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Final Basic Assessment Report for the 132kV Power Line from the existing Mbumbu Traction Substation to the proposed Tsakani Substation

A Project for: Eskom Distribution

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environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

(For official use only)

File Reference Number:	
Application Number:	
Date Received:	

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

Kindly note that:

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

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

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

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

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

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

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

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

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

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

11. Should a specialist report or report on a specialised process be submitted at any stage for any part of this application, the terms of reference for such report must also be submitted.

SECTION A: ACTIVITY INFORMATION

Has a specialist been consulted to assist with the completion of this section?	YES	NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for appointment of a specialist for each specialist thus appointed:
Any specialist reports must be contained in Appendix D.

1. ACTIVITY DESCRIPTION

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

Eskom Distribution – Northern Region ('Eskom') proposes the construction of a 17 km 132 kV overhead power line linking the existing Mbumbu Traction Substation and the new proposed Tsakani Substation (Refer to Appendix A for the Locality Map).

The study area is located in Mpumalanga Province and relatively small towns / settlements that are nearby include Thulamahashe, Edinburgh, Ludlow, and Dingleydale. Nelspruit is about 120 km from the site of the existing Mbumbu Traction Substation. The power line being considered for the project falls predominantly within rural areas largely characterised by villages and open spaces. One main road provides general access to the study area namely, the R40. Otherwise access into the inner sections of the study area is via dirt roads.

a) 132 kV Power Line Alternatives

Three alignment alternatives are being considered by Eskom (see Figure 1 below):

1. Alternative 1:Green route
2. Alternative 2:Red route
3. Alternative 3: Purple route

Alternative	Distance	Route
1 Green Route	17.05 km	This route originates near the site of the existing Mbumbu Substation and runs South traversing a wetland. From here it continues and joins Alternative 2 and thereafter proceeds to the north east and terminates just north of the site of the proposed Tsakani Substation.
2 Red route	10.26 km	This route originates from the same point as Alternative 1 and runs in between Edinburgh (a settlement) and then towards the south east at which point it connects to Alternative 1 and terminates at the same point as Alternative 1.
3 Purple route	15.48 km	This route originates from same point as Alternative 1 and runs in a north eastern direction terminating at the same point as Alternative 1.

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

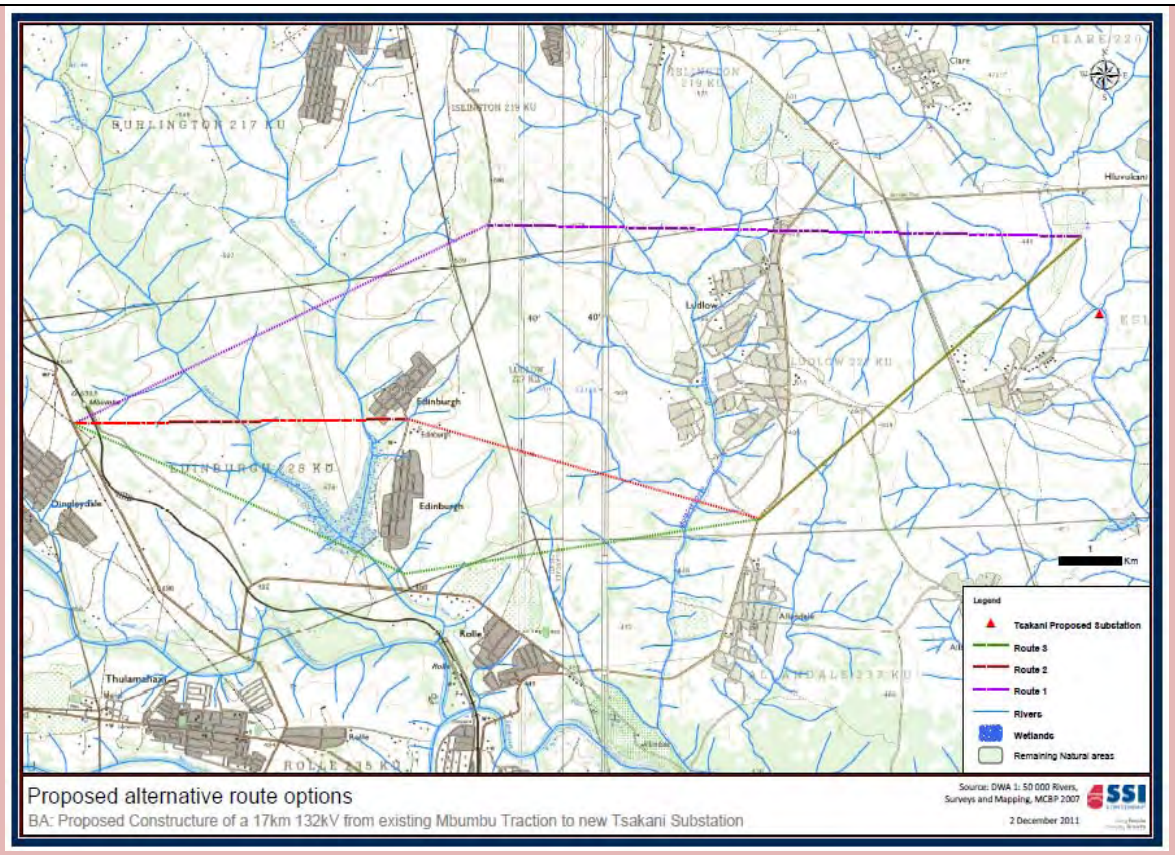

Figure 1: Proposed alternative route options

The above alignment alternatives will be evaluated during this Basic Assessment Study to determine to determine the best environmentally feasible alignment/s.

b) Proposed Tsakani Substation

An area of land approximately 100 m × 150 m (i.e. 1.5 hectares) is required for the construction of the Substation. The area that has been selected for the proposed Tsakani Substation is located within the portion of land belonging to one land owner. No alternative technically feasible sites have been identified for the establishment of the Substation.

The site of the Substation is dominated by degraded as well as transformed bushveld; the grass and forb layer is overgrazed and the site is uninhabited at the moment. In order to link the new Substation via satellite communication to the Eskom control towers, an optical fibre cable will be used.

1.1 Technical Description - 132 kV Distribution Line

In South Africa, thousands of kilometres of high voltage powerlines (i.e. 765 kV, 400 kV or 275 kV) transmit electricity generated at power stations to Eskom's major Substations. At these major Substations, the voltage is reduced, and the electricity is distributed to smaller Substations all over the country through sub-transmission lines and distribution lines (i.e. 132 kV, 88 kV or 66 kV lines). At the smaller Substations the voltage is further reduced and the power is distributed to local users via numerous small powerlines (i.e. 22 kV and 11 kV lines) referred to as reticulation lines. The power generated by Eskom can only be utilised from these points of supply, which transform the power into a usable voltage.

1.1.1 132 kV Towers

Distribution line conductors are strung on in-line (suspension) towers and bend (strain) towers. The structures proposed to be used for the 132 kV distribution line for this project area the 132 kV steel monopole structures (refer to Figure 2). These poles weigh approximately 1200 kg each and vary in height from approximately 17.4 m to 21 m. The size of the footprint depends on the type of pole, i.e. whether it is a self supporting, guyed

suspension or an angle strain pole structure. The size of the footprint ranges from 0.6 m x 0.6 m to 1.5 m x 1.5 m, with the larger footprint associated with the guyed suspension and angle strain pole used as bend/strain structures. The average span between two towers is 200 m, but can vary between 250 m and 375 m depending on the ground profile (topography) and the terrain to be spanned. The self-supporting structure (suspension pole) is typically used along the straight sections of the power line, while the guyed intermediate or guyed suspension and angle strain structures are used where there is a bend in the power line alignment.

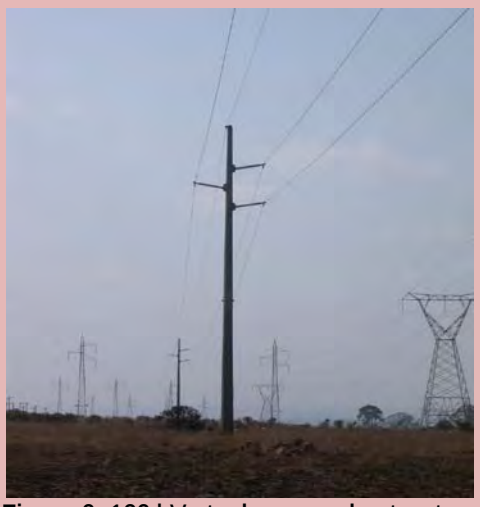

Figure 2: 132 kV steel monopole structure

1.1.2 Servitude Requirements and Clearances

The servitude width for a 132 kV distribution line is 31 m (15.5 m on either side of the centre line of the power line). The minimum vertical clearance to buildings, poles and structures not forming part of the power line must be 3.8 m, while the minimum vertical clearance between the conductors and the ground is 6.7 m.

The minimum distance of a 132 kV distribution line running parallel to proclaimed public roads is 95 m from the centre of the distribution line servitude to the centre of the road servitude. The minimum distance between any part of a tree or shrub and any bare phase conductor of a 132 kV distribution line must be 4 m, allowing for the possible sideways movement and swing of both the distribution line and the tree or shrub.

On receipt of an approval of the final corridor by the environmental authorities and after negotiations with landowners, the final definition of the centre line for the distribution line and co-ordinates of each bend in the line will be determined. Optimal tower sizes and positions will be identified and verified using a ground survey (in terms of the Environmental Management Programme (EMPr) requirements).

A minimum 8 m (4 m either side of the centre line of the power line) wide strip is to be cleared of all trees and for stringing purposes only. If any tree or shrub in other areas will interfere with the operation and/or reliability of the distribution line it will be trimmed or completely cleared. The clearing of vegetation will take place, with the aid of a surveyor, along approved profiles and in accordance with the approved EMPr and minimum standards to be used for vegetation clearing for the construction of the proposed new distribution line as listed in Table 1 (Eskom, 2000).

Table 1: Minimum standards to be used for vegetation clearing for the construction of a new distribution line

Item	Standard	Follow up
Centre line of the proposed distribution line	Clear to a maximum (depending on tower type and voltage) of an 8 m wide strip of all vegetation along the centre line. Vegetation to be cut within 100 mm of the ground. Treat stumps with herbicide.	Re-growth shall be cut within 100 mm of the ground and treated with herbicide, as necessary.
Inaccessible valleys (trace line)	Clear a 1 m strip for access by foot only, for the pulling of a pilot wire by hand.	Vegetation not to be disturbed after initial clearing – vegetation to be allowed to re-grow.
Access/service roads	Clear a maximum (depending on tower type) 5 m wide strip for vehicle access within the maximum 8 m width, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Proposed tower position and proposed support/stay wire position	Clear all vegetation within proposed tower position and within a maximum (depending on tower type) radius of 5 m around the position, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil. Allow controlled agricultural practices, where feasible.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Indigenous vegetation within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, selective trimming or cutting down of those identified plants posing a threat to the integrity of the proposed distribution line.	Selective trimming.
Alien species within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, remove all alien vegetation within servitude area and treat with appropriate herbicide.	Cut and treat with appropriate herbicide.

Once the centre line has been cleared, the surveyor pegs every tower position and marks the crossing point with existing fences for new gate installation. Once the tower positions have been marked, the vegetation clearing team will return to every tower position and clear vegetation (in accordance with the EMPr) for assembling and erection purposes.

1.1.3 Foundations

The type of terrain encountered, as well as the underlying geotechnical conditions determines the choice of foundation. The actual size and type of foundation to be installed will depend on the soil bearing capacity (actual sub-soil conditions). Strain structures require more extensive foundations for support than in-line suspension structures, which contribute to the cost of the construction of the line. The minimum working area required around a structure position is 20 m × 20 m.

Foundations will be mechanically excavated where access to the pole position is readily available. The same applies to the pouring of concrete required for the setting of the foundations. Prior to erecting the poles and filling of the foundations, the excavated foundations will be covered in order to safeguard unsuspecting animals

and people from injury. All foundations are back-filled, stabilised through compaction, and capped with concrete at ground level.

1.1.4 Insulators

Composite insulators are used to connect the conductors to the towers. Glass and porcelain have previously been used to connect the conductors for many years, and are the most common. They are, however, heavy and susceptible to breakage by vandals, as well as contamination by pollution. Composite insulators have a glass-fibre core with silicon sheds for insulation. Composite insulators are lightweight and resistant to both vandalism and pollution.

