmental Contracts Manager where he was responsible for the technical and operational management of all Fraser Alexander Tailings' environmental mining rehabilitation work. He was responsible for all facets of project management as well as implementation of rehabilitation and environmental strategies by planning activities, organizing physical, financial and human resources, delegating task responsibilities, leading people, controlling risks and providing technical support.

Rikus holds a B.Sc Botany and Zoology as well as an M.Env.Sci Ecological Remediation and Sustainable Utilisation degree. He is also registered with the South African Council for Natural Scientific Professions (SACNASP) as a Professional Ecological Scientist (No 115601).

Relevant Project Experience

2016

- Completion of a specialist ecological study and report for the proposed Olifantshoek Bulk Water Supply development in the Northern Cape Province.
- Completion of a specialist ecological study and report for the proposed N8 gravel quarries in the Free State Province.
- Completion of a specialist ecological study and report for the proposed De Eelt 10 ha vineyard development in the Northern Cape Province.

- Completion of a specialist wetland study and report for the Lafarge Lichtenburg cement production facility and quarry in the North West Province.
- Completion of a specialist ecological study and report for the proposed Nooitgedacht Retirement Estate development near Nelspruit in the Mpumalanga Province.
- Completion of a specialist ecological study and report for the proposed Ventersburg Bulk Water Supply development in the Free State Province.

2017

- Completion of a specialist ecological study and report for the proposed Phethogo Consulting filling station development in the Free State Province.
- Completion of a specialist ecological study and report for the proposed Zevenfontein filling station development in the Gauteng Province.
- Completion of a specialist ecological study and report for the proposed Olifantsvlei Curro School development in the Gauteng Province.
- Completion of a specialist ecological study and report for the proposed Babereki Agricultural development in the Northern Cape Province.
- Completion of a specialist ecological study and report for the proposed Eikenhof Curro School development in the Gauteng Province.
- Completion of a specialist ecological study and report for the proposed CoGHSTA housing development in Norvalspont, Northern Cape Province.
- Completion of a specialist ecological study and report for the proposed CoGHSTA housing development in Williston, Northern Cape Province.
- Completion of a specialist ecological study and report for the proposed Green Box residential and commercial development in Bloemfontein, Free State Province.

DECLARATION OF INDEPENDENCE

I, Adriaan Johannes Hendrikus Lamprecht, ID 870727 5043 083, declare that I:

- am a senior environmental specialist at Enviroworks
- act as an independent specialist consultant in the field of botany, ecology and vegetation science;
- am assigned as specialist consultant by Enviroworks Consultants (Pty) Ltd for this proposed project;
- I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference;

- remuneration for services by the proponent in relation to this proposal is not linked to approval by decision-making authorities responsible for permitting this proposal and
- the consultancy has no interest in secondary or downstream developments as a result of the authorisation of this project.
- have no and will not engage in conflicting interests in the undertaking of the activity;
- undertake to disclose to the client and the competent authority any material, information that have or may have the potential to influence the decision of the competent authority required in terms of the Environmental Impact Assessment Regulations 2014;
- will provide the client and competent authority with access to all information at my disposal, regarding this project, whether favourable or not.

AJH Lamprecht

Signature

DETAILS OF THE EXTERNAL REVIEWER

EnviroNiche Consulting was appointed by Enviroworks to externally review the vegetation survey conducted by the specialists as part of the process in support of an application to develop the site.

Professor Johann du Preez
EnviroNiche Consulting Biodiversity and Environmental Consultants
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HERMANUS,
7200
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Email: greenrsa@gmail.com

SUMMARY OF EXPERTISE

- Registered professional member of The South African Council for Natural Scientific Professions (Ecological Science), registration number: 400271/07.
- Ecological consultant since 2000.
- Conducted, or co-conducted, over 1 500 specialist ecological surveys as an ecological consultant.
- Co-author of a book on ecology
- Published over 30 refereed scientific reports,
- Presented 17 scientific conference presentations,

DECLARATION OF INDEPENDENCE

I, Pieter Johannes du Preez, ID 600821 5016 087, declare that I:

- am the owner of EnviroNiche Consulting
- act as an independent specialist consultant in the field of botany, ecology and vegetation science;
- am assigned as specialist consultant by Enviroworks Consultants (Pty) Ltd for this proposed project;
- I do not have or will not have any financial interest in the undertaking of the activity other than remuneration for work as stipulated in the terms of reference;
- remuneration for services by the proponent in relation to this proposal is not linked to approval by decision-making authorities responsible for permitting this proposal and

- the consultancy has no interest in secondary or downstream developments as a result of the authorisation of this project.
- have no and will not engage in conflicting interests in the undertaking of the activity;
- undertake to disclose to the client and the competent authority any material, information that have or may have the potential to influence the decision of the competent authority required in terms of the Environmental Impact Assessment Regulations 2014;
- will provide the client and competent authority with access to all information at my disposal, regarding this project, whether favourable or not.

PJ du Preez

Signature

1. INTRODUCTION

The northern part of Bloemfontein is currently electrically supplied via a single 132 kV ring network starting at the Eskom Harvard Main Transmission Station (MTS) and ending at the Bayswater distribution centre. Due to the rapid, continual growth in electricity demand over the last couple of years in the northern development areas of Bloemfontein, the existing 132 kV ring network has become increasingly under enormous pressure, especially during peak electricity demand periods. The demand is therefore continuously exceeding the possible supply from the current network.

In accordance with the integrated electricity network in Bloemfontein, the 10-year electricity demand forecast for the area towards Bayswater distribution center is approximately 238 MVA. Currently the electricity demand exceeds the safe transfer capacity of the existing 132 kV network with approximately 10 to 20 MVA.

CENTLEC, the applicant, intends to develop new infrastructure in the city of Bloemfontein Registration Division, Free State Province. The proposed development entails two main sets of developments namely a new 132 kV transmission line and secondly six associated sub-stations. The transmission line route corridor, six sub-stations and the relevant properties associated with the development are discussed in detail under heading 5.

Enviroworks was appointed by the applicant as the independent Environmental Assessment Practitioner (EAP) to conduct the Basic Assessment process as well as the Ecological study for the proposed project.

This report constitutes the Ecological Impact Assessment. Due to the nature of the potential impacts of the proposed project on the localised vegetation, an Ecological study was conducted. This is required in order to determine the potential presence of ecologically significant species or habitats within the proposed project footprint. Proposed mitigation and management measures must also be recommended in order to attempt to reduce/alleviate the identified potential impacts.

Preliminary preparations conducted prior to the site visit/assessment where as follows:

- Georeferenced spatial information was obtained of the route corridor of the proposed transmission line and associated six sub-stations in order to determine the direct impact footprint.

- A desktop study was conducted of the information available on the vegetation types as well as ecological sensitivity of the area in order to determine the ecological significance as well as vegetation structure and potential species to be expected.

2. DATE AND SEASON OF SITE VIST

A site visit/assessment for the proposed transmission line route corridor and associated six sub-station footprints was conducted over a several day period along the landowner notification process in order to fulfil the project requirements. This took place on 10, 14, 15, 16, 18 February 2017 and 5 March 2017. The date forms part of the late summer season and the majority of plant species could therefore be successfully identified.

3. ASSESSMENT RATIONAL AND PURPOSE

The protection and maintenance of the integrity of our natural resources in South Africa is essential when it comes to the well-being of the environment. Continued development however also forms a pillar stone in the socio-economic improvement of society and the livelihoods of communities and individuals. Socio-economic progress can therefore not simply be completely discarded for the sake of environmental conservation but solutions/compromises rather need to be determined in order to achieve a sustainable balance between the needs for environmental conservation without unreasonably jeopardising the requirements of socio-economic development. Adequate, sustainable and responsible utilisation and management of our natural resources is crucial and finding these essential environmental/socio-economic balances to achieve sustainability should therefore always be a priority focus point during any proposed project development.

Various environmental legislation in South Africa makes provision for the protection of our natural resources and the functionality of ecological systems in order to ensure sustainability. Such acts include the National Environmental Management: Biodiversity Act (Act 10 of 2004), National Forests Act (Act 84 of 1998), Conservation of Agricultural Resources Act (Act 43 of 1983), National Water Act (Act 36 of 1998) and framework legislation such as the National Environmental Management Act (Act 10 of 2004).

The various components of ecological systems are all interrelated and it is therefore important that specialist studies of all such components be conducted prior to the commencement of any proposed project development. Only once the potential impacts and outcomes of proposed developments on the ecological systems of an area are understood, can informed decisions be made regarding the viability of projects to address and achieve the environmental and socio-economic needs of an area.

An Ecological Impact Assessment of the proposed project area was therefore conducted in order to determine and quantify the potential impacts of the proposed development on the natural environment in the area.

4. OBJECTIVES OF THE ASSESSMENT

Vegetation and habitat survey:

- Identify and list significant species encountered on the proposed project area and list any protected and/or Red Data Listed species.
- Determine and discuss the condition and extent of degradation and/or transformation of the vegetation on the proposed project area.
- Determine and discuss the ecological sensitivity and significance of the proposed project area.
- Identify and delineate all wetland areas potentially present on the proposed project area.
- Identify, evaluate and rate the potential impacts of the proposed project on the natural environment.
- Provide recommendations on mitigation and management measures in order to attempt to reduce/alleviate these identified potential impacts.

5. STUDY AREA

CENTLEC intends to develop new infrastructure in the city of Bloemfontein Registration Division, Free State Province. The proposed development entails two main sets of developments namely a new 132 kV transmission line and secondly six associated sub-stations.

132 kV transmission line

Transmission line main loop

The proposed 132 kV transmission line to be constructed will tie into and commence from the existing Harvard transmission line which is associated with the Cecilia sub-station situated next to Koppie Road in the south-west of Bloemfontein. The commencement/tie in point of the proposed transmission line will be on the Remaining Extent of the Farm Kwaggafontein no 2300 (SG: F00300000000230000000). From the commencement point, the proposed transmission line will have a main loop which will loop around the western and northern boundaries of Bloemfontein and will be situated outside the urban edge. From the commencement point, the main loop will traverse the following farm portions:

- Remaining Extent of the Farm Kwaggafontein no 2300 (SG: F00300000000230000000)
- Portion 1 of the Farm Spitskop no 2671 (SG: F00300000000267100001)
- Portion 3 of the Farm Picton no 2264 (SG: F00300000000226400003)
- Remaining Extent of the Farm Freewater no 2505 (SG: F00300000000250500000)
- Portion 3 of the Farm Alexandria no 1746 (SG: F00300000000174600003)
- Portion 1 of the Farm Outspan no 1960 (SG: F00300000000196000001)
- Remaining Extent of the Farm Outspan no 1960 (SG: F00300000000196000000)
- Remaining Extent of the Farm Sans Souci no 1786 (SG: F00300000000178600000)
- Remaining Extent of the Farm Geerdsburg no 1961 (SG: F00300000000196100000)
- Portion 1 of the Farm Geerdsburg no 1961 (SG: F00300000000196100001)
- Remaining Extent of the Farm Highlands no 2707 (SG: F00300000000270700000)
- Remaining Extent of the Farm Bokmekier no 2711 (SG: F00300000000271100000)
- Portion 1 of the Farm Voorspoed no 1788 (SG: F00300000000178800001)
- Portion 2 of the Farm Voorspoed no 1788 (SG: F00300000000178800002)
- Remaining Extent of the Farm Voorspoed no 1788 (SG: F00300000000178800000)
- Portion 3 of the Farm Voorspoed no 1788 (SG: F00300000000178800003)
- Portion 4 of the Farm Voorspoed no 1788 (SG: F00300000000178800004)
- Portion 5 of the Farm Voorspoed no 1788 (SG: F00300000000178800005)
- Portion 6 of the Farm Voorspoed no 1788 (SG: F00300000000178800006)

- Portion 11 of the Farm Voorspoed no 1788 (SG: F00300000000178800011)
- Portion 17 of the Farm Knockacree no 1111 (SG: F00300000000111100011)
- Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000)
- The new transmission line will run parallel alongside an existing Eskom transmission line for the initial 8 km portion up to where it traverses the Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000). From there it will split away on its own route to the east of the existing line.
- Portion 2 of the Farm St Elmo no 2138 (SG: F00300000000213800002)
- Portion 4 of the Farm Kenilworth no 2734 (SG: F00300000000273400004)
- Portion 6 of the Farm Kenilworth no 2734 (SG: F00300000000273400006)
- Portion 20 of the Farm Kenilworth no 2734 (SG: F00300000000273400020)
- Portion 18 of the Farm Kenilworth no 2734 (SG: F00300000000273400018)
- Portion 1 of the Farm Kenilworth no 2734 (SG: F00300000000273400001)
- Remaining Extent of the Farm Josephine no 343 (SG: F00300000000034300000)
- Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000)
- Remaining Extent of the Farm Heeltevrede no 2685 (SG: F00300000000268500000)
- Portion 1 of the Farm Heeltevrede no 2685 (SG: F00300000000268500001)
- The new transmission line will again join up and run parallel alongside the existing Eskom transmission line from Portion 4 of the Farm Mount Pleasant no 221 (SG: F00300000000022100004).
- Portion 1 of the Farm Cumbrae no 1139 (SG: F00300000000113900001)
- Remaining Extent of the Farm Cumbrae no 1139 (SG: F00300000000113900000)
- Portion 2 of the Farm Cumbrae no 1139 (SG: F00300000000113900002)
- Remaining Extent of the Farm Georgina no 2798 (SG: F00300000000279800000)
- Remaining Extent of the Farm Fairview no 2845 (SG: F00300000000284500000)
- Portion 1 of the Farm Fairview no 1756 (SG: F00300000000175600001)
- Portion 7 of the Farm Mimosa Glen no 885 (SG: F00300000000088500007)
- Portion 2 of the Farm Fairview no 1756 (SG: F00300000000175600002)
- Portion 7 of the Farm Fairview no 2845 (SG: F00300000000284500007)
- Remaining Extent of the Farm Olrig no 1710 (SG: F00300000000171000000)
- Portion 2 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500002)
- Portion 3 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500003)
- Portion 8 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500008)
- Portion 11 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500011)

- Portion 6 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500006)
- Portion 13 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500013)
- Portion 5 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500005)

The new transmission line will then join up with an existing CENTLEC 33 kV transmission line on Portion 5 of the Farm Annex Wildealskloof no 1205 (SG: F00300000000120500005) from where it will run mostly parallel alongside the existing line for approximately 4.5 km up to where it reaches its final tie in point at the existing substation??? on Portion 8 of the Farm Hillside no 2830 (SG: F00300000000283000008) situated in the north-east of Bloemfontein.