Composite (Long rod type) insulators with silicone based weather shed material will be used for strain assemblies. Composite horizontal line post insulators will be used for the intermediate structures and on the jumper supports.

1.1.5 Access

A vehicle access road is usually required to be established to allow access along the entire length of the servitude. Access is required during both the construction and operation/maintenance phases of the distribution line life cycle.

The access roads will be considered for the three alternative routes being evaluated for the proposed project. Areas along the preferred alignment without access points and roads will be negotiated with the necessary landowners, and will be established during the construction phase.

1.1.6 Timing

Construction for the project is planned to commence in June 2014 and will be undertaken over a period of approximately 18 months, with completion aimed for December 2015, provided construction proceeds as scheduled.

1.1.7 Ongoing Maintenance

During the life span of the distribution line i.e. approximately 25 years, ongoing maintenance is required to be performed from time to time. This maintenance work is undertaken by contractors employed by Eskom, and in compliance with the Environmental Management Programme (EMPr).

1.1.8 Construction Process for distribution lines

Distribution lines are constructed in the following simplified sequence:

Step 1: Determination of technically feasible alternatives.
Step 2: EIA input into route selection and obtaining of relevant environmental permits.
Step 3: Negotiation of final route with affected landowners.
Step 4: Survey of the route.
Step 5: Selection of best-suited structures and foundations.
Step 6: Final design of distribution line and placement of towers.
Step 7: Issuing of tenders and award of contract to construction companies.
Step 8: Vegetation clearance and construction of access roads (where required).
Step 9: Pegging of structures.
Step 10: Construction of foundations.
Step 11: Assembly and erection of structures.
Step 12: Stringing of conductors.
Step 13: Rehabilitation of disturbed area and protection of erosion sensitive areas.
Step 14: Testing and commissioning.
Step 15: Continued maintenance.

1.2 Technical Description – Proposed Tsakani Substation

1.2.1 Construction Process

The proposed new Tsakani Substation and associated structures will be constructed in the following simplified sequence.

Step 1: Determination of technically feasible alternatives.
Step 2: Environmental input into Substation positioning and obtaining of relevant environmental authorisation.
Step 3: Negotiation with affected landowners.
Step 4: Survey of the site.
Step 5: Design of Substation.
Step 6: Issuing of tenders and award of contract.
Step 7: Vegetation clearance and construction of access roads (where required).
Step 8: Construction of terrace and foundations.
Step 9: Assembly and erection of equipment.
Step 10: Connection of conductors to equipment.
Step 11: Rehabilitation of any disturbed areas and protection of erosion sensitive areas.
Step 12: Testing and commissioning.
Step 13: Continued maintenance.

1.2.2 Access/Service Roads

Eskom will make use of existing access roads for construction, operation and maintenance. Additional roads will be constructed where there is no access.

1.2.3 Ongoing Maintenance

The standard life span of a Substation and its associated components is approximately 25 years. During this period, on-going maintenance is performed, and components are replaced, which can significantly extend the life span beyond 25 years, if required.

2. FEASIBLE AND REASONABLE ALTERNATIVES

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

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

Describe alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment. After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Paragraphs 3 – 13 below should be completed for each alternative.

3. ACTIVITY POSITION

Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.
List alternative sites, if applicable.

	Latitude (S):		Longitude (E):	
Alternative: (Tsakani Substation)				
Alternative S1[2] (preferred or only site alternative)-	24°	39' 59.4"	31°	19' 38.4"
Alternative S2 (if any)			0	'
Alternative S3 (if any)	0	'	0	'

In the case of linear activities:

Alternative:	Latitude (S):		Longitude (E):	
Alternative S1 (preferred or only route alternative) - Green route				
• Starting point of the activity	24°	40' 54.4"	31°	10' 44.9"
• Middle/Additional point of the activity	24°	42' 9.9"	31°	13' 37.2"
• End point of the activity	24°	39' 20.3"	31°	19' 29.2"
Alternative S2 (if any) – Red route				
• Starting point of the activity	24°	40' 54.4"	31°	10' 44.9"
• Middle/Additional point of the activity	24°	40' 52.2"	31°	13' 38.7"
• End point of the activity	24°	41' 42.3"	31°	16' 41.9"
Alternative S3 (if any)-Purple route				
• Starting point of the activity	24°	40' 54.4"	31°	10' 44.9"
• Middle/Additional point of the activity	24°	39' 14.4"	31°	14' 20.1"
• End point of the activity	24°	39' 20.3"	31°	19' 29.2"

For route alternatives that are longer than 500m, please provide an addendum with co-ordinates taken every 250 meters along the route for each alternative alignment – refer to Appendix G.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the physical size of the preferred activity/technology as well as alternative activities/technologies (footprints):

Alternative: Tsakani Substation	Size of the activity:
Alternative A1[3] (preferred activity alternative)	100 x 150m^2
Alternative A2 (if any)	m^2
Alternative A3 (if any)	m^2
or, for linear activities:	
Alternative:	Length of the

[2] "Alternative S.." refer to site alternatives.
[3] "Alternative A.." refer to activity, process, technology or other alternatives.

	activity:
Alternative A1 (preferred activity alternative)	17 050 m
Alternative A2 (if any)	10 260 m
Alternative A3 (if any)	15 480 m

Indicate the size of the alternative sites or servitudes (within which the above footprints will occur):

Alternative:	Size of the site/servitude:
Alternative A1 (preferred activity alternative)	528 550 m^2
Alternative A2 (if any)	318 060 m^2
Alternative A3 (if any)	479 880 m^2

*The power line servitude will measure 31 m in width – 15.5 m on each side measured from the centre line of the power line

5. SITE ACCESS

Does ready access to the site exist?	YES
If NO, what is the distance over which a new access road will be built	

Describe the type of access road planned:

A vehicle access road is usually required to be established to allow access along the entire length of the servitude. Access is required during both the construction and operation/maintenance phases of the distribution line life cycle. The access points and roads will be negotiated with landowners if they are to be established during the construction phase. The access roads will be considered for the various alternative routes being evaluated for the proposed project. Should a new access road be required to be constructed for the final route, it will need to be negotiated with the individual landowner/s concerned.

Include the position of the access road on the site plan and required map, as well as an indication of the road in relation to the site.

6. SITE OR ROUTE PLAN

A detailed site or route plan(s) must be prepared for each alternative site or alternative activity. It must be attached as Appendix A to this document.

The site or route plans must indicate the following:

6.1 the scale of the plan which must be at least a scale of 1:500;
6.2 the property boundaries and numbers of all the properties within 50 metres of the site;
6.3 the current land use as well as the land use zoning of each of the properties adjoining the site or sites;
6.4 the exact position of each element of the application as well as any other structures on the site;
6.5 the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, street lights, sewage pipelines, storm water infrastructure and telecommunication infrastructure;
6.6 all trees and shrubs taller than 1.8 metres;
6.7 walls and fencing including details of the height and construction material;
6.8 servitudes indicating the purpose of the servitude;

6.9 sensitive environmental elements within 100 metres of the site or sites including (but not limited thereto):
- rivers;
- the 1:100 year flood line (where available or where it is required by DWA);
- ridges;
- cultural and historical features;
- areas with indigenous vegetation (even if it is degraded or invested with alien species);

6.10 for gentle slopes the 1 metre contour intervals must be indicated on the plan and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the plan; and

6.11 the positions from where photographs of the site were taken.

7. SITE PHOTOGRAPHS

Colour photographs from the centre of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under Appendix B to this form. It must be supplemented with additional photographs of relevant features on the site, if applicable.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 as Appendix C for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity.

9. ACTIVITY MOTIVATION

9(a) Socio-economic value of the activity

What is the expected capital value of the activity on completion?	R ±35 million
What is the expected yearly income that will be generated by or as a result of the activity?	Unknown at this stage
Will the activity contribute to service infrastructure?	YES / NO
Is the activity a public amenity?	YES / NO
How many new employment opportunities will be created in the development phase of the activity?	Construction will be undertaken by Eskom Major Engineering Works, a group consisting of Eskom permanent employees
What is the expected value of the employment opportunities during the development phase?	Unknown at this stage
What percentage of this will accrue to previously disadvantaged individuals?	% Unknown at this stage

How many permanent new employment opportunities will be created during the operational phase of the activity?	Project will be undertaken by Eskom Major Engineering Works, a group consisting of Eskom permanent employees
What is the expected current value of the employment opportunities during the first 10 years?	Unknown at this stage
What percentage of this will accrue to previously disadvantaged individuals?	% Unknown at this stage

9(b) Need and desirability of the activity

Motivate and explain the need and desirability of the activity (including demand for the activity):

The new Tsakani Substation and distribution line are needed in order to split the current overloaded feeders in the area as well as to provide sufficient capacity for new clients and improve the reliability of energy supply. The new Substation further helps with de-loading the currently overloaded infrastructures in the area and reduces the customer base per line thus, improving the system average interruption duration.

NEED:			
1.	Was the relevant provincial planning department involved in the application?	YES	NO
2.	Does the proposed land use fall within the relevant provincial planning framework?	YES	NO
3.	If the answer to questions 1 and / or 2 was NO, please provide further motivation / explanation:		
	The provision of electricity solely lies with Eskom and the planning department is notified during the EIA process. Eskom planners monitor the current load in the area and plan for new Substations and power lines to reduce overloading and also provide energy for new clients.		

DESIRABILITY:			
1.	Does the proposed land use / development fit the surrounding area?	YES	NO
2.	Does the proposed land use / development conform to the relevant structure plans, SDF and planning visions for the area?	YES	NO
3.	Will the benefits of the proposed land use / development outweigh the negative impacts of it?	YES	NO
4.	If the answer to any of the questions 1-3 was NO, please provide further motivation / explanation:		
5.	Will the proposed land use / development impact on the sense of place?	YES	NO
6.	Will the proposed land use / development set a precedent?	YES	NO
7.	Will any person's rights be affected by the proposed land use /	YES	NO

	development?		
8.	Will the proposed land use / development compromise the "urban edge"?	YES	NO
9.	If the answer to any of the question 5-8 was YES, please provide further motivation / explanation.		
	The new Substation will have a visual impact on the area since currently, the proposed site is composed of only degraded and transformed bushveld and no structures are present. Since alternative 1 will traverse a settlement i.e. Edinburgh some people might be relocated thus affecting them.		

BENEFITS:			
1.	Will the land use / development have any benefits for society in general?	YES	
	Explain:		
	The availability of reliable electricity will stimulate the establishment of economic activities in the area. Currently, the majority of the land is vacant or composed of small settlements with no meaningful economic activity. Therefore, the proposed power lines and Substation will strengthen the distribution of electricity in the general area. According to the Ehlanzeni Integrated Development Plan 2011, Bushbuckridge Local Municipality was the second biggest contributor to the Gross Value Add in Ehlanzeni District through community services and construction sectors and provision of electricity in Bushbuckridge Local Municipality is a priority focus area.		
3.	Will the land use / development have any benefits for the local communities where it will be located?	YES	
4.	Explain: The local communities will benefit from the accessible source of power and the growth of economic activities will be stimulated. In addition, local people could be employed during construction to undertake tasks such as clearing bushes and digging foundations.		

10. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations, if applicable:

Title of legislation, policy or guideline:	Administering authority:	Date:
The Constitution (Act No. 108 of 1996)	National and Provincial	18 December 1996
National Environmental Management Act No. 107 of 1998 – EIA Regulations 2010	National and Provincial	18 June 2010
National Environmental Management: Air Quality Act No. 39 of 2004	National and Provincial	24 February 2005
Occupational Health and Safety Act No. 85 of	National and Provincial	23 June 1993

1993		
The Conservation of Agriculture Resources Act No. 43 of 1983	National and Provincial	21 April 1983
National Heritage Resources Act No. 25 of 1999	National and Provincial	14 April 1999
National Environment Management: Waste Act No. 59 of 2008	National and Provincial	10 March 2009
National Biodiversity Act No. 10 of 2004	National and Provincial	7 June 2004
National Water Act No. 36 of 1998	National and Provincial	26 August 1998
National Forest Act No. 84 of 1998	National and Provincial	30 October 1998
Mpumalanga Biodiversity Conservation Plan	Provincial	2007
Guidelines for Dealing with Bird Problems of Transmission Lines and Towers	National and Provincial	1983

11. WASTE, EFFLUENT, EMISSION AND NOISE MANAGEMENT

11(a) Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?	YES [ ]
If yes, what estimated quantity will be produced per month?	Unknown at this stage

How will the construction solid waste be disposed of (describe)?

Waste will be extracted and disposed off at the nearest registered landfill site in the Bushbuckridge municipal area.

Where will the construction solid waste be disposed of (describe)?

Waste will be disposed off at the nearest registered landfill site in the Bushbuckridge municipal area.

Will the activity produce solid waste during its operational phase?	YES	NO
If yes, what estimated quantity will be produced per month?	m^3	

How will the solid waste be disposed of (describe)?

N/A

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

N/A

If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?	YES	NO

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?	YES	NO

If yes, then the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

11(b) Liquid effluent

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?	YES	NO
If yes, what estimated quantity will be produced per month?	m^3	
Will the activity produce any effluent that will be treated and/or disposed of on site?	Yes	NO

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Will the activity produce effluent that will be treated and/or disposed of at another facility?	YES	NO

If yes, provide the particulars of the facility:

Facility name:			
Contact person:			
Postal address:			
Postal code:			
Telephone:		Cell:	
E-mail:		Fax:	

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:

11(c) Emissions into the atmosphere

Will the activity release emissions into the atmosphere?	YES	NO
If yes, is it controlled by any legislation of any sphere of government?	YES	NO

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the emissions in terms of type and concentration:

The major potential source emissions into the atmosphere include fugitive dust emissions during the construction, operation and maintenance phases and vehicle entrained dust from access/service roads, although these are usually not significant.

Eskom shall ensure the implementation of effective and regular control techniques for fugitive dust sources. As with the construction phase, it should be taken into consideration that watering certain areas in order to suppress fugitive dust may result in erosion. It may be appropriate not to implement dust suppression mitigation in such areas.

Small quantities of noxious and/or offensive gaseous air pollutants and smoke could be generated during operation as a result of combustion products from vehicle engines, although these emissions are generally negligible. In order to avoid the emission of gaseous air pollutants, Eskom shall ensure that all vehicles are kept in a serviceable condition to avoid excessive exhaust fumes.

The above impacts are negligible and therefore not considered significant.

11(d) Generation of noise

Will the activity generate noise?	YES	
If yes, is it controlled by any legislation of any sphere of government?	YES	

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

If no, describe the noise in terms of type and level:

Noise levels will be restricted to day time hours, and limited to the construction period. In order to limit noise generation during maintenance activities, Eskom shall provide all equipment with standard silencer units on vehicles and equipment in good working order, for those vehicles where it is necessary.

12. WATER USE

Please indicate the source(s) of water that will be used for the activity by ticking the appropriate box(es)

municipal	water board	groundwater	river, stream, dam or lake	other	the activity will not use water

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate

the volume that will be extracted per month: l

Does the activity require a water use permit from the Department of Water Affairs? NO

If yes, please submit the necessary application to the Department of Water Affairs and attach proof thereof to this application if it has been submitted.

13. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

None.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

None.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):	A

132kV distribution line: Alternative 1 - Green route

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section?

YES	NO

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

Property description/physical address:	This alternative traverses the following farms: Edinburgh 228KU; Ludlow 227KU and Eglington 225KU.
	(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.
	[redacted]
	In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.
Current land-use zoning:	All farms are zoned as rural settlement.
	In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to , to this application.

Is a change of land-use or a consent use application required?	[redacted]	NO
Must a building plan be submitted to the local authority?		NO

Locality map:

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1: Green route

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline
2.2 Plateau
2.3 Side slope of hill/mountain
2.4 Closed valley
2.5 Open valley
2.6 Plain
2.7 Undulating plain / low hills
2.8 Dune
2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	YES		YES	NO	YES	NO
Dolomite, sinkhole or doline areas		NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES		YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil		NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)		NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)		NO	YES	NO	YES	NO
Any other unstable soil or geological feature		NO	YES	NO	YES	NO
An area sensitive to erosion	YES		YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

5. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area

5.2 Low density residential
5.3 Medium density residential
5.4 High density residential
5.5 Informal residential[A]
5.6 Retail commercial & warehousing
5.7 Light industrial
5.8 Medium industrial [AN]
5.9 Heavy industrial [AN]
5.10 Power station
5.11 Office/consulting room
5.12 Military or police base/station/compound
5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital/medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard [N]
5.23 Railway line [N]
5.24 Major road (4 lanes or more) [N]
5.25 Airport [N]
5.26 Harbour
5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station [H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.33 Agriculture
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building
5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site
5.42 Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity?

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity?

If YES, specify and explain:

If YES, specify:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:
If YES, specify:

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or palaeontological sites, on or close (within 20m) to the site?	NO
If YES, explain:	
If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.	
Briefly explain the findings of the specialist:	No important cultural heritage resources or graves were found along this route.
Will any building or structure older than 60 years be affected in any way?	NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?	NO

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):	B

132kV distribution line: Alternative 2-Red route

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

Property description/physical address:	This alternative traverses the following farms: Edinburgh 228KU; Ludlow 227KU; and Eglington 225KU

(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use zoning:	All farms are zoned as rural settlement.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?	NO
Must a building plan be submitted to the local authority?	NO

Locality map:

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any): Red route

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline
2.2 Plateau
2.3 Side slope of hill/mountain
2.4 Closed valley
2.5 Open valley
2.6 Plain
2.7 Undulating plain / low hills
2.8 Dune
2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	YES	NO	YES	NO	YES	NO
Dolomite, sinkhole or doline areas	YES	NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES	NO	YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil	YES	NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)	YES	NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)	YES	NO	YES	NO	YES	NO
Any other unstable soil or geological feature	YES	NO	YES	NO	YES	NO
An area sensitive to erosion	YES	NO	YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

6. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area

5.2 Low density residential
5.3 Medium density residential
5.4 High density residential
5.5 Informal residential[A]
5.6 Retail commercial & warehousing
5.7 Light industrial
5.8 Medium industrial [AN]
5.9 Heavy industrial [AN]
5.10 Power station
5.11 Office/consulting room
5.12 Military or police base/station/compound
5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital/medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard [N]
5.23 Railway line [N]
5.24 Major road (4 lanes or more) [N]
5.25 Airport [N]
5.26 Harbour
5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station [H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.33 Agriculture
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building
5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site
5.42 Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity?

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity?

If YES, specify and explain:

If YES, specify:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:
If YES, specify:

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or palaeontological sites, on or close (within 20m) to the site?		NO
If YES, explain:		
If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.		
Briefly explain the findings of the specialist:	No important cultural heritage resources or graves were found along this route.	
Will any building or structure older than 60 years be affected in any way?		NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?		NO

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):	C

132kV distribution line: Alternative 3-Purple route

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

Property description/physical address:	This alternative traverses the following farms: Edinburgh 228KU; Burlington 217KU; Islington 219 KU, Ludlow 227KU and Eglington 225 KU;

(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.

In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.

Current land-use zoning:	All farms are zoned as rural settlement.

In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?	NO
Must a building plan be submitted to the local authority?	NO

Locality map:

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any): Purple route

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline
2.2 Plateau
2.3 Side slope of hill/mountain
2.4 Closed valley
2.5 Open valley
2.6 Plain
2.7 Undulating plain / low hills
2.8 Dune
2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	YES	NO	YES	NO	YES	
Dolomite, sinkhole or doline areas	YES	NO	YES	NO		NO
Seasonally wet soils (often close to water bodies)	YES	NO	YES	NO	YES	
Unstable rocky slopes or steep slopes with loose soil	YES	NO	YES	NO		NO
Dispersive soils (soils that dissolve in water)	YES	NO	YES	NO		NO
Soils with high clay content (clay fraction more than 40%)	YES	NO	YES	NO		NO
Any other unstable soil or geological feature	YES	NO	YES	NO		NO
An area sensitive to erosion	YES	NO	YES	NO	YES	

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

7. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area

5.2 Low density residential
5.3 Medium density residential
5.4 High density residential
5.5 Informal residential[A]
5.6 Retail commercial & warehousing
5.7 Light industrial
5.8 Medium industrial [AN]
5.9 Heavy industrial [AN]
5.10 Power station
5.11 Office/consulting room
5.12 Military or police base/station/compound
5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital/medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard [N]
5.23 Railway line [N]
5.24 Major road (4 lanes or more) [N]
5.25 Airport [N]
5.26 Harbour
5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station [H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.33 Agriculture
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building
5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site
5.42 Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity?

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity?

If YES, specify and explain:

If YES, specify:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:
If YES, specify:

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or palaeontological sites, on or close (within 20m) to the site?		NO
If YES, explain:		
If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.		
Briefly explain the findings of the specialist:	No important cultural heritage resources or graves were found along this route.	
Will any building or structure older than 60 years be affected in any way?		NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?		NO

If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.

SECTION B: SITE/AREA/PROPERTY DESCRIPTION

Important notes:

1. For linear activities (pipelines, etc) as well as activities that cover very large sites, it may be necessary to complete this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section C and indicate the area, which is covered by each copy No. on the Site Plan.

Section C Copy No. (e.g. A):	D

Proposed Tsakani Substation

2. Paragraphs 1 - 6 below must be completed for each alternative.

3. Has a specialist been consulted to assist with the completion of this section? YES

If YES, please complete the form entitled "Details of specialist and declaration of interest" for each specialist thus appointed:
All specialist reports must be contained in Appendix D.

Property description/physical address:	The proposed substation will be located on farm Eglington 225KU.
	(Farm name, portion etc.) Where a large number of properties are involved (e.g. linear activities), please attach a full list to this application.
	In instances where there is more than one town or district involved, please attach a list of towns or districts to this application.
Current land-use zoning:	Rural settlement
	In instances where there is more than one current land-use zoning, please attach a list of current land use zonings that also indicate which portions each use pertains to, to this application.

Is a change of land-use or a consent use application required?	NO
Must a building plan be submitted to the local authority?	NO

Locality map:

An A3 locality map must be attached to the back of this document, as Appendix A. The scale of the locality map must be relevant to the size of the development (at least 1:50 000. For linear activities of more than 25 kilometres, a smaller scale e.g. 1:250 000 can be used. The scale must be indicated on the map.) The map must indicate the following:

- an indication of the project site position as well as the positions of the alternative sites, if any;
- road access from all major roads in the area;
- road names or numbers of all major roads as well as the roads that provide access to the site(s);
- all roads within a 1km radius of the site or alternative sites; and
- a north arrow;
- a legend; and
- locality GPS co-ordinates (Indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection)

1. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Alternative S1-Tsakani Substation

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S2 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

Alternative S3 (if any):

Flat	1:50 – 1:20	1:20 – 1:15	1:15 – 1:10	1:10 – 1:7,5	1:7,5 – 1:5	Steeper than 1:5

2. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site:

2.1 Ridgeline
2.2 Plateau
2.3 Side slope of hill/mountain
2.4 Closed valley
2.5 Open valley
2.6 Plain
2.7 Undulating plain / low hills
2.8 Dune
2.9 Seafront

3. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

Is the site(s) located on any of the following (tick the appropriate boxes)?

	Alternative S1:		Alternative S2 (if any):		Alternative S3 (if any):	
Shallow water table (less than 1.5m deep)	YES		YES	NO	YES	NO
Dolomite, sinkhole or doline areas		NO	YES	NO	YES	NO
Seasonally wet soils (often close to water bodies)	YES		YES	NO	YES	NO
Unstable rocky slopes or steep slopes with loose soil		NO	YES	NO	YES	NO
Dispersive soils (soils that dissolve in water)		NO	YES	NO	YES	NO
Soils with high clay content (clay fraction more than 40%)		NO	YES	NO	YES	NO
Any other unstable soil or geological feature		NO	YES	NO	YES	NO
An area sensitive to erosion	YES		YES	NO	YES	NO

If you are unsure about any of the above or if you are concerned that any of the above aspects may be an issue of concern in the application, an appropriate specialist should be appointed to assist in the completion of this section. (Information in respect of the above will often be available as part of the project information or at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by the Council for Geo Science may also be consulted).

4. GROUNDCOVER

Indicate the types of groundcover present on the site:

The location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Natural veld - good condition[E]	Natural veld with scattered aliens[E]	Natural veld with heavy alien infestation[E]	Veld dominated by alien species[E]	Gardens
Sport field	Cultivated land	Paved surface	Building or other structure	Bare soil

If any of the boxes marked with an "[E] "is ticked, please consult an appropriate specialist to assist in the completion of this section if the environmental assessment practitioner doesn't have the necessary expertise.