- Portion 12 of the Farm Ribblesdale no 1506 (SG: F00300000000150600012)
- Portion 13 of the Farm Ribblesdale no 1506 (SG: F00300000000150600013)
- Portion 11 of the Farm Ribblesdale no 1506 (SG: F00300000000150600011)
- Portion 10 of the Farm Ribblesdale no 1506 (SG: F00300000000150600010)
- Remaining Extent of the Farm Mooihoek no 1078 (SG: F00300000000107800000)
- Remaining Extent of the Farm Hillside no 2830 (SG: F00300000000283000000)
- Portion 8 of the Farm Hillside no 2830 (SG: F00300000000283000008)
- The linear length of the main loop of the proposed transmission will be approximately 35.4 km.

Transmission line first split-off

A short 132 kV line section is proposed to split off from the main loop of the transmission line on the Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000) in order to reach the position where the proposed Olivier distribution centre is to be built on Portion 12 of the Farm Groenvlei no 2844 (SG: F00300000000284400012). This entire split-off section of approximately 3.5 km to where it reaches the Olivier distribution centre position will be buried underground as this is located in the vicinity of the Tempe Military Base Airstrip. The reason for the underground section will be to ensure that all the above ground components of the entire transmission line are located outside a minimum 600 m distance from the airstrip. A maximum 1.5 m wide trench will be excavated to conceal the transmission line for the stated section after which the trench will be closed up again.

Additional farm portions forming part of the first spilt off section and which are not part of the main loop list of farm portions.

- Remaining Extent of the Farm Mara no 2571 (SG: F00300000000257100000)
- Portion 1 of the Farm Oranje View no 600 (SG: F00300000000060000001)
- Portion 12 of the Farm Groenvlei no 2844 (SG: F00300000000284400012)

Transmission line second split-off

A second 132 kV line section is also proposed to split off from the main loop of the transmission line in order to reach the position where the proposed Hillandale distribution centre is to be built on the Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000). Two line route alternatives namely Alternatives 1 and 2 are suggested by the applicant for the second section splitting off.

Additional farm portions forming part of Alternative 1 (preferred alternative) and which are not part of the main loop list of farm portions.

- Remaining Extent of the Farm Olrig no 1710 (SG: F00300000000171000000)
- Remaining Extent of the Farm Mountain View no 1707 (SG: F00300000000170700000)
- Portion 1 of the Farm Mountain View no 1707 (SG: F00300000000170700001)
- Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000)

Additional farm portions forming part of Alternative 2 and which are not part of the main loop list of farm portions.

- Remaining Extent of the Farm The Kloof no 2921 (SG: F00300000000292100000)
- Portion 1 of the Farm Penrose no 2378 (SG: F00300000000237800001)
- Remaining Extent of the Farm Cerillio no 2766 (SG: F00300000000276600000)
- Remaining Extent of the Farm Penrose no 2378 (SG: F00300000000237800000)
- Remaining Extent of the Farm Cleveleys no 2990 (SG: F00300000000299000000)
- Portion 5 of the Farm Bergendal no 1706 (SG: F00300000000170600005)
- Portion 3 of the Farm Bergendal no 1706 (SG: F00300000000170600003)
- Portion 8 of the Farm Bergendal no 1706 (SG: F00300000000170600008)
- Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000)

The linear length of Alternative 1 will be approximately 5.6 km.
The linear length of Alternative 2 will be approximately 2.4 km.

Six 132 kV sub-stations

The six individual 132 kV sub-stations to be constructed will be associated with the new transmission line and will assist with the transmission and distribution of the transmission line's electricity. They will be situated on the following farm portions:

- Outspan distribution centre
  - Remaining Extent of the Farm Outspan no 1960 (SG: F00300000000196000000)
- Rooidam distribution centre
  - Remaining Extent of the Farm Knockacree no 1111 (SG: F00300000000111100000)
- Olivier distribution centre
  - Portion 12 of the farm Groenvlei no 2844 (SG: F00300000000284400012)
- Tevrede distribution centre
  - Remaining Extent of the Farm Genoegtevrede no 2974 (SG: F00300000000297400000)
- Mimosa distribution centre
  - Portion 7 of the Farm Fairview no 2845 (SG: F00300000000284500007)
- Hillandale distribution centre
  - Remaining Extent of the Farm Bergendal no 1706 (SG: F00300000000170600000)

See Figure 1 below indicating the locality of the proposed project.

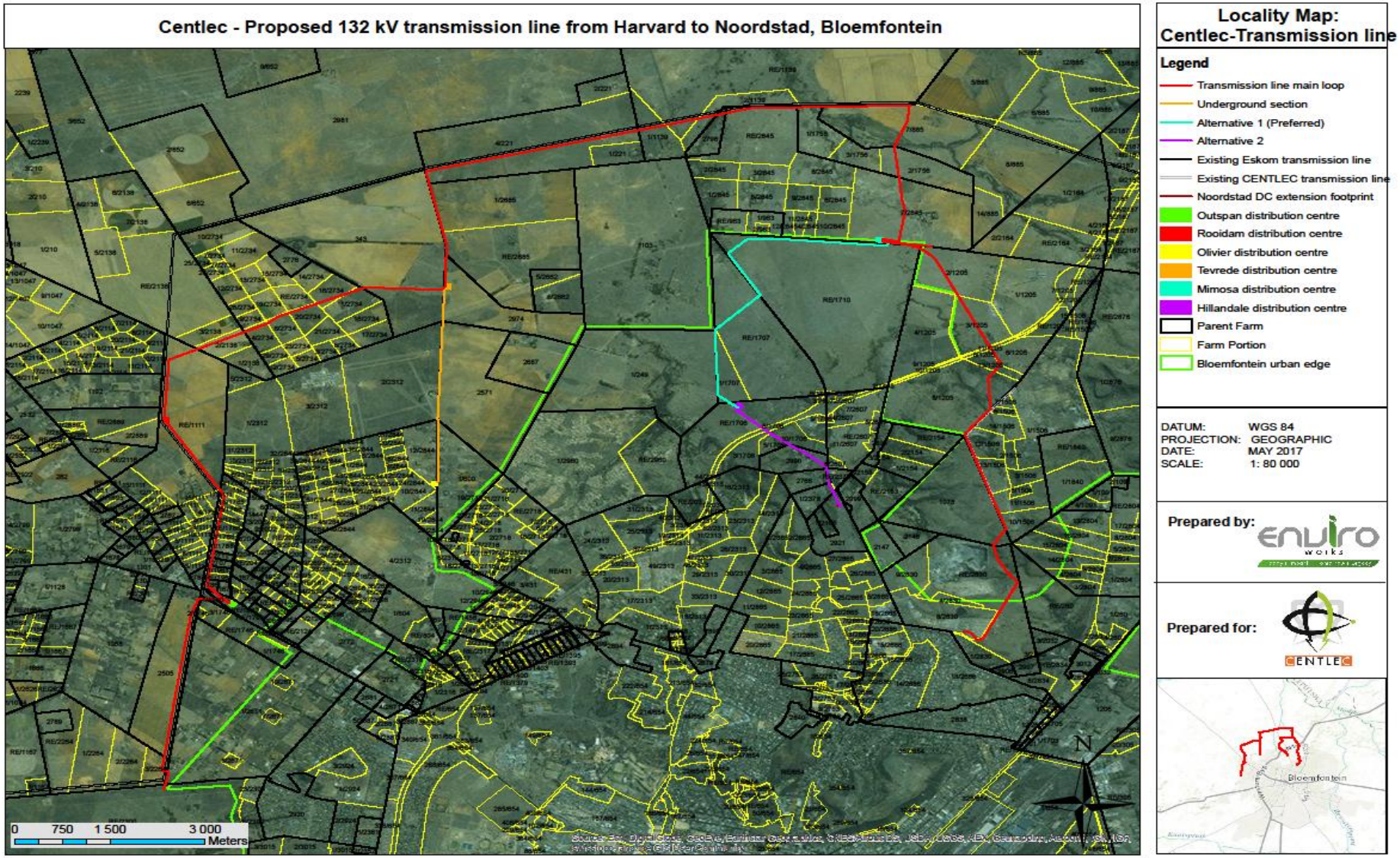

Figure 1: Locality/layout/route map of the proposed project route corridor

5.1. CLIMATE

The rainfall of the region peaks during the summer months and the Mean Annual Precipitation (MAP) of the area is between 450 mm and 550 mm (Mucina & Rutherford, 2006). The Mean Annual Temperature (MAT) of the area is 16°C with the highest average of 23°C during January and lowest average of 8°C during June. The area receives frequent frost days during the winter period.

5.2. GEOLOGY AND SOILS

According to Mucina & Rutherford (2006) the geology of the landscape and associated vegetation types can be described as the following:

Ca and Ae land types are nearly equally represented in the slightly undulating bottomland landscape. Sedimentary mudstones and sandstones mainly of the Adelaide subgroup (part of the Beaufort Group) are mostly present and dominate the area. Soil types mainly include forms such as Hutton, Bainsvlei & Bloemdal.

Solitary hills, slopes and escarpments are also scattered through the area. Extensive dolerite sills forming rides, plateaus and slopes of koppies are present also covering sedimentary mudstones and sandstones mainly of the Adelaide subgroup. Stoney Mispah and gravel rich Glenrosa soil types derived from Jurassic dolerite are prominent.

Isolated sheets/outcrops of Jurassic dolerites are scattered within the sediments of the Adelaide subgroup. These outcrops usually possess a shallow layer of sand of aeolian origin overlaying the dolerite.

5.3. VEGETATION

According to Mucina & Rutherford (2006) the proposed transmission line route corridor traverses four vegetation types. The majority of the route corridor is located within the Bloemfontein Dry Grassland (Gh 5) while a small portion forms part of the Winburg Grassy Shrubland (Gh 7), Bloemfontein Karroid Shrubland (Gh 8) and the Highveld Alluvial (Aza 5) vegetation types.

The associated six sub-stations will only be situated within the Bloemfontein Dry Grassland (Gh 5) and Winburg Grassy Shrubland (Gh 7) vegetation types (Mucina & Rutherford, 2006).

- Bloemfontein Dry Grassland (Gh 5) vegetation type

  - This vegetation type mainly consists of slightly undulating bottomland landscape covered with tall, dense grassland.
  - The conservation status of the vegetation type is classified as endangered due to significant cultivation transformation and urbanisation expansion pressures in the Bloemfontein area.
  - The entire vegetation type is classified as having a vulnerable status in terms of the national threatened ecosystems system.
- Winburg Grassy Shrubland (Gh 7) vegetation type
  - This vegetation type constitutes solitary hills, slopes and escarpments with habitats ranging from open grassland to shrubland. It is characterised by extended ridge areas with mainly grassland and few shrubs. Gound-truthing has indicated that the proposed route corridor will only traverse any significant hills or escarpments in its north eastern section and will rather mainly be confined to the undulating bottom lands of the Bloemfontein Dry Grassland (Gh 5) vegetation type.
  - The vegetation type is classified as least threatened.
  - Within the Winburg Grassy Shrubland (Gh 7), a number of dolerite rocky outcrops/domes are noticeable. Although not necessarily indicated as such on the vegetation map due to their small size, they form part of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type.
- Bloemfontein Karroid Shrubland (Gh 8) vegetation type
  - This vegetation type constitutes isolated sheets/outcrops of Jurassic dolerites which are scattered within the sediments of the Adelaide subgroup. These outcrops usually possess a shallow layer of sand of aeolian origin overlaying the dolerite. This soil structure therefore only supports low shrubland dominated by dwarf small leaved karroid and succulent shrubs. Grasses are restarted to depressions and crevices filled with fine soil.
  - These rocky outcrops are scattered within the landscape.
  - The vegetation type is endangered by urbanisation development.
- Highveld Alluvial (Aza 5) vegetation type
  - This vegetation type constitutes a flat topography supporting riparian thickets mostly dominated by *Acacia karroo*, accompanied by seasonally flooded grasslands and disturbed herblands.
  - The proposed line route corridor will on traverse this particular at a specific isolated position.

- The vegetation type is classified as least threatened.

An approximately 3.3 km portion of the proposed transmission line route corridor will traverse a Critical Biodiversity Area 1 (CBA) as classified by the Provincial Spatial Biodiversity Plan, 2014. Critical Biodiversity Areas are areas which play an important role in conservation and reaching certain required biodiversity targets for ecosystem types, species or ecological processes (Collins, 2015). Pylons will be constructed within the CBA. Pylons will not be constructed within watercourses but may need to be placed within 32 metres of watercourses.

Potential reasons for the area being categorised as a CBA:

- The Lesser Kestrel uses this area for foraging.
- The plant species *Strumaria tenella* subsp *orientalis* may occur within the development footprint and destruction of individuals of the species must be avoided.
- The CBA planning units account for the vegetation types Bloemfontein Karroid Shrubland and Winburg Grassy Shrubland.

The proposed development will however have minimum physical footprint impact on the vegetation of the CBA as only the pylons positions will impact directly on the surface vegetation. The associated six sub-station footprints (total of 5.1 ha) will not be developed within any CBA's.
See vegetation and sensitivity maps below.

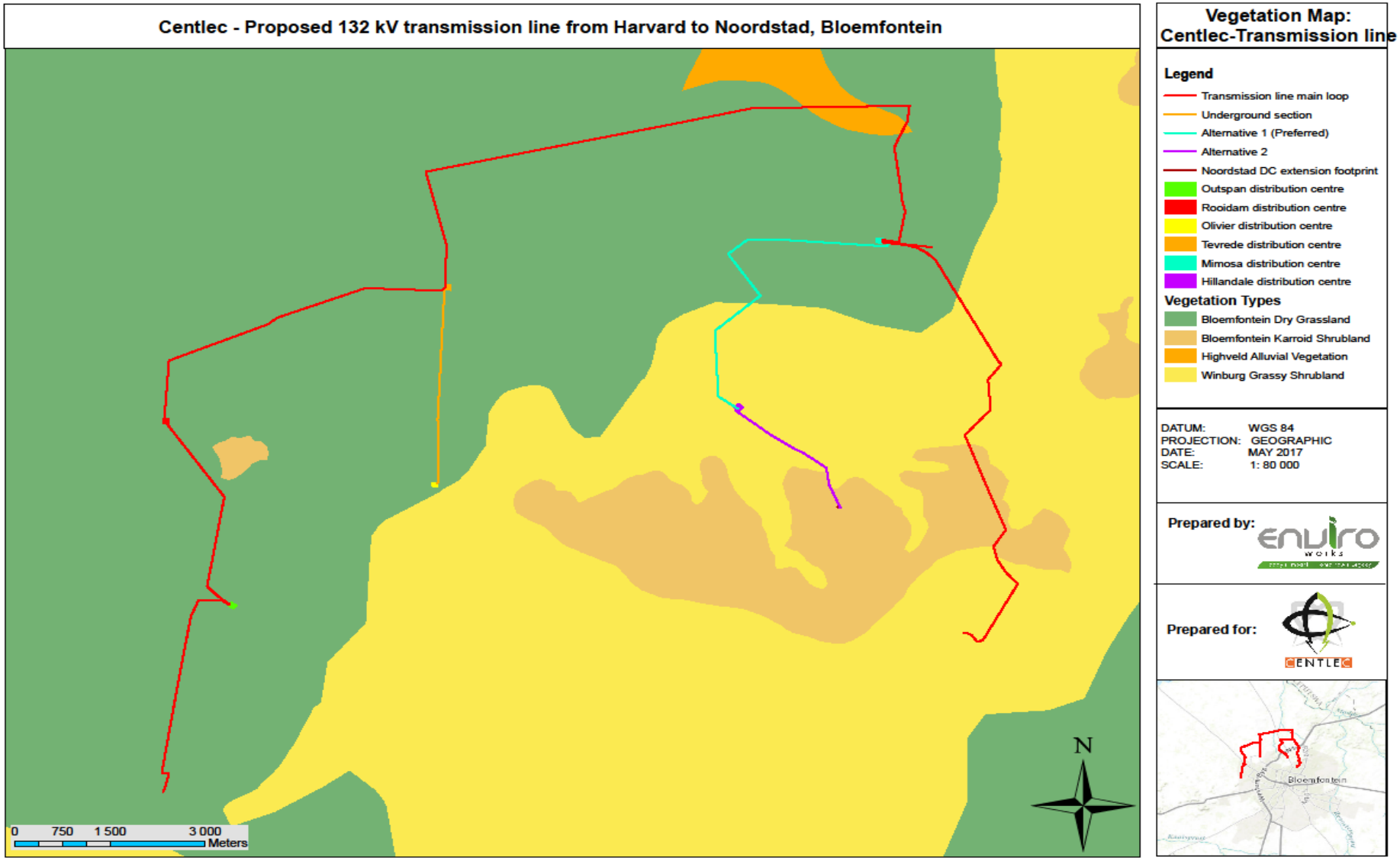

Figure 2: Vegetation map of the proposed project layout

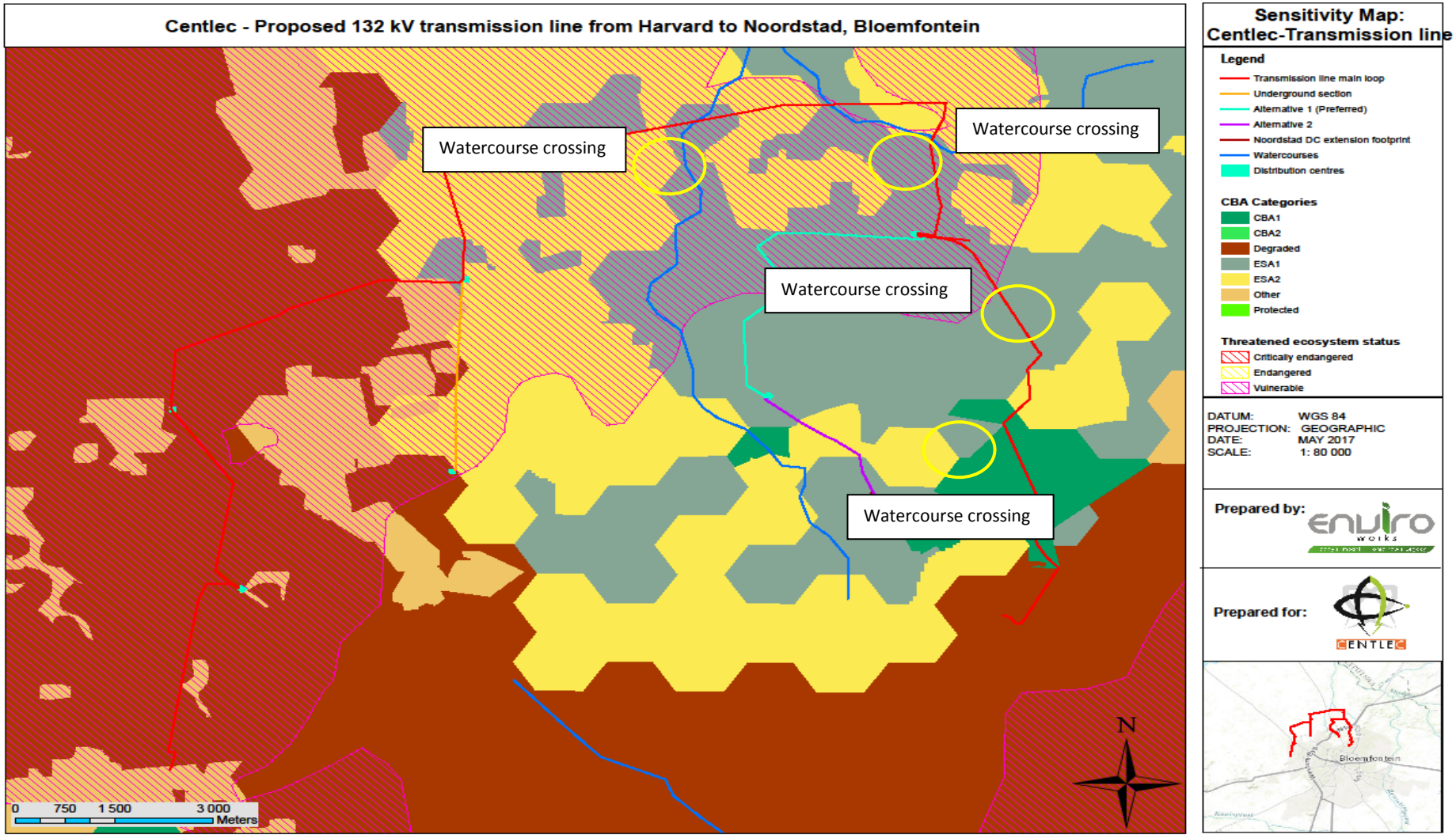

Figure 3: Sensitivity map of the proposed project layout

6. METHODOLOGY

- The proposed project area was assessed by driving along the route corridor and traversing on foot at strategic areas. Visual observations/identifications of species and habitat conditions on the footprint areas were conducted.
- Species were listed and categorised as per the Red Data Species List; Protected Species List of the National Forests Act (Act 84 of 1998), Invasive Species List of the National Environmental Management: Biodiversity Act (Act 10 of 2004), Alien and Invasive Species Regulations, 2014 and the Free State's Nature Conservation Ordinance (No 8 of 1969).
- Potential impacts of the proposed project on the surrounding natural environment were identified, evaluated and rated as per the methodology described below:

The **Present Ecological State (PES)** of the proposed project area was assessed and rated as per the table below.

- The Present Ecological State (PES) refers to the current state or condition of an area in terms of all its characteristics and reflects the change to the area from its reference condition. The value gives an indication of the alterations that have occurred in the ecosystem.

Table 1: Criteria for PES calculations

Ecological Category	Score	Description
A	> 90-100%	**Unmodified**, natural.
B	> 80-90%	**Largely natural** with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.
C	> 60-80%	**Moderately modified**. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.
D	> 40-60%	**Largely modified**. A large loss of natural habitat, biota and basic ecosystem functions has occurred.
E	> 20-40%	**Seriously modified**. The loss of natural habitat, biota and basic ecosystem functions is extensive.
F	0-20%	**Critically/Extremely modified**. Modifications have reached a critical level and the system has been modified completely with an almost complete loss of natural habitat and biota. In the worst instances the basic ecosystem functions have been destroyed and the changes are irreversible.

The **Ecological Importance and Sensitivity (EIS)** of the proposed project area was assessed and rated as per the table below.

- The Ecological Importance and Sensitivity (EIS) of an area is an expression of its importance to the maintenance of ecological diversity and functioning on local and wider scales, and both abiotic and biotic components of the system are taken into consideration. Sensitivity refers to the system's ability to resist disturbance and its capability to recover from disturbance once it has occurred.

Table 2: Criteria for EIS calculations

EIS Categories	Score	Description
Low/Marginal	**D**	Not ecologically important and sensitive at any scale. Biodiversity ubiquitous and not sensitive to flow and habitat modifications.
Moderate	**C**	Ecologically important and sensitive on provincial/local scale. Biodiversity not usually sensitive to flow and habitat modifications.
High	**B**	Ecologically important and sensitive. Biodiversity may be sensitive to flow and habitat modifications.
Very High	**A**	Ecologically important and sensitive. On national even international level. Biodiversity usually very sensitive to flow and habitat modifications.

The tables below indicate and explain the methodology and criteria used for the evaluation of the Environmental Risk Ratings as well as the calculation of the final Environmental Significance Ratings of the identified potential ecological impacts.

Each potential environmental impact is scored for each of the Evaluation Components as per the table below.