8. LAND USE CHARACTER OF SURROUNDING AREA

Indicate land uses and/or prominent features that does currently occur within a 500m radius of the site and give description of how this influences the application or may be impacted upon by the application:

5.1 Natural area
5.2 Low density residential

5.3 Medium density residential
5.4 High density residential
5.5 Informal residential[A]
5.6 Retail commercial & warehousing
5.7 Light industrial
5.8 Medium industrial [AN]
5.9 Heavy industrial [AN]
5.10 Power station
5.11 Office/consulting room
5.12 Military or police base/station/compound
5.13 Spoil heap or slimes dam[A]
5.14 Quarry, sand or borrow pit
5.15 Dam or reservoir
5.16 Hospital/medical centre
5.17 School
5.18 Tertiary education facility
5.19 Church
5.20 Old age home
5.21 Sewage treatment plant[A]
5.22 Train station or shunting yard [N]
5.23 Railway line [N]
5.24 Major road (4 lanes or more) [N]
5.25 Airport [N]
5.26 Harbour
5.27 Sport facilities
5.28 Golf course
5.29 Polo fields
5.30 Filling station [H]
5.31 Landfill or waste treatment site
5.32 Plantation
5.33 Agriculture
5.34 River, stream or wetland
5.35 Nature conservation area
5.36 Mountain, koppie or ridge
5.37 Museum
5.38 Historical building
5.39 Protected Area
5.40 Graveyard
5.41 Archaeological site
5.42 Other land uses (describe)

If any of the boxes marked with an "[N] "are ticked, how will this impact / be impacted upon by the proposed activity?

If any of the boxes marked with an "[An]" are ticked, how will this impact / be impacted upon by the proposed activity?

If YES, specify and explain:
If YES, specify:

If any of the boxes marked with an "H" are ticked, how will this impact / be impacted upon by the proposed activity.

If YES, specify and explain:	
If YES, specify:	

6. CULTURAL/HISTORICAL FEATURES

Are there any signs of culturally or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including Archaeological or palaeontological sites, on or close (within 20m) to the site?		NO
If YES, explain:		
If uncertain, conduct a specialist investigation by a recognised specialist in the field to establish whether there is such a feature(s) present on or close to the site.		
Briefly explain the findings of the specialist:	No important cultural heritage resources or graves were found along this route.	
Will any building or structure older than 60 years be affected in any way?		NO
Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?		NO
If yes, please submit or, make sure that the applicant or a specialist submits the necessary application to SAHRA or the relevant provincial heritage agency and attach proof thereof to this application if such application has been made.		

SECTION C: PUBLIC PARTICIPATION

1. ADVERTISEMENT

The person conducting a public participation process must take into account any guidelines applicable to public participation as contemplated in section 24J of the Act and must give notice to all potential interested and affected parties of the application which is subjected to public participation by—

(a) fixing a notice board (of a size at least 60cm by 42cm; and must display the required information in lettering and in a format as may be determined by the competent authority) at a place conspicuous to the public at the boundary or on the fence of—
    (i) the site where the activity to which the application relates is or is to be undertaken; and
    (ii) any alternative site mentioned in the application;
(b) giving written notice to—
    (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
    (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
    (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
    (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
    (v) the municipality which has jurisdiction in the area;
    (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
    (vii) any other party as required by the competent authority;
(c) placing an advertisement in—
    (i) one local newspaper; or
    (ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or local municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official *Gazette* referred to in subregulation 54(c)(ii); and
(e) using reasonable alternative methods, as agreed to by the competent authority, in those instances where a person is desiring of but unable to participate in the process due to—
    (i) illiteracy;
    (ii) disability; or
    (iii) any other disadvantage.

2. CONTENT OF ADVERTISEMENTS AND NOTICES

A notice board, advertisement or notices must:

(a) indicate the details of the application which is subjected to public participation; and
(b) state—
    (i) that the application has been submitted to the competent authority in terms of these Regulations, as the case may be;

(ii) whether basic assessment or scoping procedures are being applied to the application, in the case of an application for environmental authorisation;

(iii) the nature and location of the activity to which the application relates;

(iv) where further information on the application or activity can be obtained; and

(iv) the manner in which and the person to whom representations in respect of the application may be made.

3. PLACEMENT OF ADVERTISEMENTS AND NOTICES

Where the proposed activity may have impacts that extend beyond the municipal area where it is located, a notice must be placed in at least one provincial newspaper or national newspaper, indicating that an application will be submitted to the competent authority in terms of these regulations, the nature and location of the activity, where further information on the proposed activity can be obtained and the manner in which representations in respect of the application can be made, unless a notice has been placed in any *Gazette* that is published specifically for the purpose of providing notice to the public of applications made in terms of the EIA regulations.

Advertisements and notices must make provision for all alternatives.

4. DETERMINATION OF APPROPRIATE MEASURES

The practitioner must ensure that the public participation is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees, ratepayers associations and traditional authorities where appropriate. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was inadequate.

5. COMMENTS AND RESPONSE REPORT

The practitioner must record all comments and respond to each comment of the public before the application is submitted. The comments and responses must be captured in a comments and response report as prescribed in the EIA regulations and be attached to this application. The comments and response report must be attached under Appendix E.

6. AUTHORITY PARTICIPATION

Please note that a complete list of all organs of state and or any other applicable authority with their contact details must be appended to the basic assessment report or scoping report, whichever is applicable.

Authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input.

List of authorities informed:

- Amashangana Tribal Authority
- Mnisi Tribal Authority
- Bushbuckridge Local Municipality
- Ehlanzeni District Municipality
- Department of Water Affairs
- Mpumalanga Department of Health
- Mpumalanga Parks and Tourism Agency
- Mpumalanga Department of Social Development
- Mpumalanga Department of Development and Planning
- Mpumalanga Department of Public Works, Roads and Transport
- Mpumalanga Department of Economic Development, Environment and Tourism (MDEDET)-Ehlanzeni District
- Mpumalanga Department of Agriculture, Rural Development and Land Administration-Ehlanzeni North and South (DARDLA)

List of authorities from whom comments have been received:

- Bushbuckridge Local Municipality
- Ehlanzeni District Municipality
- Mpumalanga Department of Economic Development, Environment and Tourism
- Mpumalanga Department of Agriculture, Rural Development and Land Administration-Ehlanzeni North and South
- Amashangana Tribal Authority
- Mnisi Tribal Authority

7. CONSULTATION WITH OTHER STAKEHOLDERS

Note that, for linear activities, or where deviation from the public participation requirements may be appropriate, the person conducting the public participation process may deviate from the requirements of that sub-regulation to the extent and in the manner as may be agreed to by the competent authority. Proof of any such agreement must be provided, where applicable.

Has any comment been received from stakeholders? YES

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

- Health and safety of the community in the area is the main area of interest in the proposed project.
- Requested a detailed document addressing dust control, noise control, waste management, water pollution control, ablution facilities for personnel and approved building plan from local authority.
- Compliance to requirements with regards to water supply, ablution facilities, waste management, air quality management and chemical management should be ensured.
- No construction activities will be supported within the identified wetland areas, or within 50 m from the edge of the Sephiriri River.
- Construction workers must be provided with appropriate personal protective equipment. Education and training on the use of such equipment must be given to the construction workers.
- Requested a notification to be sent to an additional role player who should be involved in the EIA process.
- Education and training on handling of chemicals and other hazardous materials, health and hygiene and environmental management must be given to all construction workers including management.
- The main area of interest is the site of the proposed Tsakani substation (which is still subject to be negotiated for approval) is within the expanding agricultural land of the nearby community.
- Bushbuckridge local municipality is challenged with providing electricity in some villages due to overloaded substations. Hence the construction of the new substation is recommended as it will reduce electrification backlogs and it will benefit the community.
- What is the next step to be taken in order for Eskom to get a go-ahead?
- This project will be affecting the communities how will they be informed?
- Have other Departments been consulted about the proposed project?
- What positive impact will the project have on the community?
- When is construction of the power line and substation expected to commence?
- Will the landowners that are affected by the project be compensated?
- The project is fully supported and it can proceed.
- Whereabouts is the Tsakani substation located since there is an area called Tsakani nearby?
- Has permission to use the land been negotiated with the landowners and have the Chiefs been consulted in this regard?
- How long would this process take before people can receive electricity?
- Will any job opportunities be created by the project?
- What is the estimated budget for the proposed project?

- They welcomed the project wholeheartedly and they are happy about it.
- Currently, there are power shortages and as a result numerous interruptions to those villagers that are already connected. It is appreciated that the proposed substation will reduce the load on the existing substation. The electricity available is unreliable and in short supply and the situation is very serious because the local hospital also experiences blackouts.
- The new proposed substation will add value to the villages by improving the quality of life and it will also support other substations.
- The proposed project will create job opportunities by stimulating economic development in the surrounding villages.
- The proposed site of the substation and power line is available for the proposed project.
- The Municipality must be involved at all times in matters that involve the community. It was requested that the councillors and headmen inform the local community about the proposed project.

SECTION D: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2010, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts.

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

List the main issues raised by interested and affected parties.

- Health and safety of the community in the area is the main area of interest in the proposed project.
- Requested a detailed document addressing dust control, noise control, waste management, water pollution control, ablution facilities for personnel and approved building plan from local authority.
- Compliance to requirements with regards to water supply, ablution facilities, waste management, air quality management and chemical management should be ensured.
- No construction activities will be supported within the identified wetland areas, or within 50 m from the edge of the Sephiriri River.
- Construction workers must be provided with appropriate personal protective equipment. Education and training on the use of such equipment must be given to the construction workers.
- Requested a notification to be sent to an additional role player who should be involved in the EIA process.
- Education and training on handling of chemicals and other hazardous materials, health and hygiene and environmental management must be given to all construction workers including management.
- The main area of interest is the site of the proposed Tsakani substation. The proposed site of the substation (which is still subject to be negotiated for approval) is within the expanding agricultural land of the nearby community.
- Bushbuckridge local municipality is challenged with providing electricity in some villages due to overloaded substations. Hence the construction of the new substation is recommended as it will reduce electrification backlogs and it will benefit the

community.

- What is the next step to be taken in order for Eskom to get a go-ahead?
- This project will be affecting the communities how will they be informed?
- Have other Departments been consulted about the proposed project?
- What positive impact will the project have on the community?
- When is construction of the power line and substation expected to commence?
- Will the landowners that are affected by the project be compensated?
- The project is fully supported and it can proceed.
- Whereabouts is the Tsakani substation located since there is an area called Tsakani nearby?
- Has permission to use the land been negotiated with the landowners and have the Chiefs been consulted in this regard?
- How long would this process take before people can receive electricity?
- Will any job opportunities be created by the project?
- What is the estimated budget for the proposed project?
- They welcomed the project wholeheartedly and they are happy about it.
- Currently, there are power shortages and as a result numerous interruptions to those villagers that are already connected. It is appreciated that the proposed substation will reduce the load on the existing substation. The electricity available is unreliable and in short supply and the situation is very serious because the local hospital also experiences blackouts.
- The new proposed substation will add value to the villages by improving the quality of life and it will also support other substations.
- The proposed project will create job opportunities by stimulating economic development in the surrounding villages.
- The proposed site of the substation and power line is available for the proposed project.
- The Municipality must be involved at all times in matters that involve the community. It was requested that the councillors and headmen inform the local community about the proposed project.

Response from the practitioner to the issues raised by the interested and affected parties (A full response must be given in the Comments and Response Report that must be attached to this report as Appendix E):

Refer to Appendix E.

2. IMPACTS THAT MAY RESULT FROM THE PLANNING AND DESIGN, CONSTRUCTION, OPERATIONAL, DECOMMISSIONING AND CLOSURE PHASES AS WELL AS PROPOSED MANAGEMENT OF IDENTIFIED IMPACTS AND PROPOSED MITIGATION MEASURES

List the potential direct, indirect and cumulative property/activity/design/technology/operational alternative related impacts (as appropriate) that are likely to occur as a result of the planning and design phase, construction phase, operational phase, decommissioning and closure phase, including impacts relating to the choice of site/activity/technology alternatives as well as the mitigation measures that may eliminate or reduce the potential impacts listed.

The following parameters are used to describe the impact/issues in this assessment:

1. Nature
   A brief written statement of the environmental aspect being impacted upon by a particular action or activity.

2. Extent
   The area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment phase of a project in terms of further defining the determined significance or intensity of an impact.

- Site (1) – Within the construction site.
- Local (2) – Within a radius of 2 km of the construction site.
- Regional (3) – the scale applies to impacts on a provincial level and parts of neighbouring provinces.
- National (4) – the scale applies to impacts that will affect the whole South Africa.