Table 3: Scale utilised for the evaluation of the Environmental Risk Ratings

Evaluation Component	Rating Scale and Description/criteria
MAGNITUDE of NEGATIVE IMPACT (at the indicated spatial scale)	**10 - Very high**: Bio-physical and/or social functions and/or processes might be *severely* altered. **8 - High**: Bio-physical and/or social functions and/or processes might be *considerably* altered. **6 - Medium**: Bio-physical and/or social functions and/or processes might be *notably* altered. **4 - Low** : Bio-physical and/or social functions and/or processes might be *slightly* altered. **2 - Very Low**: Bio-physical and/or social functions and/or processes might be *negligibly* altered. **0 - Zero**: Bio-physical and/or social functions and/or processes will remain *unaltered.*
MAGNITUDE of POSITIVE IMPACT (at the indicated spatial scale)	**10 - Very high (positive)**: Bio-physical and/or social functions and/or processes might be *substantially* enhanced. **8 - High (positive)**: Bio-physical and/or social functions and/or processes might be *considerably* enhanced. **6 - Medium (positive)**: Bio-physical and/or social functions and/or processes might be *notably* enhanced. **4 - Low (positive)**: Bio-physical and/or social functions and/or processes might be *slightly* enhanced. **2 - Very Low (positive)**: Bio-physical and/or social functions and/or processes might be *negligibly* enhanced. **0 - Zero (positive)**: Bio-physical and/or social functions and/or processes will remain *unaltered.*

DURATION	**5 - Permanent** **4 - Long term**: Impact ceases after operational phase/life of the activity > 60 years. **3 - Medium term**: Impact might occur during the operational phase/life of the activity – 60 years. **2 - Short term**: Impact might occur during the construction phase - < 3 years. **1 - Immediate**
EXTENT (or spatial scale/influence of impact)	**5 - International**: Beyond National boundaries. **4 - National**: Beyond Provincial boundaries and within National boundaries. **3 - Regional**: Beyond 5 km of the proposed development and within Provincial boundaries. **2 - Local**: Within 5 km of the proposed development. **1 - Site-specific**: On site or within 100 m of the site boundary. **0 -** None
IRREPLACEABLE loss of resources	**5 – Definite** loss of irreplaceable resources. **4 – High** potential for loss of irreplaceable resources. **3 – Moderate** potential for loss of irreplaceable resources. **2 – Low** potential for loss of irreplaceable resources. **1 – Very low** potential for loss of irreplaceable resources. **0 - None**
REVERSIBILITY of impact	**5 –** Impact **cannot** be reversed. **4 – Low** potential that impact might be reversed. **3 – Moderate** potential that impact might be reversed. **2 – High** potential that impact might be reversed. **1 –** Impact **will be** reversible. **0 –** No impact.
PROBABILITY (of occurrence)	**5 - Definite**: >95% chance of the potential impact occurring. **4 - High probability**: 75% - 95% chance of the potential impact occurring. **3 - Medium probability**: 25% - 75% chance of the potential impact occurring **2 - Low probability**: 5% - 25% chance of the potential impact occurring. **1 - Improbable**: <5% chance of the potential impact occurring.
CUMULATIVE impacts	**High**: The activity is one of several similar past, present or future activities in the same geographical area, and might contribute to a very significant combined impact on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Medium**: The activity is one of a few similar past, present or future activities in the same geographical area, and might have a combined impact of moderate significance on the natural, cultural, and/or socio-economic resources of local, regional or national concern. **Low**: The activity is localised and might have a negligible cumulative impact. **None**: No cumulative impact on the environment.

Once the Environmental Risk Ratings have been evaluated for each potential ecological impact, the Significance Score of each potential ecological impact is calculated by using the following formula:

- **SS (Significance Score) = (magnitude + duration + extent + irreplaceable + reversibility) x probability.**

The maximum Significance Score value is 150.

The Significance Score is then used to rate the Environmental Significance of each potential ecological impact as per Table 4 below. The Environmental Significance rating process is completed for all identified potential ecological impacts both before and after implementation of the recommended mitigation measures.

Table 4: Scale used for the evaluation of the Environmental Significance Ratings

Significance Score	Environmental Significance	Description/criteria
125 – 150	Very high (VH)	An impact of very high significance will mean that the project cannot proceed, and that impacts are irreversible, regardless of available mitigation options.
100 – 124	High (H)	An impact of high significance which could influence a decision about whether or not to proceed with the proposed project, regardless of available mitigation options.
75 – 99	Medium-high (MH)	If left unmanaged, an impact of medium-high significance could influence a decision about whether or not to proceed with a proposed project. Mitigation options should be relooked.
40 – 74	Medium (M)	If left unmanaged, an impact of moderate significance could influence a decision about whether or not to proceed with a proposed project.
<40	Low (L)	An impact of low is likely to contribute to positive decisions about whether or not to proceed with the project. It will have little real effect and is unlikely to have an influence on project design or alternative motivation.
+	Positive impact (+)	A positive impact is likely to result in a positive consequence/effect, and is likely to contribute to positive decisions about whether or not to proceed with the project.

- Wetlands were identified and delineated on the proposed project area as per the methodology described below:

For the purposes of this investigation a wetland was defined according to the definition in the National Water Act (Act 36 of 1998) as: “land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.”

In 2005 DWAF published a wetland delineation procedure in a guideline document titled “A Practical Field Procedure for the Identification and Delineation of Wetlands and Riparian Areas”. Guidelines for the undertaking of biodiversity assessments exist. These guidelines contain a number of stipulations relating to the protection of wetlands and the undertaking of wetland assessments. These guidelines state that a wetland delineation procedure must identify the outer edge of the temporary zone of the wetland, which marks the boundary between the wetland and adjacent terrestrial areas and is that part of the wetland that remains flooded or saturated close to the soil surface for only a few weeks in the year, but long enough to develop anaerobic conditions and determine the nature of the plants growing in the soil.

The guidelines also state that locating the outer edge of the temporary zone must make use of four specific indicators namely:

- the terrain unit indicator,
- the soil form indicator,
- the soil wetness indicator and
- the vegetative indicator.

In addition the wetland and a protective buffer zone, beginning from the outer edge of the wetland temporary zone, must be designated as sensitive in a sensitivity map. The guidelines stipulate buffers to be delineated around the boundary of a wetland. A protective 32 m buffer zone, beginning from the outer edge of the wetland temporary zone, must be implemented and designated as sensitive within which no development must be allowed to occur.

7. ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

The processes of investigation which have led to the production of this report, harbours several **assumptions**, which include the following:

- All information provided by the applicant and engineering design team to the environmental specialist was correct and valid at the time that it was provided;
- The proposed transmission line route corridor as provided by the engineering design team is correct and will not be significantly deviated from.
- Strategic level investigations undertaken by the applicant prior to the commencement of the BA process, determined that the development site represents a potentially suitable and technically acceptable location;
- The public will receive a fair and reoccurring opportunity to participate and comment during the BA process, through the provision of adequate public participation timeframes stipulated in the Regulations;
- The need and desirability of the project is based on strategic national, provincial and local plans and policies which reflect the interests of both statutory and public viewpoints;
- The BA process is a project-level framework and the specialists are limited to assessing the anticipated environmental impacts associated with the construction and operational phases of the proposed project
- Strategic level decision making is conducted through cooperative governance principles with the consideration of sustainable and responsible development principles underpinning all decision making.

Given that a BA involves prediction, **uncertainty** forms an integral part of the process. Two types of uncertainty are associated with the BA process, namely process-related and prediction-related.

- Uncertainty of prediction is critical at the data collection phase as final certainty will only be obtained upon implementation of the proposed development. Adequate research, experience and expertise may minimise this uncertainty;
- Uncertainty of values depicts the approach assumed during the BA process, while final certainty will be determined at the time of decision making. Enhanced communication and widespread/comprehensive coordination can lower uncertainty;
- Uncertainty of related decision relates to the interpretation and decision making aspect of the BA process, which shall be appeased once monitoring of the project phases is undertaken.

The significance/importance of widespread/comprehensive consultation towards minimising the risk/possibility of omitting significant impacts is further stressed. The use of quantitative impact significance rating formulas (as utilised in this document) can further standardise the interpretation of results and limit the occurrence and scale of uncertainty.

Gaps in knowledge can be attributed to:

The ecological study process is being undertaken prior to the availing of certain information which would be derived from the final project design and layout (pylon positions).

The principle of human nature provides for uncertainties with regards to the identified socio-economic impacts of the proposed development.

Enviroworks is an independent environmental consulting firm and as such, all processes and attributes of the specialist investigations and BA are addressed in a fair and unbiased/objective manner. It is believed that through the running of a transparent and participatory process, risks associated with assumptions, uncertainties and gaps in knowledge can be and have been acceptably reduced.

8. RESULTS AND DISCUSSION

The proposed project area can roughly be divided into the following sections based on landscape structure, land use, composition and condition of vegetation:

- Pre-existing transformed and disturbed cultivated lands and road servitudes associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type
- Semi-natural urbanised and cultivated areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type
- Natural, currently undeveloped rural areas associated with all three relevant vegetation types
- Critical Biodiversity Area associated with the Winburg Grassy Shrubland (Gh 7) and Bloemfontein Karroid Shrubland (Gh 8) vegetation types
- Watercourses/drainage areas
- Six sub-station footprints

Each of these identified areas will now be discussed in detail.

8.1. PRE-EXISTING TRANSFORMED AND DISTURBED CULTIVATED LANDS AND ROAD SERVITUDES ASSOCIATED WITH THE BLOEMFONTEIN DRY GRASSLAND (GH 5) VEGETATION TYPE

More than half of the transmission line route corridor (approximately 20.6 km) is situated in areas with little to no natural, untransformed vegetation remaining. The majority of natural vegetation (mostly part of the Bloemfontein Dry Grassland, Gh 5) has already been previously transformed and or disturbed by cultivation and other development activities as well as the negative ecological 'edge effects' caused by roadside reserve maintenance which encroaches into the surrounding areas. Natural species richness in these areas is very low (≤ 10) and these areas therefore don't play a significant role in the conversation value through biodiversity or ecological functionality persistence of the natural surrounding ecosystem and vegetation type.

8.1.1. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of these transformed areas is classified as Class D as it is largely modified due to a large loss and transformation of natural habitat, biota and basic ecosystem functions.

The Ecological Importance and Sensitivity (EIS) of these transformed areas is classified as Class D as it is not ecologically important or sensitive at any scale. Biodiversity is ubiquitous and not sensitive to

further habitat modifications due to the already existing high level of transformation and disturbance.

8.1.2. Conclusion & Recommendations

The majority of the transmission line development will have a small actual surface footprint impact on vegetation; impact will mainly be restricted to pylon construction footprints. These transformed areas have little if any ecologically functional or conversation value for the natural surrounding ecosystem and vegetation type.

- It is recommended that pylons, as far as practicably possible, be placed within such already transformed areas in order to minimise the impacts on remaining semi-natural and natural vegetation.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.

8.2. SEMI-NATURAL URBANISED AND CULTIVATED AREAS ASSOCIATED WITH THE BLOEMFONTEIN DRY GRASSLAND (GH 5) VEGETATION TYPETION TYPE

Although being mostly fragmented and isolated (by developed urban infrastructure and cultivated lands discussed as under heading 8.1), a number of areas along the proposed transmission line route corridor still possess natural to semi-natural vegetation cover associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type (see figures below). Such fragmented semi-natural areas can still provide available habitat for various plant and animal species associated with the vegetation type and contribute to ecological functionality of the larger ecosystem and natural corridors. The species richness (60 ≤) determined in these semi-natural areas corresponds closely with that of similar surrounding un-fragmented natural areas and it is therefore important to attempt to impact as little as practically possible on such identified areas. A list of species encountered in the semi-natural and natural areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type is provided under heading 8.3.

Figures 4 a-d: Four images indicating examples of semi-natural areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type

8.2.1. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of these semi-natural areas is classified as Class C as it is only moderately modified. Loss and change of natural habitat and biota have occurred, but the basic ecosystem functions are still predominantly unchanged.

The Ecological Importance and Sensitivity (EIS) of these semi-natural areas is classified as Class C as it is ecologically important and sensitive on provincial/local scale. Although being significantly fragmented and isolated, such areas still form an important supporting component of the biodiversity and ecological functionality of the surrounding natural ecosystem.

8.2.2. Conclusion & Recommendations

Urbanisation and cultivation expansion has resulted in extensive transformation and decrease in representation of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and continues to do so. The majority of the transmission line will have a small actual surface footprint impact on vegetation; impact will mainly be restricted to pylon construction footprints. Although being significantly isolated and fragmented, these semi-natural areas form an important supporting component of the surrounding natural ecosystem and contribute to available habitat for various plant and animal species associated with the vegetation type as well as ecological functionality of the larger ecosystem. They must therefore be protected.

- It is recommended that the amount of pylons to be placed within these areas be minimised, as far as practicably possible, in order to minimise impacts on the habitat and ecological functionality remaining in these semi-natural areas.
- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of and construction processes.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.
- Significant care must be taken to ensure that no indigenous woody shrubs or trees (such as *Searcia lancea, Ziziphus mucronata* and *Acacia karroo*) are removed, as far as practicably possible, during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the

individuals and provide recommendations on their management or potential removal or the possibility of relocation.

8.3. NATURAL, CURRENTLY UNDEVELOPED RURAL AREAS ASSOCIATED WITH ALL THREE RELEVANT VEGETATION TYPES

The majority of undisturbed natural vegetation remaining along the proposed transmission line route corridor is located in the northern and eastern route sections. With the exception of the Critical Biodiversity Area (CBA) located in the eastern section of the proposed line route, the majority of remaining natural land forms part of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type. The CBA (which will be discussed separately under heading 8.4) as well as a small solitary hill, located along the western portion of the line route, consist of an intertwined mosaic of the Winburg Grassy Shrubland (Gh 7) and the Bloemfontein Karroid Shrubland (Gh 8) vegetation types.

8.3.1. Bloemfontein Dry Grassland (Gh 5) vegetation type

The natural areas remaining on the proposed transmission line route corridor, of which the majority are associated with this vegetation type, form part of and play significant roles in larger surrounding continual natural corridors. The vegetation type is classified as having a vulnerable status in terms of the national threatened ecosystems system and these natural areas are therefore subsequently also important to the habitat and ecological functionality persistence of the surrounding ecosystem.

The areas consist of medium height grassland with a distinct lack of a woody component (with the exception of perennial watercourses). The species richness of these natural areas is ≥ 60 and one conservationally significant Red Data Listed species (*Boophone disticha*; Declining) was encountered during the site visit. The table below indicates the species encountered during the site visits for both the semi-natural and natural areas:

Table 5: Species list for both the semi-natural and natural areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type (Red Data Listed species highlighted in red and provincially protected species highlighted in yellow)

Species name		
Graminoids	**Forbs**	**Shrubs & trees**
Anthephora pubescens	*Albuca setosa*	*Acacia karroo*
Aristida bipartita	*Arctotis venusta*	*Buddleja saligna*

Aristida canescens	*Asparagus sp.*	*Caesalpinia gilliesii* (Category 1b invasive species)
Aristida congesta	*Berkheya onopordifolia*	*Osyris lanceolata*
Cymbopogon pospischilii	*Boophone disticha* (Red Data Listed as Declining)	*Schinus molle* (exotic)
Cynodon dactylon	*Brunsvigia radulosa* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)	*Searsia lancea*
Cyperus sp.	*Chenopodium album* (exotic)	*Ziziphus mucronata*
Digitaria argyrograpta	*Chrysocoma ciliata*	-
Digitaria eriantha	*Conyza bonariensis*	-
Eragrostis chloromelas	*Dicoma sp.*	-
Eragrostis gummiflua	*Felicia muricata*	-
Eragrostis lehmanniana	*Harpagophytum procumbens*	-
Eragrostis superba	*Helichrysum rugulosum*	-
Fingerhuthia africana	*Hibiscus pusillus*	-
Heteropogon contortus	*Ipomoea oblongata*	-
Hyparrhenia hirta	*Jamesbrittenia caerulea*	-
Panicum schinzii	*Kedrostis africana*	-
Paspalum sp.	*Ledebouria marginata*	-
Setaria verticillata	*Nidorella resedifolia*	-
Sporobolus africanus	*Oxalis depressa*	-
Sporobolus fimbriatus	*Pollichia campestris*	-
Themeda triandra	*Ruschia hamata*	-
Tragus berteronianus	*Selago densiflora*	-
Tragus koeleroides	*Solanum elaeagnifolium* (invasive)	-
Urochloa panicoides	*Solanum incanum*	-
-	*Sphaeralcea bonariensis* (exotic)	-
-	*Strumaria tenella*	-

Figures 5 a-c: Three images indicating examples of natural areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type

Seeing that urbanisation and cultivation expansion has resulted in extensive destruction and decrease in representation of this vegetation type (classified as a vulnerable ecosystem) and continues to do so, it is vitally important that impacts on these remaining natural areas be minimised as far as practicably possible and that the areas be efficiently managed and conserved.

8.3.2. Winburg Grassy Shrubland (Gh 7) and the Bloemfontein Karroid Shrubland (Gh 8) vegetation type

A small solitary hill is located along the western portion of the proposed transmission line route corridor. Although the hill is classified as only forming part of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type (Mucina & Rutherford, 2006), 'ground truthing' during the site inspections has indicated that it rather mainly forms part of the Winburg Grassy Shrubland (Gh 7) vegetation type with a smaller intertwined mosaic of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type.

The proposed line route corridor is situated around the southern foot slope of the hill and therefore forms part of a transitional zone between the Winburg Grassy Shrubland (Gh 7) vegetation type and the surrounding grassland. The graminoid layer of the route corridor associated with the hill therefore does not significantly differ in species composition from the surrounding Bloemfontein Dry

Grassland (Gh 5) vegetation type with the exception of a small number of additional forb and woody species. The area possesses a significantly more rocky soil strata and a more prolific woody shrub and tree component. Additional species encountered during the site visit and which were not found to be present in the Bloemfontein Dry Grassland (Gh 5) vegetation type are indicated in the table below:

Table 6: Additional species list for the natural areas associated with the Winburg Grassy Shrubland (Gh 7) vegetation type (Provincially protected species are highlighted in yellow)

Species name		
Graminoids	**Forbs**	**Shrubs & trees**
-	*Cheilanthes eckloniana*	*Diospyros austro-africana*
-	*Lantana rugosa*	*Gymnosporea karroica*
-	*Solanum pseudo-capsicum*	*Olea europaea subsp. africana* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)
-	*Tephrosia capensis*	*Searsia ciliata*

Figures 6 a & b: Two images indicating examples of natural areas associated with the Winburg Grassy Shrubland (Gh 7) vegetation type

Although the Winburg Grassy Shrubland (Gh 7) vegetation type is classified as least threatened by Mucina & Rutherford (2006), this hill provides a rather unique localised habitat for various plant and animal species which differs considerably from the surrounding grassland. It is therefore important that the structural integrity and diversity of the woody component of this hill be conserved and not be significantly impacted upon by the proposed development.

8.3.3. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of these natural areas is classified as Class B as it is largely natural with few modifications. A small change in natural habitats and biota may have inevitably taken place but the ecosystem functions are essentially unchanged.

The Ecological Importance and Sensitivity (EIS) of these natural areas is classified as Class B as it is ecologically important and sensitive. Biodiversity will be sensitive to further habitat modifications and this must therefore be avoided.

8.3.4. Conclusion & Recommendations

Urbanisation and cultivation expansion has resulted in extensive destruction and decrease in representation of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and continues

to do so. The majority of the transmission line will however have a small actual surface footprint impact on vegetation; impact will mainly be restricted to pylon construction footprints. These remaining natural areas form part of and play significant roles in larger surrounding continual natural corridors. They are therefore subsequently also very important to the habitat and ecological functionality persistence of the surrounding ecosystem. They must therefore be protected.

The small solitary hill associated with the Winburg Grassy Shrubland (Gh 7) vegetation type provides a rather unique localised habitat for various plant and animal species which differs considerably from the surrounding grassland. It is therefore important that the structural integrity and diversity of the woody component of this hill be conserved and not significantly be impacted upon by the proposed development

- It is recommended that the amount of pylons to be placed within these natural areas be restricted and pylons rather be placed in transformed areas, as far as practicably possible. This must be done in order to minimise impacts on the habitat and ecological functionality of the natural areas.
- It is recommended that the Steel Monopole tower type be implemented in the natural areas as far as practicably possible due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.
- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of and construction processes.
- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. Sufficient existing farm tracks are present around the two solitary hills of the Winburg Grassy Shrubland (Gh 7) vegetation type. No new road/track impacts are therefore allowed in the vicinity of the hills.

- Although the majority of the transmission line will have a small actual surface footprint impact on vegetation mainly restricted to pylon construction footprints, it is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural areas of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.

8.4. CRITICAL BIODIVERSITY AREA ASSOCIATED WITH THE WINBURG GRASSY SHRUBLAND (GH 7) AND BLOEMFONTEIN KARROID SHRUBLAND (GH 8) VEGETATION TYPES

Critical Biodiversity Areas (CBA) are areas which play an important role in conservation and reaching certain required biodiversity targets for ecosystem types, species or ecological processes (Collins, 2015). The conservation and adequate management of CBA's is therefore a high priority for the competent authority, the Department of Environmental Affairs (DEA).

An approximately 3.3 km portion at the end of the proposed transmission line main loop will traverse a Critical Biodiversity Area (CBA). Potential significant reasons for the area being categorised as a CBA:

- The Lesser Kestrel utilises this area for foraging. This should be discussed by the avifaunal specialist report.
- The plant species *Strumaria tenella* subsp *orientalis* may occur within the development footprint and destruction of individuals of the species must be avoided.
- The CBA planning units account for the Winburg Grassy Shrubland (Gh 7) and Bloemfontein Karroid Shrubland (Gh 8) vegetation types. The proposed development will however pose minimal physical footprint impact to the vegetation types if the construction phase is adequately managed.

The CBA portion of the line route corridor is situated within a pristine, naturally vegetated area consisting of numerous hills associated with the Winburg Grassy Shrubland (Gh 7) vegetation type and which are intertwined with a mosaic of rocky outcrops of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type. The vegetation of the hills possesses a significant woody component (≤ 6 m in height) as opposed to the surrounding grassland while the rocky outcrops have a lower, less significant woody shrub layer (≤ 3 m in height) due to the lack of adequate soil depth. The rocky outcrops however possess a localised unique and conservationally important succulent component. A number of seasonal drainage lines are also present along the proposed line route falling within the CBA.

Although the condition of the broader CBA is relatively pristine, the proposed transmission line will join up with an existing CENTLEC 33 kV transmission line inside the CBA from where it will run parallel alongside the existing line for virtually the entire route section until it exits the CBA. The presence of the existing line has slightly reduced the local pristineness in its immediate vicinity. The significance of the impact on the CBA will thereof be lower than it would have been if the line had to traverse another portion of the CBA on its own.

Additional species encountered during the site visit associated with the Bloemfontein Karroid Shrubland (Gh 8) vegetation type and which were not found to be present in the Bloemfontein Dry Grassland (Gh 5) vegetation type are indicated in the table below:

Table 7: Additional species list for the CBA associated with the Bloemfontein Karroid Shrubland (Gh 8) vegetation type (Provincially protected species are highlighted in yellow)

Species name		
Graminoids	**Forbs**	**Shrubs & trees**
Eragrostis nindensis	*Aloe grandidentata* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)	*Cussonia paniculata* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)
Eustachys paspaloides	*Anacampseros filamentosa* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)	*Euclea crispa*
Melinis repens	*Bonatea speciosa* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)	*Olea europaea subsp. africana* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)
-	*Cotyledon orbiculata*	*Opuntia engelmannii* (Category 1b invasive species)
-	*Crassula setosa*	*Rhigozum obovatum*
-	*Euphorbia mauritanica* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)	-

-	*Euryops empetrifolius*	-
-	*Felicia filifolia*	-
-	*Geigeria filifolia*	-
-	*Kalanchoe paniculata*	-
-	*Ledebouria luteola*	-
-	*Portulaca kermesina*	-
-	*Ruschia spinosa*	-
-	*Selago albida*	-
-	*Stapelia grandiflora* (Protected in terms of the Free State Nature Conservation Ordinance (No 8 of 1969)	-
-	*Stomatium braunsii*	-

Figures 7 a & b: Two images indicating examples of the rocky outcrops inside the CBA associated with the Bloemfontein Karroid Shrubland (Gh 8) vegetation type

The hills and rocky outcrops areas are also home to numerous wild animals such as *Rock hyrax* and small deer species. The area is stocked with game animals such as zebra and larger antelope. The mobility of such animals will result in them moving away from the disturbance during construction process and returning after construction completion. It is however important that the noise impact and disturbance of wild animals and game be adequately managed and kept to a minimum during construction.

8.4.1. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of the CBA is classified as Class A as the area is unmodified and natural. The structural integrity, species diversity and subsequent ecological connectivity and functionality must therefore be conserved and maintained.

The Ecological Importance and Sensitivity (EIS) of the CBA is classified as Class A as it is very ecologically important and sensitive on a provincial and national level. Biodiversity will be sensitive to habitat modifications and this must therefore be avoided.

8.4.2. Conclusion & Recommendations

The pristine vegetation of the CBA forms part of a larger natural corridor which plays a very significant role in faunal and floral migration and dispersion activities. The area provides a rather unique localised habitat for various plant and animal species which differs considerably from the surrounding grassland of the Bloemfontein Dry Grassland (Gh 5) vegetation type. It is therefore extremely important that the structural integrity, species diversity and subsequent ecological connectivity and functionality as part of the larger natural corridor and surrounding ecosystem be maintained and not be significantly impacted upon by the proposed development. The majority of the transmission line will however have a small actual surface footprint impact on the vegetation of the CBA; impact will mainly be restricted to pylon construction footprints. The presence of the existing line has also slightly reduced the local pristineness in its immediate vicinity. The significance of the impact on the CBA will thereof be lower than it would have been if the line had to traverse another portion of the CBA on its own.

- It is recommended that the amount of pylons to be placed within the CBA be restricted, as far as practicably possible, in order to minimise impacts on the habitat and ecological functionality of the natural area.
- It is instructed that only the Steel Monopole tower type be implemented in the CBA due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.
- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Pylon placement within any significant rocky outcrops of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type to be prevented as far as practicably possible.
- No site camp footprint to be established within the CBA and the entire construction phase planning and layout which is to occur within the CBA to firstly be reviewed and approved by a suitably qualified, registered and experienced ecologist in order to ensure minimal impact is achieved.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions within the CBA must be conducted in order to ensure that no Bloemfontein Karroid Shrubland (Gh 8) vegetation type rocky outcrops will be significantly impacted upon and to identify any potentially significant species individuals which would require relocation. These walkthrough and potential

relocation activities must be completed prior to the commencement of and construction processes.

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. An existing CENTLEC 33 kV transmission line already runs through a portion of the CBA and the proposed transmission line will be developed directly adjacent to it. This could enable the utilisation of exiting service roads.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- The noise impact and disturbance of wild animals and game must be adequately managed and kept to a minimum during construction.

8.5. WATERCOURSES/DRAINAGE AREAS

The proposed transmission line route will traverse a number of identified watercourses. These watercourses consist of either small seasonal drainage lines or larger semi-perennial streams classified as first and second order streams. No significantly large watercourses such as locally or regionally important rivers are crossed by the proposed line route.

8.5.1. Seasonal drainage lines

The majority of the identified watercourses are only small seasonal drainage lines. The vegetation species and structural composition therefore does not vary significantly from the surrounding grasslands due to the drainage lines being dry for the majority of the year. Active water flow is only induced once significant rainfall events occur. Some of these seasonal drainage lines are characterised by a slight increase in the presence of a woody component consisting mainly of small to medium sized *Acacia karroo* shrubs although this is not always the case.