3. Duration

Indicates what the lifetime of the impact will be.

- Short-term (1) – less than 5 years.
- Medium-term (2) – between 5 and 15 years.
- Long-term (3) – between 15 and 30 years.
- Permanent (4) – over 30 years and resulting in a permanent and lasting change that will always be there.

4. Intensity
   Describes whether an impact is destructive or benign.

- Very High (4) - Natural, cultural and social functions and processes are altered to extent that they permanently cease.
- High (3) - Natural, cultural and social functions and processes are altered to extent that they temporarily cease.
- Moderate (2) - Affected environment is altered, but natural, cultural and social functions and processes continue albeit in a modified way.
- Low (1) - Impact affects the environment in such a way that natural, cultural and social functions and processes are not affected.

5. Probability
   Describes the likelihood of an impact actually occurring.

- Improbable (1) - Likelihood of the impact materialising is very low.
- Possible (2) - The impact may occur.
- Highly Probable (3) - Most likely that the impact will occur.
- Definite (4) - Impact will certainly occur.

6. Cumulative
   In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

7. Significance
   Significance is determined through a synthesis of impact characteristics. Significance is an

indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Low impact (4 - 6 points)	A low impact has no permanent impact of significance. Mitigation measures are feasible and are readily instituted as part of a standing design, construction or operating procedure.
Medium impact (7 - 9 points)	Mitigation is possible with additional design and construction inputs.
High impact (10 - 12 points)	The design of the site may be affected. Mitigation and possible remediation are needed during the construction and/or operational phases. The effects of the impact may affect the broader environment.
Very High impact (13 - 16 points)	Permanent and important impacts. The design of the site may be affected. Intensive remediation is needed during construction and/or operational phases. Any activity which results in a "very high impact" is likely to be a fatal flaw.
Status	Denotes the perceived effect of the impact on the affected area.
Positive (+)	Beneficial impact.
Negative (-)	Deleterious or adverse impact.
Neutral (/)	Impact is neither beneficial nor adverse.

Alternative 1 (132 kV power line - Green Route Alignment): Planning and Design Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct			
1. Flora/Vegetation and Fauna Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, rocky outcrops etc.) may impact these sensitive communities.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• General mitigation measures would include avoiding any physical damage to natural vegetation on the periphery of the proposed servitude as well as riparian vegetation. • The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula). • Prior to construction and vegetation clearance, a suitably qualified zoologist/botanist or ecologist should closely examine the proposed construction areas (tower supports) for the presence of animal burrows, rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitats away from the servitude or tower.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
2. Access Roads New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian	Extent: Local (-2) Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-11)	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
areas, rocky outcrops, etc.).		has been identified. Use should be made of existing roads as far as possible.	
3. Wetlands and Surface Water Bodies Numerous seasonal drainage lines are crossed by the proposed development routes as well as the perennial Sephiriri River Catchment which drains into a local dam in the vicinity of Edinburgh and Thulamahaxi. The Sephiriri River is a significant water feature in the study area and is a tributary of the Sand River flowing along the south of the study area. The green route alignment crosses the Sephiriri River dam, one perennial river (Sephiriri River), 5 non-perennial rivers (Mphyangane, Molapakgomo and Khokhovela) as well as one flat depression wetland.	Extent: Regional (-3) Duration: Permanent (-4) Intensity: High (-3) Probability: Definite (-4) Significance: Very High (-14)	• The wetland buffer zone and development setback should be established, where no construction activities should take place within 32 m of wetlands edges for all identified water features (wetlands and Sand River seasonal tributaries). • For the Sephiriri River, a buffer of at least 50 m on each side of the river edge should be adopted as a no-go area.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Alternative 2: (132 kV power line - Red Route Alignment) – Planning and Design Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
Direct Impacts			
1. Flora/Vegetation and Fauna Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, rocky outcrops etc.) may impact these sensitive communities.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• General mitigation measures would include avoiding any physical damage to natural vegetation on the periphery of the proposed servitude as well as riparian vegetation. • The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula). • Prior to construction and vegetation clearance, a suitably qualified zoologist/botanist or ecologist should closely examine the proposed construction areas (tower supports) for the presence of animal burrows, rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitats away from the servitude or tower.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)
2. Access Roads New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, rocky outcrops, etc.).	Extent: Local (-2) Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-11)	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site has been identified. Use should be	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		made of existing roads as far as possible.	
3. Wetlands and Surface Water Bodies Numerous seasonal drainage lines are crossed by the proposed development routes as well as the perennial Sephiriri River Catchment which drains into a local dam in the vicinity of Edinburgh and Thulamahaxi. The Sephiriri River is a significant water feature in the study area and is a tributary of the Sand River flowing along the south of the study area. The red route alignment crosses one perennial river (Sephiriri River) and 6 non-perennial rivers (Mphyangane, Molapakgomo and Khokhovela) and one small flat depression wetland.	Extent: Regional (-3) Duration: Permanent (-4) Intensity: High (-3) Probability: Definite (-4) Significance: Very High (-14)	• The wetland buffer zone and development setback should be established, where no construction activities should take place within 32 m of wetlands edges for all identified water features (wetlands and Sand River seasonal tributaries). • For the Sephiriri River, a buffer of at least 50 m on each side of the river edge should be adopted as a no-go area.	Extent: Local (-2) Duration: Long-term (-3) Intensity: :Low (-1) Probability: Possible (-2) Significance: Medium (-8)
Indirect Impacts			
None.			
Cumulative impacts			
None.			

Alternative 3 (132 kV power line – Purple Route Alignment): Planning and Design Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Flora/Vegetation and Fauna Placement of footprints near areas of high sensitivity (natural vegetation, protected tree species, riparian areas, rocky outcrops etc.) may impact these sensitive communities.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• General mitigation measures would include avoiding any physical damage to natural vegetation on the periphery of the proposed servitude as well as riparian vegetation. • The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula). • Prior to construction and vegetation clearance, a suitably qualified zoologist/botanist or ecologist should closely examine the proposed construction areas (tower supports) for the presence of animal burrows, rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitats away from the servitude or tower.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Highly Probable (-3) Significance: Medium (-9)
2. Access Roads New access roads and haulage routes could impact on areas of high sensitivity (natural vegetation, protected tree species, riparian areas, rocky outcrops, etc.).	Extent: Local (-2) Duration: Permanent (-4) Intensity: Very High (-4) Probability: Highly Probable (-3) Significance: Very High (-13)	• Temporary access and haulage routes must be designed prior to construction commencing to ensure that the most preferable access and haulage routes for each tower site has been identified. Use should be	Extent: Local (-2) Duration: Long-term (-3) Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-10)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		made of existing roads as far as possible.	
3. Wetlands and Surface Water Numerous seasonal drainage lines are crossed by the proposed development routes as well as the perennial Sephiriri River Catchment which drains into a local dam in the vicinity of Edinburgh and Thulamahaxi. The Sephiriri River is a significant water feature in the study area and is a tributary of the Sand River flowing along the south of the study area. The purple route alignment crosses one perennial river (Sephiriri River) and 4 non-perennial rivers (Mphyangane, Molapakgomo and Khokhovela).	Extent: Regional (-3) Duration: Permanent (-4) Intensity: High (-3) Probability: Definite (-4) Significance: Very High (-14)	• The wetland buffer zone and development setback should be established, where no construction activities should take place within 32 m of wetlands edges for all identified water features (wetlands and Sand River seasonal tributaries). • For the Sephiriri River, a buffer of at least 50 m on each side of the river edge should be adopted as a no-go area.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
4. Avifauna A number of listed species occur in the study area as well as various micro-habitats are available to avifauna. In general terms, the impacts that could be associated with the project include: collision of birds with the overhead cables; electrocution; destruction of habitat and disturbance of birds.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Definite (-4) Significance: Very High (-13)	• An avifaunal walk-through is order to "fine-tune" the avifaunal sensitive zones and to identify the exact spans of the line (once the preferred line option is chosen) for marking to mitigate for bird collisions. • Bird-friendly monopole structures (as per Eskom guidelines) should be used for all pylon structures to mitigate electrocution impacts.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
Indirect Impacts			
None.			
Cumulative impacts			
None.			

Summary of Impacts and Average Points allocated to each power line Alternative during the Planning and Design Phase

IMPACTS	Alternative 1 - Green Route: Without Mitigation	Alternative 1 - Green Route: With Mitigation	Alternative 2 - Red Route: Without Mitigation	Alternative 2 - Red Route: With Mitigation	Alternative 3- Purple Route: With Mitigation	Alternative 3 - Purple Route: Without Mitigation
DIRECT						
Flora	-12	-7	-12	-9	-12	-9
Access Roads	-11	-7	-11	-7	-13	-10
Wetlands	-14	-8	-14	-8	-14	-7
Avifauna	-	-	-	-	-13	-7
Average Total	-12.33	-7.33	-12.33	-8.00	-13.00	-8.25
INDIRECT						
None.						
CUMULATIVE						
None.						

Alternative 1 - Tsakani Substation: Planning and Design Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct			
1. Wetlands and Surface Water Bodies This proposed Substation site is located immediately to the west of the perennial Khokhovela River. A non-perennial drainage line occurs to the south of the site.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• The Substation and towers should be located outside the riparian areas of the Khokhovela River and the non-perennial drainage line. A 32 m buffer zone from the outer edge of the riparian zone must be maintained (Refer to the Wetland Delineation Report – Appendix D).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
Indirect Impacts			
None.			
Cumulative Impacts			

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
None.			