Graminoid species encountered within the proposed line route corridor which are associated with the seasonal drainage lines and are not present in the surrounding grasslands are indicated in the table below:

Table 8: Species list for the seasonal watercourses which are not present in the surrounding grasslands

Species name		
Graminoids	**Forbs**	**Shrubs & trees**
Paspalum sp. (hydrophytic species)	-	*Acacia karroo*
Cyperus sp. (hydrophytic species)	-	*Searcia lancea*
Typha capensis (hydrophytic species) (only is certain instances)	-	*Ziziphus mucronata*

Figure 8: An image indicating an example of a seasonal watercourse

Although only being small and seasonal, these water drainage lines still cumulatively contribute to the adequate water drainage of the larger surrounding local catchment areas. Any impact on the vegetation and watercourse structures or impediment or diversion of flow must therefore be completely avoided. Adequate buffer areas must be implemented around these watercourses and no access or construction routes or any physical footprint impacts such as pylons are to be made within the recommended buffer areas without the prior inspection and approval by a suitably qualified, registered and experienced ecologist.

8.5.2. Perennial streams

Only the two watercourses identified in the northern portion of the proposed line route are considered to be of a perennial nature. The perennial nature of these watercourses is confirmed by the presence of a well-established woody component consisting of mainly medium to large *Acacia karroo* but also *Ziziphus mucronata* shrubs and trees. These perennial watercourses are the primary contributors to adequate water drainage of the larger surrounding local catchment areas which form part of the branched Stinkhoutspruit and which subsequently drains into the Modder River. They are therefore vitally important to the ecological functionality of the surrounding ecosystem. They also provide important habitat for various forms of waterfowl and other aquatic avifauna. Red-knobbed coots (*Fulica cristata*), Egyptian geese (*Alopochen aegyptiacus*) and yellow weavers (*Ploceidae sp.)* were observed during the site visit.

Any impact on the vegetation and watercourse structures or impediment or diversion of flow must therefore be completely avoided. Adequate buffer areas must be implemented around these watercourses and no access or construction routes or any physical footprint impacts such as pylons are to be made within the recommended buffer areas without the prior inspection and approval by a suitably qualified, registered and experienced ecologist.

Figures 9 a - c: Three images indicating examples of a perennial watercourse

8.5.3. Present Ecological State (PES) and Ecological Importance and Sensitivity (EIS)

The Present Ecological State (PES) of the seasonal as well as perennial watercourse areas is classified as Class B as it is largely natural with few modifications. A small change in natural habitats and biota may have inevitably taken place but the ecosystem functions are essentially unchanged.

The Ecological Importance and Sensitivity (EIS) of the seasonal watercourse areas is classified as Class C as it is ecologically important and sensitive on provincial/local scale. Biodiversity is however not usually very sensitive to flow and habitat modifications.

The Ecological Importance and Sensitivity (EIS) of the perennial watercourse areas is classified as Class B as it is ecologically important and sensitive. Biodiversity will be sensitive to any habitat modifications and this must therefore be avoided.

8.5.4. Conclusion & Recommendations

The identified seasonal drainage lines and perennial watercourses cumulatively contribute in a significant manner towards adequate water drainage of the larger surrounding local catchment areas which form part of the branched Stinkhoutspruit and which subsequently drains into the Modder River. They are therefore vitally important to the ecological functionality of the surrounding ecosystem.

- Any impact on the vegetation and watercourse structures or impediment or diversion of flow must be completely avoided. Transmission line design and layout must therefore ensure the continued ecological functionality and unimpeded flow of the watercourse after construction completion.
    - Care must be taken to ensure that no woody shrubs or trees are removed from the watercourse areas during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- Adequate buffer areas to be implemented around identified watercourses.
    - No access or construction routes or any physical footprint impacts are to be made within the recommended buffer areas without the prior inspection and approval by a suitably qualified, registered and experienced ecologist.
    - No pylons to be constructed within the recommended buffer areas. If any pylon construction is required within the buffer areas, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the proposed footprint areas and provide recommendations on their management.

- Any areas around the watercourses potentially impacted by the construction of the transmission line must be to be adequately rehabilitated.

8.6. SIX SUB-STATION FOOTPRINTS

Outspan, Rooidam, Olivier and Tevrede distribution centres will all be situated within a transformed area and must therefore simply be managed in terms of heading 8.1. Care must be taken not to damage the existing *Ziziphus mucronata* & *Searsia lancea* tree individuals present on the Olivier site if possible (see figures below).

Figures 10 a & b: Two images indicating the existing *Ziziphus mucronata* & *Searsia lancea* tree individuals present on the Olivier distribution centre site

Mimosa & Hillandale distribution centres will be situated within natural areas and must therefore be adequately managed in terms of heading 8.3. None of them will be situated within the CBA or watercourse buffer zones.

- The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.
- Once the sub-station designs have been finalised by the applicant, an ecological walkthrough of the final sub-station footprints must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes.
- Existing roads, farm tracks and service roads in close proximity to the proposed sub-station locations must be used as far as practicably possible.
- The construction and subsequent operation of the sub-stations must be continually managed in terms of an adequate and approved Environmental Management Programme (EMPr).

8.7. PROPOSED TRANSMISSION LINE ROUTE SENSITIVITY MAP AND ALTERNATIVES COMPARISON

The map below indicates the locations of the different sensitive areas as identified.

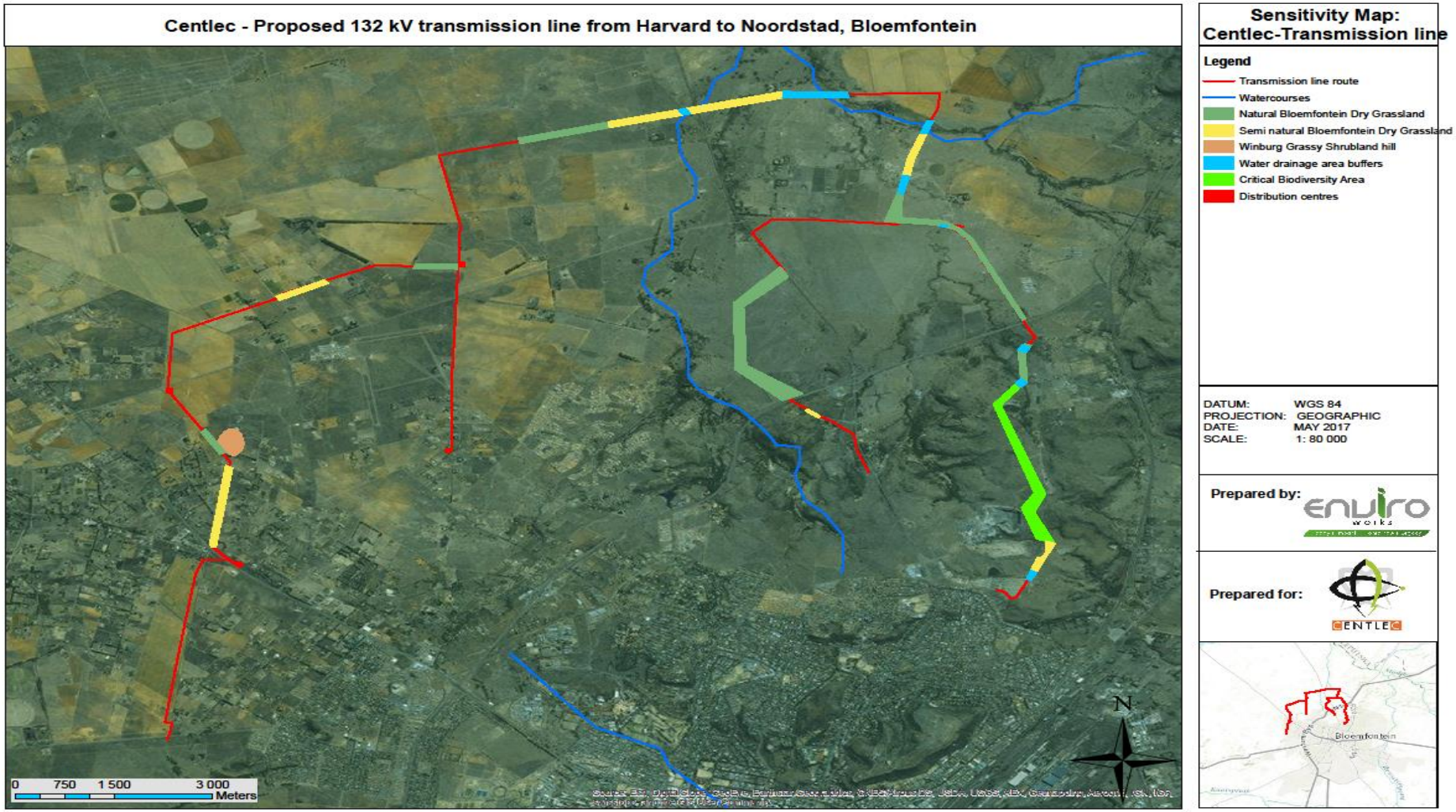

Figure 11: Sensitivity map of the proposed transmission line route corridor indicating the identified sensitive areas

8.7.1. Transmission line route alternatives

The first half of Alternative 1 will traverse a pre-existing transformed area as per heading 8.1 as it will run in the road reserve next to the R 700 and associated dirt road. The conservational value of the first half of Alternative 1 is therefore of little, if any conservational significance.

The latter half will however traverse a natural grassland area associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type as per heading 8.3. These remaining natural areas form part of and play significant roles in larger surrounding continual natural corridors. They are therefore subsequently also very important for habitat and ecological functionality persistence of the surrounding ecosystem and adequate management and reduction of impacts is very important in line with heading 8.3 in order to conserve this vulnerable ecosystem type.

Alternative 2 will merely traverse a pre-existing transformed area as per heading 8.1 as well as a small, isolated portion of semi-natural area as per heading 8.2. The conservational value of Alternative 2 is therefore of little, if any conservational significance.

Although the majority of the transmission line will have a small actual surface footprint impact on vegetation mainly restricted to pylon construction footprints, it is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural areas of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.

8.7.2. Pylon type technology alternatives

The proposed transmission line impact will mainly be restricted to pylon construction footprints. It is therefore recommended that the Steel Monopole tower type be implemented rather than the Steel Lattice tower type as far as practicably possible due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.

9. ECOLOGICAL IMPACT ASSESSMENT

The following section identifies the potential ecological impacts (both positive and negative) which the proposed project will have on the surrounding environment.

Once the potential ecological impacts are identified, they are assessed by rating their Environmental Risk after which the final Environmental Significance is calculated and rated for each identified ecological impact.

The same Environmental Risk rating process is then followed for each ecological impact to determine the Environmental Significance if the recommended mitigation measures were to be implemented.

The objective of this section is therefore firstly to identify all the potential ecological impacts of the proposed project and secondly to determine the significance of the impacts and how effective the recommended mitigation measures will be able to reduce their significance. The potential ecological impacts which are still rated as highly significant, even after implementation of mitigations, can then be identified in order to specifically focus on implement of effective management strategies for them.

9.1. DESCRIPTION OF POTENTIAL ECOLOGICAL IMPACTS AND THEIR RECOMMENDED MITIGATION MEASURES

The following section provides descriptions of the potential ecological impacts which the proposed project will have as well as the recommended mitigation measures to be implemented for each impact as identified.

9.1.1. Construction phase

Destruction/transformation of vegetation of pre-existing transformed and disturbed cultivated lands and road servitudes within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type

The development of the proposed transmission line through transformed and disturbed cultivated lands and road servitudes as identified per heading 8.1 and Figure 12 could result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. Due to the pre-existing transformed and disturbed nature of such areas, the significance of these potential impacts on vegetation will be very low.

Mitigation measures to reduce potential impacts:

- It is recommended that pylons, as far as practicably possible, be placed within such already transformed areas in order to minimise the impacts on remaining semi-natural and natural vegetation.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.

Destruction/transformation of vegetation of pre-existing transformed and disturbed cultivated lands and road servitudes within the sub-station footprints associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type

The footprints of Outspan, Rooidam, Olivier and Tevrede distribution centres will all be situated within pre-existing transformed and disturbed areas. The development of these proposed sub-stations on transformed and disturbed cultivated lands and road servitudes as identified per heading 8.1 and Figure 12 will result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and restricted to the actual proposed sub-station footprint areas. Due to the pre-existing transformed and disturbed nature of such areas, the significance of these potential impacts on vegetation will be very low.

Mitigation measures to reduce potential impacts:

- The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.
- Existing roads, farm tracks and service roads in close proximity to the proposed sub-station locations must be used as far as practicably possible.
- The construction and subsequent operation of the sub-stations must be continually managed in terms of an adequate and approved Environmental Management Programme (EMPr).

Destruction/transformation of semi-natural and natural vegetation within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and the Winburg Grassy Shrubland (Gh 7) vegetation type

The development of the proposed transmission line through semi-natural and natural areas as identified per headings 8.2 & 8.3 and Figure 12 could result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. These remaining semi-natural and natural areas form part

and play significant roles in larger surrounding continual natural corridors. They are therefore subsequently also very important to the habitat persistence and ecological functionality of the surrounding ecosystem. The significance of these potential impacts on the vegetation will therefore be medium.