Alternative 1 (132 kV power line – Green Route Alignment): Construction Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct impacts			
1. Topography and Soils The direct impact on landforms with the establishment of distribution lines and additional Substation components is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
2. Loss of wetland habitat and bed/bank modification Impacts include the loss of wetland habitat and some modification to the	Extent: Regional (-3) Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Highly Probable (-3)	• A buffer zone of at least 32 m should be adopted for all identified Sand River Seasonal Tributaries and a	Extent: Local (-2) Duration: Long-term (-2) Intensity: Low (-1) Probability: Possible (-2)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
bed or banks of freshwater systems.	Significance: High (-12)	buffer of at least 50 m should be adopted in the Sephiriri River System as indicated in the Wetland Delineation Report (see Appendix D). No construction vehicles should dredge and / or work within these buffers. • Where possible all towers should be relocated to avoid wetlands. • If possible, the undertaking of construction activities near the rivers and associated wetlands should take place during the dry season. • The rehabilitation and re-vegetation of disturbed areas must take place concurrently. Only appropriate indigenous riparian vegetation may be used for rehabilitation and re-vegetation within the study area and wetland buffer areas (preferably indigenous plants represented in the reserve to the north and those existing in the wetland areas). • If clearing of vegetation needs to be undertaken on site and in the wetland buffer, it should be carried-out without significantly altering the condition and health of the associated water feature.	Significance: Medium (-7)
3. Water Quality Impairment Sedimentation and construction related effluent disturbance.	Extent: Local (-2) Duration: Medium-term (-2) Intensity: Low (-1) Probability: Possible (-2)	• The water quality impacts should be addressed through the EMPr, which is implemented by an on-site Environmental Control Officer.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
	Significance: Medium (-7)	• Run-off from the construction area must be prevented from directly entering wetlands and associated water features (except where the gradient is not feasible). The intensity of stormwater run-off should be reduced where possible through encouraging paving and surfaces that allow for greater infiltration. • Activities that lead to elevated levels of turbidity must be minimised. Bulldozing and the use of other mechanical machinery in the wetland buffer zone should also be prevented as far as possible.	Significance: Low (-6)
4. Flow Modification Similar to impacts discussed under loss of wetland habitat and bed/bank modification.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)	• The hydrological impacts on the wetland are negated if constructing outside of floodlines. • A buffer zone of at least 32 m should be adopted for all identified Sand River Seasonal Tributaries and a buffer of at least 50 m should be adopted in the Sephiriri River System as indicated in the Wetland Delineation Report (see Appendix D).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
5. Loss of wetland biodiversity The loss of wetland biodiversity is expected to occur in localised areas. The natural vegetation around the wetland areas impacted by the development is expected to recover in the mid-term as a result of the	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-10)	• The rehabilitation and re-vegetation of disturbed areas must take place concurrently. Only appropriate indigenous riparian vegetation may be used for rehabilitation and re-vegetation within the study area and wetland buffer areas (preferably	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
small development footprint.		indigenous plants represented in the reserve to the north and those existing in the wetland areas). • Heavy construction vehicles (where possible) must not be used in proximity to the wetlands. • All alien vegetation should be cleared off the property and landscaping using the neighbouring parks and reserves plant species is encouraged. It is believed that this area will naturally recover from the direct (dust, pollution) and indirect (change in passive infiltration of the vicinity) disturbances. The trimming of bulrush and reeds should be allowed if densities are too high.	
6. Water Resources Pollution of groundwater and surface water resources.	Extent: Regional (-3) Duration: Short-term (-1) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-10)	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		are included in the EMPr (Appendix D).	
7. Flora and Fauna The majority of vegetation adjacent to the proposed green route alternative consists of completely transformed bushveld habitat with limited habitat diversity. Impacts include: Loss of protected tree species.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• Protected tree species or plants shall not be removed unless they are interfering with a structure. • All protected species not to be removed must be clearly marked and such areas fenced off if required. • A permit will be required from the Department of Forestry and the Provincial Nature Conservation for the removal of any protected tree species. • The alignment of towers and the power line should be adjusted to prevent the destruction of any remaining large (>4 m) indigenous or protected tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Highly Probable (-3) Significance: Medium (-9)
8. Flora and Fauna - Loss of faunal habitats.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Definite (-4) Significance: High (-13)	• No dumping of any materials in undeveloped open areas and neighbouring properties should be allowed. • Disturbance of vegetation cover as well as rocky outcrops, logs, stumps, termite mounds within sensitive areas should be limited. • All temporary stockpile areas	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		including litter and dumped material and rubble must be removed on completion of construction.	
9. Flora and Fauna - Threatened fauna.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• As a precautionary mitigation measure it is recommended that the developer and construction contractor as well as an independent environmental control officer should be made aware of the possible presence of certain threatened animal species (South African Python) prior to the commencement of construction activities. In the event that any of the above-mentioned species are discovered relevant conservation authorities should be informed and activities surrounding the site suspended until further investigations have been conducted. • Access to the powerline servitude must be restricted. Access to the powerline servitude should ideally be fenced off and gated along the main access roads. • Prior to construction and vegetation clearance a suitably qualified Zoologist/Botanist or Ecologist should closely examine the proposed construction areas (tower supports) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs,	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		stumps and other debris and relocate any affected animals to appropriate habitat away from the servitude or tower. • Contract employees must be educated about the value of wild animals and the importance of their conservation. • Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed.	
10. Flora and Fauna - Increased human presence.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed. • Movement of workers must be limited to areas under construction and access to the undeveloped areas, especially the surrounding open areas must be strictly regulated ("no-go" areas during construction activities).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
11. Flora and Fauna - Vegetation clearance.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Definite (-4) Significance: Medium (-9)	• Only an 8m strip may be cleared flush with the ground to allow vehicular passage during construction. No scalping shall be allowed on any part of the servitude road unless absolutely necessary. • The removal of all economically	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Definite (-4) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed. • Vegetation clearing on tower sites must be kept to a minimum. • Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. • Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. • Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower. • No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks (riparian zone). Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard. • Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. • With permission of the landowner, the total servitude under the line and up to 5m outside the outer phases should be cleared.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• All remaining Aloes (*Aloe greatheadii*), bulbous plants (geophytes) should be replanted if unearthed during the construction phase of the project. • Disturbance of vegetation must be limited to areas of construction. • Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited. The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. The application of herbicides shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the supplier's specifications. • All alien vegetation in the total servitude and densifiers creating a fire hazard shall be cleared and treated with herbicides • All alien invasive plant should be removed from the site to prevent further invasion. • All alien vegetation should be eradicated over a five-year period. • The contractor must have the	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		necessary knowledge to be able to identify protected species as well as species not interfering with the operation of the line due to their height and growth rate. • The contractor must also be able to identify declared weeds and alien species that can be totally eradicated. • The contractor must be in possession of a valid herbicide applicators licence.	
12. Flora and Fauna – Re-vegetation.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Re-seeding shall be done on disturbed areas as directed by the Environmental Control Officer.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-1) Significance: Low (-5)
13. Flora and Fauna – Disturbance to livestock.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species. • The Contractor shall under no circumstances interfere with livestock without the Landowner being present. This includes the moving of livestock where they interfere with construction activities. • Should the Contractors workforce obtain any livestock for eating	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		purposes, they must be in possession of a written note from the Landowner. • Speed limits must be restricted especially on farm roads (30km/hr) preventing unnecessary road fatalities of surrounding livestock.	
14. Flora and Fauna – Fire.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-8)	• No open fires shall be allowed on site under any circumstance. The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
15. Avifauna - Disturbance of birds, impact on Red Data and other avifaunal species.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Strict control should be maintained over all activities during construction. It is difficult to mitigate properly for this as some disturbance is inevitable. During construction, if any of the "Focal Species" identified in the avifaunal report (Appendix D) are observed to be roosting and/or breeding in the vicinity, the Endangered Wildlife Trust is to be contacted for further instruction.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
16. Avifauna - Destruction or alteration of bird habitat, Impact on Red Data and other species.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Definite (-4) Significance: High (-11)	• Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)
17. Heritage Impact on sites of cultural	Extent: Local (-2) Duration: Permanent (-4)	• If during construction any cultural heritage resources or graves are	Extent: Local (-2) Duration: Permanent (-4)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
significance, e.g. graves. Archaeological material, by its very nature, occurs below ground. The applicant and contractors should therefore keep in mind that archaeological sites might be exposed during the construction work.	Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-8)	unearthed, all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-8)
18. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Where possible, construction waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		F).	
19. Dust Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following possible sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the transport of equipment to the site; preparation of the surface areas which may be required prior to the set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Frequent and effective dust-suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
20. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
21. Social - Land-use	Extent: Local (-2)	• No mitigation proposed - however,	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
The construction of the power line could potentially impact on agricultural activities in the area.	Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-11)	the footprint of the proposed pole structure to be used is small (i.e. approximately 1 m x 1 m) and would thus have a localised impact. As agricultural activities can still continue to a large degree below the power line, the impact on the use of land for agricultural purposes is anticipated to be low.	
22. Social – Loss of land and relocation of households for servitudes and power line construction and maintenance.	Extent: Local (-2) Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Possible (-2) Significance: High (-10)	• Some households might need to be relocated to accommodate the new power line. • Avoid existing settlements whenever possible. • Compensate for relocation and hassle costs[4] appropriately.	Extent: Local (-2) Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Possible (-2) Significance: High (-10)
23. Visual Most of the area surrounding the project area has been disturbed and severely impacted by human activity such as overgrazing by livestock, collection of vegetation for various uses, settlements and cultivation: Impact on potential sensitive viewing locations such as rural residences, roads, and protected areas.	Extent: Local (-2) Duration: Short term (-1) Intensity: High (-3) Probability: Definite (-4) Significance: High (-10)	• By taking advantage of natural topographic features, cut and fill slopes can be greatly minimized. • Partial clearing at the limits of construction rather than clearing the entire area – leaving islands of vegetation results in a more natural look. • Use irregular clearing shapes. • Feather/thin the edges of the cleared areas. Feathering edges reduces strong lines of contrast. To create a more natural look along an edge, a good mix of tree/shrub species and sizes should be retained.	Extent: Local (-2) Duration: Short term (-1) Intensity: Moderate (-2) Probability: Highly probable(-3) Significance: Medium (-8)

[4] Hassle costs include: increase in transportation, educational costs etc. if households need to be relocated.

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• Establish limits of disturbance that reflect the minimum area required for construction. • Locate construction staging and administrative areas in less visually sensitive areas. • Colours on smooth structures need to be two or three shades darker than the background colours to compensate for shadow patterns created by natural textures that make colours appear darker. The colour selection for all structures should be made to achieve the best blending with the surrounding landscape in the winter and summer. • Use earth-tone paints and stains. Colours that blend with or are in harmony with the existing colours of the surrounding earth, rocks and vegetation, are usually more visually pleasing and attract less attention than colours that are chosen to match the colour of the sky. • Galvanized steel on structures should be darkened to prevent glare. Low lustre paints should be used wherever possible to reduce glare. • Select paint finishes with low levels of reflectivity. • Screen the structure from view through the use of natural landforms and vegetation.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• Minimize the number of structures and combining different activities in one structure where possible. • Attempt to repeat the form, line, colour and texture of the surrounding landscape to reduce the contrast between the landscape and the proposed infrastructure. • Use natural stone in wall surfaces if possible. • Haul in or haul out excessive earth cut or fill in sensitive viewing areas. • Bend slopes to match existing landforms. • Retain existing rock formations, vegetation, drainage, etc., whenever possible. • Tone down freshly broken rock faces through the use of asphalt emulsions, rock stains, etc. • Protect roots from damage during excavations. • Avoid soil types that will generate strong contrasts with the surrounding landscape when they are disturbed. • Prohibit dumping of excess earth/rock on downhill slopes.	
Indirect Impacts			
1. Flora a) Alien and exotic species encroachment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2)	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
	Probability: Highly Probable (-3) Significance: Medium (-8)	the grass to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	Probability: Possible (-2) Significance: Low (-6)
2. Social Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	Extent: Local (+2) Duration: Short-term (+1) Intensity: Moderate (+2) Probability: Possible (+2) Significance: Medium (+7)	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	
3. Wetlands: a) The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor stormwater management and /or poor tower and/or access road location. b) Alien vegetation encroachment associated with the above-mentioned disturbances.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Provision of adequate stormwater measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No.43 of 1983).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
Cumulative Impacts			
None.			