Mitigation measures to reduce potential impacts:

- It is recommended that the amount of pylons to be placed within these natural areas be restricted and pylons rather be placed in transformed areas, as far as practicably possible. This must be done in order to minimise impacts on the habitat and ecological functionality of the natural areas.
- It is recommended that the Steel Monopole tower type be implemented in the natural areas as far as practicably possible due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.
- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of and construction processes.
- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- It is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.

Destruction/transformation of natural vegetation within the sub-station footprints associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type

The footprints of Mimosa & Hillandale distribution centres will all be situated within natural areas associated with the Bloemfontein Dry Grassland (Gh 5) vegetation type. The development of these proposed sub-stations on natural areas as identified per heading 8.3 and Figure 12 will unfortunately result in the transformation and destruction of surface vegetation. The physical impacts will however be localised in extent and mainly restricted to the actual proposed sub-station footprint areas. These remaining natural areas form part and play significant roles in larger surrounding continual natural corridors. They are therefore subsequently also very important to the habitat persistence and ecological functionality of the surrounding ecosystem. The significance of these potential impacts on the vegetation will therefore be medium-high.

Mitigation measures to reduce potential impacts:

- The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.
- Once the sub-station designs have been finalised by the applicant, an ecological walkthrough of the final sub-station footprints must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes.
- Existing roads, farm tracks and service roads in close proximity to the proposed sub-station locations must be used as far as practicably possible.
- The construction and subsequent operation of the sub-stations must be continually managed in terms of an adequate and approved Environmental Management Programme (EMPr).

Destruction/transformation of a Critical Biodiversity Area associated with the transmission line route corridor

An approximately 3.3 km portion at the end of the proposed transmission line main loop will traverse a Critical Biodiversity Area (CBA) as identified per heading 8.4 and Figure 12. The CBA portion of the line route corridor is situated within an undisturbed, naturally vegetated area consisting of numerous hills associated with the Winburg Grassy Shrubland (Gh 7) vegetation type and which are intertwined with a mosaic of rocky outcrops of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type. The development of the proposed transmission line through the CBA could

result in the transformation and destruction of surface vegetation. The majority of the transmission line will however have a small actual surface footprint impact on the vegetation of the CBA; impact will mainly be restricted to pylon construction footprints. The presence of an existing line has also slightly reduced the local pristineness in its immediate vicinity. The significance of the impact on the CBA will thereof be lower than it would have been if the line had to traverse another portion of the CBA on its own.

The natural, undisturbed vegetation of the CBA forms part of a larger natural corridor which plays a very significant role in faunal and floral migration and dispersion activities. It is therefore extremely important that the structural integrity, species diversity and subsequent ecological connectivity and functionality as part of the larger natural corridor be maintained and not be significantly impacted upon by any proposed development. The significance of these potential impacts on the CBA will therefore be medium-high.

Mitigation measures to reduce potential impacts:

- It is recommended that the amount of pylons to be placed within the CBA be restricted, as far as practicably possible, in order to minimise impacts on the habitat and ecological functionality of the natural areas.
- It is instructed that only the Steel Monopole tower type be implemented in the CBA due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.
- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.
- Pylon placement within any significant rocky outcrops of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type to be prevented as far as practicably possible.
- No site camp footprint to be established within the CBA and the entire construction phase planning and layout which is to occur within the CBA to firstly be reviewed and approved by a suitably qualified, registered and experienced ecologist in order to ensure minimal impact is achieved.
- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions within the CBA must be conducted in order to ensure that no Bloemfontein Karroid Shrubland (Gh 8) vegetation type rocky outcrops will be significantly impacted upon and to identify any potentially significant species individuals which would require relocation. These walkthrough and potential

relocation activities must be completed prior to the commencement of and construction processes.

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. An existing CENTLEC 33 kV transmission line already runs through a portion of the CBA and the proposed transmission line will be developed directly adjacent to it. This could enable the utilisation of exiting service roads.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- The noise impact and disturbance of wild animals and game must be adequately managed and kept to a minimum during construction.

Destruction/damage to Red Data Listed or protected species individuals associated with the transmission line route corridor and sub-station footprints

Only one Red Data Listed species (*Boophone disticha*; Declining) and number of provincially protected species were identified within the proposed transmission line route corridor and associated sub-station footprints (see heading 8). The development of the transmission line and associated sub-stations will inevitably destroy or damage such individuals. The physical impacts relating to the transmission line will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. Although a Red Data Listed species was identified, the presence and distribution extent is low. The significance of these potential impacts on the species individuals will therefore be medium.

Mitigation measures to reduce potential impacts:

- Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.

- Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes.
- The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.
- Once the proposed sub-station designs have been finalised by the applicant, an ecological walkthrough of the final sub-station footprints must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.

Surface material erosion

Areas around established pylon footprints could potentially be prone to significant surface soil erosion due to the loosening of materials and potential removal of vegetation during construction which usually binds surface material. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable erosion prevention measures at all construction footprints.
- Areas around pylon footprints must be adequately rehabilitated to prevent significant erosion.

Alien invasive species establishment

Areas around established pylon footprints could potentially be prone to significant alien invasive species establishment due to disturbances caused by construction activities. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable alien invasive species prevention measures at all construction footprints.

- Areas around pylon footprints must be adequately rehabilitated to prevent significant alien invasive species establishment.

Damage to or impeding of watercourses

The proposed transmission line route corridor traverses a number of seasonal drainage lines and perennial watercourses. The development of the proposed transmission line over identified watercourses could result in the alteration of watercourse structures or impediment or diversion of flow. The identified drainage lines and watercourses cumulatively contribute in a significant manner towards adequate water drainage of the larger surrounding local catchment areas and are therefore vitally important to the ecological functionality of the surrounding ecosystem. The significance of these potential impacts on the watercourses will therefore be medium.

Mitigation measures to reduce potential impacts:

- Any impact on the vegetation and watercourse structures or impediment or diversion of flow must be completely avoided. Transmission line design and layout must therefore ensure the continued ecological functionality and unimpeded flow of the watercourse after construction completion.
    - Care must be taken to ensure that no woody shrubs or trees are removed from the watercourse areas during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- Adequate buffer areas to be implemented around identified watercourses.
    - No access or construction routes or any physical footprint impacts are to be made within the recommended buffer areas without the prior inspection and approval by a suitably qualified, registered and experienced ecologist.
    - No pylons to be constructed within the recommended buffer areas. If any pylon construction is required within the buffer areas, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the proposed footprint areas and provide recommendations on their management.
- Any areas around the watercourses potentially impacted by the construction of the transmission line must be to be adequately rehabilitated.

9.1.2. Operational phase

Once the construction of the transmission line and associated sub-stations has been completed, there should be no significant additional ecological impacts associated with the operational phase of the project. The following potential ecological impacts associated with the operational phase should however be managed.

Continued destruction/transformation of semi-natural and natural vegetation within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and the Winburg Grassy Shrubland (Gh 7) vegetation type

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired surface impacts on the semi-natural and natural areas. As these remaining semi-natural and natural areas are very important to the habitat persistence and ecological functionality of the surrounding ecosystem, the significance of these potential impacts on the vegetation will be medium.

Mitigation measures to reduce potential impacts:

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.
- It is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.

Continued destruction/transformation of a Critical Biodiversity Area associated with the transmission line route corridor

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired surface

impacts on the Critical Biodiversity Area (CBA). As this natural, undisturbed vegetation of the CBA plays a very significant role in faunal and floral migration and dispersion activities, the significance of these potential impacts on the CBA will be high.

Mitigation measures to reduce potential impacts:

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. An existing CENTLEC 33 kV transmission line already runs through a portion of the CBA and the proposed transmission line will be developed directly adjacent to it. This could enable the utilisation of exiting service roads.
- Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.

Continued destruction/damage to Red Data Listed or protected species individuals associated with the transmission line route corridor and sub-station footprints

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired surface impacts which could destroy/damage important species individuals. Although a Red Data Listed species was identified, its presence and distribution extent is low. The significance of these potential impacts on the species individuals will therefore be medium.

Mitigation measures to reduce potential impacts:

- No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude.
- Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.
- Significant care must be taken to ensure that no significant species individuals are destroyed or damaged during the operational/maintenance phase of the proposed project development.

If any removal of significant species individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.

Continued surface material erosion

Areas around established pylon footprints and service roads could potentially be prone to significant surface soil erosion due to continued disturbances caused by management/maintenance activities. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable erosion prevention measures at all construction footprints.
- Areas around pylon footprints must be adequately rehabilitated to prevent significant erosion.

Continued alien invasive species establishment

Areas around established pylon footprints and service roads could potentially be prone to significant alien invasive species establishment due to continued disturbances caused by management/maintenance activities. Due to the large number of pylons to be constructed, the significance of this potential impact will be medium.

Mitigation measures to reduce potential impacts:

- Implement suitable alien invasive species prevention measures at all construction footprints.
- Areas around pylon footprints must be adequately rehabilitated to prevent significant alien invasive species establishment.

Continued damage to or impeding of watercourses

Once the construction of the proposed transmission line has been completed, management and maintenance processes required by the applicant could result in additional undesired alteration of watercourse structures or impediment or diversion of flow. The significance of these potential impacts on the watercourses will therefore be high.

Mitigation measures to reduce potential impacts:

- Any impact on the vegetation and watercourse structures or impediment or diversion of flow during management/maintenance processes must be completely avoided.

- No service roads are to be constructed through any watercourses or within the recommended buffer areas.

9.1.3. Cumulative Impacts

A number of transmission lines are present within the broader area as this is required for adequate electricity distribution within the metropolitan municipal area. The new transmission line will run parallel alongside an existing Eskom transmission line for the large majority of the proposed route. As discussed earlier, it will also then join up with an existing CENTLEC 33 kV transmission line inside the CBA from where it will run parallel alongside the existing line for virtually the entire route section until it exits the CBA.

None of the identified potential ecological impacts are rated as significantly high after mitigation measures have been implemented and due to the proposed transmission line being situated in close proximity to already existing lines at various sections, it should not significantly contribute in a cumulative way to the identified potential ecological impacts.

Destruction of natural vegetation within the sub-station footprints will add cumulatively to development footprint destruction of the endangered vegetation types and is assigned a medium rating.

9.2. RISK RATINGS OF POTENTIAL IMPACTS

The following section provides the Environmental Risk as well as the Environmental Significance Ratings for the potential ecological impacts for the proposed project both before and after implementation of the recommended mitigation measures.

9.2.1. Construction phase

Table 9: Environmental Risk and Significance Ratings

	Proposed project	No-Go Alternative
Identified Environmental Impacts	**Destruction/transformation of vegetation of pre-existing transformed and disturbed cultivated lands and road servitudes within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Very Low (2)	-
Duration of impact:	Short term (2)	-
Extent of the impact	Site specific (1)	-
Degree to which local resources are irreplaceable	Very Low (1)	-
Degree to which the impact can be reversed:	Reversible (1)	-
Probability of occurrence:	Medium probability (3)	-
Cumulative impact prior to mitigation:	Low	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High,	Low (21)	-

or Very-High)		
Proposed mitigation:	It is recommended that pylons, as far as practicably possible, be placed within such already transformed areas in order to minimise the impacts on remaining semi-natural and natural vegetation. Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.	-
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (18)	-
	Proposed project	**No-Go Alternative**
Identified Environmental Impacts	**Destruction/transformation of vegetation of pre-existing transformed and disturbed cultivated lands and road servitudes within the sub-station footprints associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Very Low (2)	-

Duration of impact:	Permanent (5)	-
Extent of the impact	Site specific (1)	-
Degree to which local resources are irreplaceable	Very Low (1)	-
Degree to which the impact can be reversed:	Reversible (1)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Low	
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (40)	-
Proposed mitigation:	The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place. Existing roads, farm tracks and service roads in close proximity to the proposed sub-station locations must be used as far as practicably possible.	

	The construction and subsequent operation of the sub-stations must be continually managed in terms of an adequate and approved Environmental Management Programme (EMPr).	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (24)	-
	Proposed project	
Identified Environmental Impacts	**Destruction/transformation of semi-natural and natural vegetation within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and the Winburg Grassy Shrubland (Gh 7) vegetation type**	
	Alternative 1	**Alternative 2**
Magnitude of Impact	Medium (6)	Low (4)
Duration of impact:	Medium term (3)	Medium term (3)
Extent of the impact	Local (2)	Local (2)
Degree to which local resources are irreplaceable	Moderate (3)	Low (2)

Degree to which the impact can be reversed:	Moderate (3)	Moderate (3)
Probability of occurrence:	Medium probability (3)	Medium probability (3)
Cumulative impact prior to mitigation:	Medium	Low
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (51)	Medium (42)
Proposed mitigation:	It is recommended that the amount of pylons to be placed within these natural areas be restricted and pylons rather be placed in transformed areas, as far as practicably possible. This must be done in order to minimise impacts on the habitat and ecological functionality of the natural areas. It is recommended that the Steel Monopole tower type be implemented in the natural areas as far as practicably possible due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation. Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place.	It is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.

	Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of and construction processes. No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude. Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly	

	inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation. It is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.	
Cumulative impact post mitigation:	Low	Low
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (28)	Low (22)
	Proposed project	**No-Go Alternative**
Identified Environmental Impacts	**Destruction/transformation of natural vegetation within the sub-station footprints associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Medium (6)	-
Duration of impact:	Permanent (5)	-

Extent of the impact	Local (2)	-
Degree to which local resources are irreplaceable	Moderate (3)	-
Degree to which the impact can be reversed:	Moderate (3)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Medium	
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium-High (76)	-
Proposed mitigation:	The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place. Once the sub-station designs have been finalised by the applicant, an ecological walkthrough of the final sub-station footprints must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation	

	activities must be completed prior to the commencement of any construction processes. Existing roads, farm tracks and service roads in close proximity to the proposed sub-station locations must be used as far as practicably possible. The construction and subsequent operation of the sub-stations must be continually managed in terms of an adequate and approved Environmental Management Programme (EMPr).	
Cumulative impact post mitigation:	Medium	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (72)	-
	Proposed project	**No-Go Alternative**
Identified Environmental Impacts	**Destruction/transformation of a Critical Biodiversity Area associated with the transmission line route corridor**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	High (8)	-

Duration of impact:	Medium term (3)	-
Extent of the impact	Local (2)	-
Degree to which local resources are irreplaceable	High (4)	-
Degree to which the impact can be reversed:	Moderate (3)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Medium	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium-High (80)	-
Proposed mitigation:	It is recommended that the amount of pylons to be placed within the CBA be restricted, as far as practicably possible, in order to minimise impacts on the habitat and ecological functionality of the natural areas. It is instructed that only the Steel Monopole tower type be implemented in the CBA due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.	

	Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place. Pylon placement within any significant rocky outcrops of the Bloemfontein Karroid Shrubland (Gh 8) vegetation type to be prevented as far as practicably possible. No site camp footprint to be established within the CBA and the entire construction phase planning and layout which is to occur within the CBA to firstly be reviewed and approved by a suitably qualified, registered and experienced ecologist in order to ensure minimal impact is achieved. Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions within the CBA must be conducted in order to ensure that no Bloemfontein Karroid Shrubland (Gh 8) vegetation type rocky outcrops will be significantly impacted upon and to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the

	commencement of and construction processes. No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude. Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. An existing CENTLEC 33 kV transmission line already runs through a portion of the CBA and the proposed transmission line will be developed directly adjacent to it. This could enable the utilisation of exiting service roads. Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.

	The noise impact and disturbance of wild animals and game must be adequately managed and kept to a minimum during construction.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (57)	-
	Proposed project	**No-Go Alternative**
Identified Environmental Impacts	**Destruction/damage to Red Data Listed or protected species individuals associated with the transmission line route corridor and sub-station footprints**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Low (4)	-
Duration of impact:	Permanent (5)	-
Extent of the impact	Site specific (1)	-
Degree to which local resources are irreplaceable	High (4)	-
Degree to which the impact can be reversed:	Low (4)	-

Probability of occurrence:	Medium probability (3)	-
Cumulative impact prior to mitigation:	Low	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (54)	-
Proposed mitigation:	Pylon construction footprints must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised pylon footprint expansion should take place. Once the proposed transmission line layout designs have been finalised by the applicant, an ecological walkthrough of the final pylon footprint positions must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes. The construction footprint of the sub-stations must be kept as small as practicably possible to reduce the actual surface impact on vegetation and no unnecessary/unauthorised footprint expansion should take place.	-

	Once the proposed sub-station designs have been finalised by the applicant, an ecological walkthrough of the final sub-station footprints must be conducted in order to identify any potentially significant species individuals which would require relocation. These walkthrough and potential relocation activities must be completed prior to the commencement of any construction processes. Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (36)	-

	Proposed project	No-Go Alternative
Identified Environmental Impacts	**Surface material erosion**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Low (4)	-
Duration of impact:	Short term (2)	-
Extent of the impact	Site specific (1)	-
Degree to which local resources are irreplaceable	Very low (1)	-
Degree to which the impact can be reversed:	High (2)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Low	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (40)	-
Proposed mitigation:	Implement suitable erosion prevention measures at all construction	-

	footprints. Areas around pylon footprints must be adequately rehabilitated to prevent significant erosion.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (20)	-
	Proposed project	**No-Go Alternative**
Identified Environmental Impacts	**Alien invasive species establishment**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Medium (6)	-
Duration of impact:	Medium term (3)	-
Extent of the impact	Local (2)	-
Degree to which local resources are irreplaceable	Very low (1)	-

Degree to which the impact can be reversed:	High (2)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Medium	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (56)	-
Proposed mitigation:	Implement suitable alien invasive species prevention measures at all construction footprints. Areas around pylon footprints must be adequately rehabilitated to prevent significant alien invasive species establishment.	-
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (28)	-

	Proposed project	No-Go Alternative
Identified Environmental Impacts	**Damage to or impeding of watercourses**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	High (8)	-
Duration of impact:	Medium term (3)	-
Extent of the impact	Regional (3)	-
Degree to which local resources are irreplaceable	Moderate (3)	-
Degree to which the impact can be reversed:	Moderate (3)	-
Probability of occurrence:	Medium probability (3)	-
Cumulative impact prior to mitigation:	Medium	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (60)	-
Proposed mitigation:	Any impact on the vegetation and watercourse structures or impediment or	-

	diversion of flow must be completely avoided. Transmission line design and layout must therefore ensure the continued ecological functionality and unimpeded flow of the watercourse after construction completion. Care must be taken to ensure that no woody shrubs or trees are removed from the watercourse areas during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation. Adequate buffer areas to be implemented around identified watercourses. No access or construction routes or any physical footprint impacts are to be made within the recommended buffer areas without the prior inspection and approval by a suitably qualified, registered and experienced ecologist.. No pylons to be constructed within the recommended buffer areas. If any pylon construction is required within the buffer areas, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the proposed footprint areas and provide	

	recommendations on their management. Any areas around the watercourses potentially impacted by the construction of the transmission line must be to be adequately rehabilitated.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (38)	-

9.2.2. Operational phase

Table 10: Environmental Risk and Significance Ratings

	Proposed project	No-Go Alternative
Identified Environmental Impacts	**Continued destruction/transformation of semi-natural and natural vegetation within the transmission line route corridor associated with the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type and the Winburg Grassy Shrubland (Gh 7) vegetation type**	
	Alternative 1	**Alternative 2**
Magnitude of Impact	Medium (6)	Low (4)
Duration of impact:	Medium term (3)	Medium term (3)
Extent of the impact	Local (2)	Local (2)
Degree to which local resources are irreplaceable	Moderate (3)	Low (2)
Degree to which the impact can be reversed:	Moderate (3)	Moderate (3)
Probability of occurrence:	Medium probability (3)	Medium probability (3)
Cumulative impact prior to mitigation:	Medium	Low
Significance rating of impact prior to mitigation	Medium (51)	Medium (42)

(Low, Medium, Medium-High, High, or Very-High)		
Proposed mitigation:	No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude. Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.	It is recommended that Alternative 2 for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type.
Cumulative impact post mitigation:	Low	Low
Significance rating of impact after mitigation **(Low, Medium, Medium-High, High, or Very-High)**	Low (28)	Low (22)

	Proposed project	No-Go Alternative
Identified Environmental Impacts	**Continued destruction/transformation of a Critical Biodiversity Area associated with the transmission line route corridor**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	High (8)	-
Duration of impact:	Medium term (3)	-
Extent of the impact	Local (2)	-
Degree to which local resources are irreplaceable	High (4)	-
Degree to which the impact can be reversed:	Moderate (3)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Medium	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium-High (80)	-
Proposed mitigation:	No physical maintenance (removal or defoliation by means of cutting or	

	burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude. Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. An existing CENTLEC 33 kV transmission line already runs through a portion of the CBA and the proposed transmission line will be developed directly adjacent to it. This could enable the utilisation of exiting service roads. Significant care must be taken to ensure that no significant woody shrubs or trees are removed from the route corridor during the construction or operational/maintenance phase of the proposed project development. If any removal of woody shrubs or trees individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High,	Medium (57)	-

or Very-High)		
	Proposed project	**No-Go Alternative**
Identified Environmental Impacts	**Continued destruction/damage to Red Data Listed or protected species individuals associated with the transmission line route corridor and sub-station footprints**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Low (4)	-
Duration of impact:	Permanent (5)	-
Extent of the impact	Site specific (1)	-
Degree to which local resources are irreplaceable	High (4)	-
Degree to which the impact can be reversed:	Low (4)	-
Probability of occurrence:	Medium probability (3)	-
Cumulative impact prior to mitigation:	Low	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High,	Medium (54)	-

or Very-High)		
Proposed mitigation:	No physical maintenance (removal or defoliation by means of cutting or burning) is allowed on the natural vegetation present inside the proposed transmission line route servitude. Existing roads, farm tracks and service roads of existing lines running in close proximity to the proposed transmission line route must be used as far as practicably possible. Significant care must be taken to ensure that no significant species individuals are destroyed or damaged during the operational/maintenance phase of the proposed project development. If any removal of significant species individuals is required, a suitably qualified, registered and experienced ecologist must be assigned to firstly inspect the individuals and provide recommendations on their management or potential removal or the possibility of relocation.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (36)	-

	Proposed project	No-Go Alternative
Identified Environmental Impacts	**Continued surface material erosion**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Low (4)	-
Duration of impact:	Short term (2)	-
Extent of the impact	Site specific (1)	-
Degree to which local resources are irreplaceable	Very low (1)	-
Degree to which the impact can be reversed:	High (2)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Low	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (40)	-
Proposed mitigation:	Implement suitable erosion prevention measures at all construction	-

	footprints. Areas around pylon footprints must be adequately rehabilitated to prevent significant erosion.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (20)	-
	Proposed project	**No-Go Alternative**
Identified Environmental Impacts	**Continued alien invasive species establishment**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	Medium (6)	-
Duration of impact:	Medium term (3)	-
Extent of the impact	Local (2)	-
Degree to which local resources are irreplaceable	Very low (1)	-

Degree to which the impact can be reversed:	High (2)	-
Probability of occurrence:	High probability (4)	-
Cumulative impact prior to mitigation:	Medium	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (56)	-
Proposed mitigation:	Implement suitable alien invasive species prevention measures at all construction footprints. Areas around pylon footprints must be adequately rehabilitated to prevent significant alien invasive species establishment.	-
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (28)	-

	Proposed project	No-Go Alternative
Identified Environmental Impacts	**Continued damage to or impeding of watercourses**	**The proposed development will not take place and as such this impact will not occur**
Magnitude of Impact	High (8)	-
Duration of impact:	Medium term (3)	-
Extent of the impact	Regional (3)	-
Degree to which local resources are irreplaceable	Moderate (3)	-
Degree to which the impact can be reversed:	Moderate (3)	-
Probability of occurrence:	Medium probability (3)	-
Cumulative impact prior to mitigation:	Medium	-
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium (60)	-
Proposed mitigation:	Any impact on the vegetation and watercourse structures or impediment or	-

	diversion of flow during management/maintenance processes must be completely avoided. No service roads are to be constructed through any watercourses or within the recommended buffer areas.	
Cumulative impact post mitigation:	Low	-
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low (38)	-

10. CONCLUSION

More than half of the transmission line route corridor (approximately 20.6 km) and four of the sub-station footprints are situated in pre-existing transformed and disturbed areas with little to no natural vegetation remaining. These areas therefore don't play a significant role in the ecological functionality of the natural surrounding ecosystem and vegetation and have a low conversation value. It is in the opinion of the specialist that the construction of the proposed transmission line and associated sub-stations in such transformed areas will therefore not pose any significant additional ecological impacts and the project should be allowed to continue.

Although the proposed transmission line route corridor crosses a number of watercourses and also traverses semi-natural and natural areas forming part of an endangered vegetation type as well as a Critical Biodiversity Area (CBA), the majority of the transmission line will have a small actual surface footprint impact on vegetation; impact will mainly be restricted to pylon construction footprints. The presence of an existing line has also slightly reduced the local pristineness in its immediate vicinity. The significance of the impact on the CBA will thereof be lower than it would have been if the line had to traverse another portion of the CBA on its own. The two remaining sub-stations will also be situated within natural areas but their impacts will be restricted to their physical surface footprints.

Although Alternative 1 will also be an acceptable route to follow due to the low level of the actual impacts on the natural vegetation, it is recommended that **Alternative 2** for the proposed transmission line route corridor rather be followed in order to minimise the impact on remaining natural area of the endangered Bloemfontein Dry Grassland (Gh 5) vegetation type. It is also recommended that the **Steel Monopole tower type** be implemented rather than the Steel Lattice tower type as far as practicably possible due to its smaller physical surface footprint size and subsequent reduced impact on the vegetation.

Only one Red Data Listed species (*Boophone disticha*; Declining) and number of provincially protected species were identified within the proposed transmission line route corridor and associated sub-station footprints. The development of the transmission line and associated sub-stations will inevitably destroy or damage such individuals. The physical impacts relating to the transmission line will however be localised in extent and mainly restricted to the actual proposed pylon footprint areas. Although a Red Data Listed species was identified, the presence and distribution extent is low.

It is in the opinion of the specialist that all identified potential ecological impacts in such important areas can be suitably reduced to within acceptable levels and that the project should therefore be allowed to continue. The proposed project may however only continue if all recommended mitigations measures as per this ecological report are adequately implemented and managed for both the construction and operational phases of the proposed project. All necessary authorisations and permits must also be obtained prior to any commencement.

11. REFERENCES

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