Alternative 2 (132 kV power line – Red Route Alignment): Construction Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
Direct Impacts			
1. Topography and Soils The direct impact on landforms with the establishment of distribution lines and additional Substation components is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
2. Loss of wetland habitat and bed/bank modification Impacts include the loss of wetland habitat and some modification to the bed or banks of freshwater systems.	Extent: Regional (-3) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: Very High (-13)	• A buffer zone of at least 32 m should be adopted for all identified Sand River Seasonal Tributaries and a buffer of at least 50 m should be adopted in the Sephiriri River System as indicated in the Wetland Delineation Report (see Appendix	Extent: Local (-2) Duration: Long-term (-2) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-7)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		D). No construction vehicles should dredge and / or work within these buffers. • Where possible all towers should be relocated to avoid wetlands. • If possible, the undertaking of construction activities near the rivers and associated wetlands should take place during the dry season. • The rehabilitation and re-vegetation of disturbed areas must take place concurrently. Only appropriate indigenous riparian vegetation may be used for rehabilitation and re-vegetation within the study area and wetland buffer areas (preferably indigenous plants represented in the reserve to the north and those existing in the wetland areas). • If clearing of vegetation needs to be undertaken on site and in the wetland buffer, it should be carried-out without significantly altering the condition and health of the associated water feature.	
3. Water Quality Impairment Sedimentation and construction related effluent disturbance.	Extent: Local (-2) Duration: Medium-term (-2) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-7)	• The water quality impacts should be addressed through the EMPr, which is implemented by an on-site Environmental Control Officer. • Run-off from the construction area must be prevented from directly entering wetlands and associated water features (except where the	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		gradient is not feasible). The intensity of stormwater run-off should be reduced where possible through encouraging paving and surfaces that allow for greater infiltration. • Activities that lead to elevated levels of turbidity must be minimised. Bulldozing and the use of other mechanical machinery in the wetland buffer zone should also be prevented as far as possible.	
4. Flow Modification Similar to impacts discussed under loss of wetland habitat and bed/bank modification.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• The hydrological impacts on the wetland are negated if constructing outside of floodlines. • A buffer zone of at least 32 m should be adopted for all identified Sand River Seasonal Tributaries and a buffer of at least 50 m should be adopted in the Sephiriri River System as indicated in the Wetland Delineation Report (see Appendix D).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
5. Loss of wetland biodiversity The loss of wetland biodiversity is expected to occur in localised areas. The natural vegetation around the wetland areas impacted by the development is expected to recover in the mid-term as a result of the small development footprint.	Extent: Local (-2) Duration: Long-term (-3) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-11)	• The rehabilitation and re-vegetation of disturbed areas must take place concurrently. Only appropriate indigenous riparian vegetation may be used for rehabilitation and re-vegetation within the study area and wetland buffer areas (preferably indigenous plants represented in the reserve to the north and those existing in the wetland areas). • Heavy construction vehicles (where	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		possible) must not be used in proximity to the wetlands. • All alien vegetation should be cleared off the property and landscaping using the neighbouring parks and reserves plant species is encouraged. It is believed that this area will naturally recover from the direct (dust, pollution) and indirect (change in passive infiltration of the vicinity) disturbances. The trimming of bulrush and reeds should be allowed if densities are too high.	
6. Water Resources Pollution of groundwater and surface water resources.	Extent: Regional (-3) Duration: Short-term (-1) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-10)	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
7. Flora and Fauna The majority of the vegetation along	Extent: Local (-2) Duration: Permanent (-4)	• Protected tree species or plants shall not be removed unless they are	Extent: Local (-2) Duration: Long-term (-3)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
the red route alignment has been transformed or degraded although certain sections display a more natural species composition. Impacts include: Loss of protected tree species.	Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	interfering with a structure. • All protected species not to be removed must be clearly marked and such areas fenced off if required. • A permit will be required from the Department of Forestry and the Provincial Nature Conservation for the removal of any protected tree species. • The alignment of towers and the power line should be adjusted to prevent the destruction of any remaining large (>4 m) indigenous or protected tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula).	Intensity: Low (-1) Probability: Highly Probable (-3) Significance: Medium (-9)
8. Flora and Fauna - Loss of faunal habitats.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Definite (-4) Significance: Very High (-13)	• No dumping of any materials in undeveloped open areas and neighbouring properties should be allowed. • Disturbance of vegetation cover as well as rocky outcrops, logs, stumps, termite mounds within sensitive areas should be limited. • All temporary stockpile areas including litter and dumped material and rubble must be removed on completion of construction.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)
9. Flora and Fauna - Threatened	Extent: Local (-2)	• As a precautionary mitigation	Extent: Local (-2)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
fauna.	Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	measure it is recommended that the developer and construction contractor as well as an independent environmental control officer should be made aware of the possible presence of certain threatened animal species (South African Python) prior to the commencement of construction activities. In the event that any of the above-mentioned species are discovered relevant conservation authorities should be informed and activities surrounding the site suspended until further investigations have been conducted. • Access to the powerline servitude must be restricted. Access to the powerline servitude should ideally be fenced off and gated along the main access roads. • Prior to construction and vegetation clearance a suitably qualified Zoologist/Botanist or Ecologist should closely examine the proposed construction areas (tower supports) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and relocate any affected animals to appropriate habitat away from the servitude or tower. • Contract employees must be	Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		educated about the value of wild animals and the importance of their conservation. • Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed.	
10. Flora and Fauna - Increased human presence.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed. • Movement of workers must be limited to areas under construction and access to the undeveloped areas, especially the surrounding open areas must be strictly regulated ("no-go" areas during construction activities).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
11. Flora and Fauna - Vegetation clearance.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Definite (-4) Significance: Medium (-9)	• Only an 8m strip may be cleared flush with the ground to allow vehicular passage during construction. No scalping shall be allowed on any part of the servitude road unless absolutely necessary. • The removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed. • Vegetation clearing on tower sites must be kept to a minimum. • Big trees with large root systems shall be cut manually and removed,	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Definite (-4) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. • Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. • Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower. • No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks (riparian zone). Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard. • Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. • With permission of the landowner, the total servitude under the line and up to 5m outside the outer phases should be cleared. • All remaining Aloes (*Aloe greatheadii*), bulbous plants (geophytes) should be replanted if unearthed during the construction phase of the project. • Disturbance of vegetation must be limited to areas of construction.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		• Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited. The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. The application of herbicides shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the supplier's specifications. • All alien vegetation in the total servitude and densifiers creating a fire hazard shall be cleared and treated with herbicides • All alien invasive plant should be removed from the site to prevent further invasion. • All alien vegetation should be eradicated over a five-year period. • The contractor must have the necessary knowledge to be able to identify protected species as well as species not interfering with the operation of the line due to their height and growth rate. • The contractor must also be able to identify declared weeds and alien	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		species that can be totally eradicated. • The contractor must be in possession of a valid herbicide applicators licence.	
12. Flora and Fauna – Re-vegetation.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Re-seeding shall be done on disturbed areas as directed by the Environmental Control Officer.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-1) Significance: Low (-5)
13. Flora and Fauna – Disturbance to livestock.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species. • The Contractor shall under no circumstances interfere with livestock without the Landowner being present. This includes the moving of livestock where they interfere with construction activities. • Should the Contractors workforce obtain any livestock for eating purposes, they must be in possession of a written note from the Landowner. • Speed limits must be restricted especially on farm roads (30km/hr) preventing unnecessary road fatalities of surrounding livestock.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
14. Flora and Fauna – Fire.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-8)	• No open fires shall be allowed on site under any circumstance. The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
15. Avifauna - Disturbance of birds, impact on Red Data and other avifaunal species.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Strict control should be maintained over all activities during construction. It is difficult to mitigate properly for this as some disturbance is inevitable. During construction, if any of the "Focal Species" identified in the avifaunal report (Appendix D) are observed to be roosting and/or breeding in the vicinity, the Endangered Wildlife Trust is to be contacted for further instruction.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
16. Avifauna - Destruction or alteration of bird habitat, Impact on Red Data and other species.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Definite (-4) Significance: High (-11)	• Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)
17. Heritage Impact on sites of cultural significance, e.g. graves. Archaeological material, by its very nature, occurs below ground. The applicant and contractors should therefore keep in mind that archaeological sites might be exposed during the construction	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-8)	• If during construction any cultural heritage resources or graves are unearthed, all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
work.		allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	
18. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Where possible, construction waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix X).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
19. Dust Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following possible	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Frequent and effective dust-suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the transport of equipment to the site; preparation of the surface areas which may be required prior to the set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.		this purpose must be used in quantities that will not result in the generation of run-off.	
20. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
21. Social - Land-use The construction of the power line could potentially impact on agricultural activities in the area.	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-9)	• No mitigation proposed - however, the footprint of the proposed pole structure to be used is small (i.e. approximately 1 m x 1 m) and would thus have a localised impact. As agricultural activities can still continue to a large degree below the power line, the impact on the use of land for agricultural purposes is	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		anticipated to be low. •	
22. Social – Loss of land and relocation of households for servitudes and power line construction and maintenance. The red route alternative passes through the Edinburgh settlement.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• Some households might need to be relocated to accommodate the new power line. • Avoid existing settlements whenever possible. • Compensate for relocation and hassle costs[5] appropriately.	Extent: Local (-2) Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-11)
23. Visual Most of the area surrounding the project area has been disturbed and severely impacted by human activity such as overgrazing by livestock, collection of vegetation for various uses, settlements and cultivation: Impact on potential sensitive viewing locations such as rural residences, roads, and protected areas.	Extent: Local (-2) Duration: Short term (-1) Intensity: High (-3) Probability: Definite (-4) Significance: High (-10)	• By taking advantage of natural topographic features, cut and fill slopes can be greatly minimized. • Partial clearing at the limits of construction rather than clearing the entire area – leaving islands of vegetation results in a more natural look. • Use irregular clearing shapes. • Feather/thin the edges of the cleared areas. Feathering edges reduces strong lines of contrast. To create a more natural look along an edge, a good mix of tree/shrub species and sizes should be retained. • Establish limits of disturbance that reflect the minimum area required for construction. • Locate construction staging and administrative areas in less visually sensitive areas. • Colours on smooth structures need	Extent: Local (-2) Duration: Short term (-1) Intensity: Moderate (-2) Probability: Highly probable(-3) Significance: Medium (-8)

[5] Hassle costs include: increase in transportation, educational costs etc. if households need to be relocated.

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		to be two or three shades darker than the background colours to compensate for shadow patterns created by natural textures that make colours appear darker. The colour selection for all structures should be made to achieve the best blending with the surrounding landscape in the winter and summer. • Use earth-tone paints and stains. Colours that blend with or are in harmony with the existing colours of the surrounding earth, rocks and vegetation, are usually more visually pleasing and attract less attention than colours that are chosen to match the colour of the sky. • Galvanized steel on structures should be darkened to prevent glare. Low lustre paints should be used wherever possible to reduce glare. • Select paint finishes with low levels of reflectivity. • Screen the structure from view through the use of natural landforms and vegetation. • Minimize the number of structures and combining different activities in one structure where possible. • Attempt to repeat the form, line, colour and texture of the surrounding landscape to reduce the contrast between the landscape and the	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		proposed infrastructure. • Use natural stone in wall surfaces if possible. • Haul in or haul out excessive earth cut or fill in sensitive viewing areas. • Bend slopes to match existing landforms. • Retain existing rock formations, vegetation, drainage, etc., whenever possible. • Tone down freshly broken rock faces through the use of asphalt emulsions, rock stains, etc. • Protect roots from damage during excavations. • Avoid soil types that will generate strong contrasts with the surrounding landscape when they are disturbed. • Prohibit dumping of excess earth/rock on downhill slopes.	
Indirect Impacts			
1. Flora a) Alien and exotic species encroachment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow the grass to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance of impacts after mitigation
		Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	
2. Social Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	Extent: Local (+2) Duration: Short-term (+1) Intensity: Moderate (+2) Probability: Possible (+2) Significance: Medium (+7)	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	
3. Wetlands: a) The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor stormwater management and /or poor tower and/or access road location. b) Alien vegetation encroachment associated with the above-mentioned disturbances.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Provision of adequate stormwater measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No.43 of 1983).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
Cumulative Impacts			
None.			

Alternative 3 (132 kV power line – Purple Route Alignment): Construction Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Topography and Soils The direct impact on landforms with the establishment of distribution lines and additional Substation components is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
2. Loss of wetland habitat and bed/bank modification Impacts include the loss of wetland habitat and some modification to the bed or banks of freshwater systems.	Extent: Regional (-3) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: Very High (-13)	• A buffer zone of at least 32 m should be adopted for all identified Sand River Seasonal Tributaries and a buffer of at least 50 m should be adopted in the Sephiriri River System as indicated in the Wetland Delineation Report (see Appendix D). No construction vehicles should	Extent: Local (-2) Duration: Long-term (-2) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-7)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		dredge and / or work within these buffers. • Where possible all towers should be relocated to avoid wetlands. • If possible, the undertaking of construction activities near the rivers and associated wetlands should take place during the dry season. • The rehabilitation and re-vegetation of disturbed areas must take place concurrently. Only appropriate indigenous riparian vegetation may be used for rehabilitation and re-vegetation within the study area and wetland buffer areas (preferably indigenous plants represented in the reserve to the north and those existing in the wetland areas). • If clearing of vegetation needs to be undertaken on site and in the wetland buffer, it should be carried-out without significantly altering the condition and health of the associated water feature.	
3. Water Quality Impairment Sedimentation and construction related effluent disturbance.	Extent: Local (-2) Duration: Medium-term (-2) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-7)	• The water quality impacts should be addressed through the EMPr, which is implemented by an on-site Environmental Control Officer. • Run-off from the construction area must be prevented from directly entering wetlands and associated water features (except where the	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		gradient is not feasible). The intensity of stormwater run-off should be reduced where possible through encouraging paving and surfaces that allow for greater infiltration. • Activities that lead to elevated levels of turbidity must be minimised. Bulldozing and the use of other mechanical machinery in the wetland buffer zone should also be prevented as far as possible.	
4. Flow Modification Similar to impacts discussed under loss of wetland habitat and bed/bank modification.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• The hydrological impacts on the wetland are negated if constructing outside of floodlines. • A buffer zone of at least 32 m should be adopted for all identified Sand River Seasonal Tributaries and a buffer of at least 50 m should be adopted in the Sephiriri River System as indicated in the Wetland Delineation Report (see Appendix D).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
5. Loss of wetland biodiversity The loss of wetland biodiversity is expected to occur in localised areas. The natural vegetation around the wetland areas impacted by the development is expected to recover in the mid-term as a result of the small development footprint.	Extent: Local (-2) Duration: Long-term (-3) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-11)	• The rehabilitation and re-vegetation of disturbed areas must take place concurrently. Only appropriate indigenous riparian vegetation may be used for rehabilitation and re-vegetation within the study area and wetland buffer areas (preferably indigenous plants represented in the reserve to the north and those existing in the wetland areas).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• Heavy construction vehicles (where possible) must not be used in proximity to the wetlands. • All alien vegetation should be cleared off the property and landscaping using the neighbouring parks and reserves plant species is encouraged. It is believed that this area will naturally recover from the direct (dust, pollution) and indirect (change in passive infiltration of the vicinity) disturbances. The trimming of bulrush and reeds should be allowed if densities are too high.	
6. Water Resources Pollution of groundwater and surface water resources.	Extent: Regional (-3) Duration: Short-term (-1) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-10)	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
7. Flora and Fauna The vegetation in the purple route alignment displays a more natural species composition (more abundant tree and shrub species) and has been less impacted on than vegetation towards the south and east around the existing villages. Impacts include: Loss of protected tree species.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• Protected tree species or plants shall not be removed unless they are interfering with a structure. • All protected species not to be removed must be clearly marked and such areas fenced off if required. • A permit will be required from the Department of Forestry and the Provincial Nature Conservation for the removal of any protected tree species. • The alignment of towers and the power line should be adjusted to prevent the destruction of any remaining large (>4 m) indigenous or protected tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-10)
8. Flora and Fauna - Loss of faunal habitats.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Definite (-4) Significance:Very High (-13)	• No dumping of any materials in undeveloped open areas and neighbouring properties should be allowed. • Disturbance of vegetation cover as well as rocky outcrops, logs, stumps, termite mounds within sensitive areas should be limited. • All temporary stockpile areas including litter and dumped material and rubble must be removed on completion of construction.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Highly Possible (-3) Significance: High (-10)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
9. Flora and Fauna - Threatened fauna.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• As a precautionary mitigation measure it is recommended that the developer and construction contractor as well as an independent environmental control officer should be made aware of the possible presence of certain threatened animal species (South African Python) prior to the commencement of construction activities. In the event that any of the above-mentioned species are discovered relevant conservation authorities should be informed and activities surrounding the site suspended until further investigations have been conducted. • Access to the powerline servitude must be restricted. Access to the powerline servitude should ideally be fenced off and gated along the main access roads. • Prior to construction and vegetation clearance a suitably qualified Zoologist/Botanist or Ecologist should closely examine the proposed construction areas (tower supports) for the presence of any animal burrows (including spiders and scorpions), rocky outcrops, logs, stumps and other debris and	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		relocate any affected animals to appropriate habitat away from the servitude or tower. • Contract employees must be educated about the value of wild animals and the importance of their conservation. Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed.	
10. Flora and Fauna - Increased human presence.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Highly Probable (-3) Significance: Medium (-9)	• Activities in the surrounding open undeveloped areas (especially open bushveld must be strictly regulated and managed. Movement of workers must be limited to areas under construction and access to the undeveloped areas, especially the surrounding open areas must be strictly regulated ("no-go" areas during construction activities).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)
11. Flora and Fauna - Vegetation clearance.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Definite (-4) Significance: High (-10)	• Only an 8m strip may be cleared flush with the ground to allow vehicular passage during construction. No scalping shall be allowed on any part of the servitude road unless absolutely necessary. • The removal of all economically valuable trees or vegetation shall be negotiated with the Landowner before such vegetation is removed. • Vegetation clearing on tower sites	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Definite (-4) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		must be kept to a minimum. • Big trees with large root systems shall be cut manually and removed, as the use of a bulldozer will cause major damage to the soil when the root systems are removed. Stumps shall be treated with herbicide. • Smaller vegetation can be flattened with a machine, but the blade should be kept above ground level to prevent scalping. • Any vegetation cleared on a tower site shall be removed or flattened and not be pushed to form an embankment around the tower. • No vegetation clearing in the form of de-stumping, scalping or uprooting shall be allowed on river- and stream banks (riparian zone). Vegetation shall only be cut to allow for the passage of the pilot-cables and headboard. • Trees and vegetation not interfering with the statutory clearance to the conductors can be left under the line. • With permission of the landowner, the total servitude under the line and up to 5m outside the outer phases should be cleared. • All remaining Aloes (*Aloe greatheadii*), bulbous plants (geophytes) should be replanted if	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		unearthed during the construction phase of the project. • Disturbance of vegetation must be limited to areas of construction. • Where herbicides are used to clear vegetation, specimen-specific chemicals should be applied to individual plants only. General spraying should be prohibited. The use of herbicides shall only be allowed after a proper investigation into the necessity, the type to be used, the long-term effects and the effectiveness of the agent. The application of herbicides shall be under the direct supervision of a qualified technician. All surplus herbicide shall be disposed of in accordance with the supplier's specifications. • All alien vegetation in the total servitude and densifiers creating a fire hazard shall be cleared and treated with herbicides • All alien invasive plant should be removed from the site to prevent further invasion. • All alien vegetation should be eradicated over a five-year period. • The contractor must have the necessary knowledge to be able to identify protected species as well as species not interfering with the	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		operation of the line due to their height and growth rate. • The contractor must also be able to identify declared weeds and alien species that can be totally eradicated. • The contractor must be in possession of a valid herbicide applicators licence.	
12. Flora and Fauna – Re-vegetation.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Re-seeding shall be done on disturbed areas as directed by the Environmental Control Officer.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-1) Significance: Low (-5)
13. Flora and Fauna – Disturbance to livestock.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Construction activities must be planned carefully so as not to interfere with the calving and lambing season for most animal species. • The Contractor shall under no circumstances interfere with livestock without the Landowner being present. This includes the moving of livestock where they interfere with construction activities. • Should the Contractors workforce obtain any livestock for eating purposes, they must be in possession of a written note from the Landowner.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• Speed limits must be restricted especially on farm roads (30km/hr) preventing unnecessary road fatalities of surrounding livestock.	
14. Flora and Fauna – Fire.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-8)	• No open fires shall be allowed on site under any circumstance. The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
15. Avifauna - Disturbance of birds, impact on Red Data and other avifaunal species.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Strict control should be maintained over all activities during construction. It is difficult to mitigate properly for this as some disturbance is inevitable. During construction, if any of the "Focal Species" identified in the avifaunal report (Appendix D) are observed to be roosting and/or breeding in the vicinity, the Endangered Wildlife Trust is to be contacted for further instruction.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
16. Avifauna - Destruction or alteration of bird habitat, Impact on Red Data and other species.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Definite (-4) Significance: High (-11)	• Strict control should be maintained over all activities during construction, in particular heavy machinery and vehicle movements, and staff. It is difficult to mitigate properly for this as some habitat destruction is inevitable.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)
17. Heritage Impact on sites of cultural significance, e.g. graves. Archaeological material, by its very nature, occurs below	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1) Probability: Improbable (-1)	• If during construction any cultural heritage resources or graves are unearthed, all work has to be stopped until the site has been	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1) Probability: Improbable (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
ground. The applicant and contractors should therefore keep in mind that archaeological sites might be exposed during the construction work.	Significance: Medium (-8)	inspected and mitigated by a cultural heritage practitioner. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	Significance: Medium (-8)
18. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Where possible, construction waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
19. Dust	Extent: Local (-2)	• Frequent and effective dust-	Extent: Local (-2)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following possible sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the transport of equipment to the site; preparation of the surface areas which may be required prior to the set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.	Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.	Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
20. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
21. Social - Land-use The construction of the power line could potentially impact on agricultural activities in the area.	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-9)	• No mitigation proposed - however, the footprint of the proposed pole structure to be used is small (i.e. approximately 1 m x 1 m) and would thus have a localised impact. As	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		agricultural activities can still continue to a large degree below the power line, the impact on the use of land for agricultural purposes is anticipated to be low.	
22. Social – Loss of land and relocation of households for servitudes and power line construction and maintenance. The red route alternative passes through the Ludlow settlement.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• Some households might need to be relocated to accommodate the new power line. • Avoid existing settlements whenever possible. • Compensate for relocation and hassle costs[6] appropriately.	Extent: Local (-2) Duration: Permanent (-4) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-11)
23. Visual Most of the area surrounding the project area has been disturbed and severely impacted by human activity such as overgrazing by livestock, collection of vegetation for various uses, settlements and cultivation: Impact on potential sensitive viewing locations such as rural residences, roads, and protected areas.	Extent: Local (-2) Duration: Short term (-1) Intensity: Low (-1) Probability: Highly Probable (-3) Significance: Medium (-7)	• By taking advantage of natural topographic features, cut and fill slopes can be greatly minimized. • Partial clearing at the limits of construction rather than clearing the entire area – leaving islands of vegetation results in a more natural look. • Use irregular clearing shapes. • Feather/thin the edges of the cleared areas. Feathering edges reduces strong lines of contrast. To create a more natural look along an edge, a good mix of tree/shrub species and sizes should be retained. • Establish limits of disturbance that reflect the minimum area required	Extent: Local (-2) Duration: Short term (-1) Intensity: Low (-1) Probability: Possible(-2) Significance: Low (-6)

[6] Hassle costs include: increase in transportation, educational costs etc. if households need to be relocated.

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		for construction. • Locate construction staging and administrative areas in less visually sensitive areas. • Colours on smooth structures need to be two or three shades darker than the background colours to compensate for shadow patterns created by natural textures that make colours appear darker. The colour selection for all structures should be made to achieve the best blending with the surrounding landscape in the winter and summer. • Use earth-tone paints and stains. Colours that blend with or are in harmony with the existing colours of the surrounding earth, rocks and vegetation, are usually more visually pleasing and attract less attention than colours that are chosen to match the colour of the sky. • Galvanized steel on structures should be darkened to prevent glare. Low lustre paints should be used wherever possible to reduce glare. • Select paint finishes with low levels of reflectivity. • Screen the structure from view through the use of natural landforms and vegetation.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• Minimize the number of structures and combining different activities in one structure where possible. • Attempt to repeat the form, line, colour and texture of the surrounding landscape to reduce the contrast between the landscape and the proposed infrastructure. • Use natural stone in wall surfaces if possible. • Haul in or haul out excessive earth cut or fill in sensitive viewing areas. • Bend slopes to match existing landforms. • Retain existing rock formations, vegetation, drainage, etc., whenever possible. • Tone down freshly broken rock faces through the use of asphalt emulsions, rock stains, etc. • Protect roots from damage during excavations. • Avoid soil types that will generate strong contrasts with the surrounding landscape when they are disturbed. • Prohibit dumping of excess earth/rock on downhill slopes.	
Indirect Impacts			
1. Flora a) Alien and exotic species encroachment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2)	• Exotic weeds and invaders that might establish on the re-vegetated areas should be controlled to allow	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
	Probability: Highly Probable (-3) Significance: Medium (-8)	the grass to properly establish. • Monitoring the potential spread of declared weeds and invasive alien vegetation to neighbouring land and protecting the agricultural resources and soil conservation works are regulated by the Conservation of Agricultural Resources Act, No. 43 of 1983 and should be addressed on a continual basis.	Probability: Possible (-2) Significance: Low (-6)
2. Social Limited opportunities do, however, exist for manual labour for unskilled tasks, where the appointed contractor would be required to make use of local workers (e.g. for bush clearing and the digging of foundations).	Extent: Local (+2) Duration: Short-term (+1) Intensity: Moderate (+2) Probability: Possible (+2) Significance: Medium (+7)	• In order to minimise the potential for influx of workers, however, it is recommended that local labour be utilised as far as possible.	
3. Wetlands: a) The erosion and/or sedimentation of the wetland downslope of the tower location and the access roads during the construction phase as a result of poor stormwater management and /or poor tower and/or access road location. b) Alien vegetation encroachment associated with the above-mentioned disturbances.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Provision of adequate stormwater measures and controls during construction. • The establishment and re-growth of alien vegetation must be controlled after the removal of grass. All declared aliens must be identified and managed in accordance with the Conservation of Agricultural Resources Act, 1983 (Act No.43 of 1983).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
Cumulative Impacts			
None.			

Summary of Impacts and Average Points allocated to each distribution Line Alternative during the Construction Phase

IMPACTS	Alternative 1 - Green Route: Without Mitigation	Alternative 1 - Green Route: With Mitigation	Alternative 2 - Red Route: Without Mitigation	Alternative 2 - Red Route: With Mitigation	Alternative 3- Purple Route: With Mitigation	Alternative 3 - Purple Route: Without Mitigation
DIRECT						
Topography and Soils	-8	-5	-8	-5	-8	-5
Loss of wetland habitat and bed / bank modification	-12	-7	-13	-7	-13	-7
Water quality impairment	-7	-6	-7	-6	-7	-6
Flow modification	-8	-7	-9	-7	-9	-7
Loss of wetland biodiversity	-10	-8	-11	-8	-11	-8
Water resources: Pollution of groundwater and surface water resources	-10	-6	-10	-6	-10	-6
Flora and Fauna: Loss of protected tree species	-12	-9	-12	-9	-12	-10
Flora and Fauna: Loss of faunal habitats	-13	-9	-13	-9	-13	-10
Flora and Fauna: Threatened fauna	-9	-8	-9	-8	-9	-8
Flora and Fauna: Increased human presence	-8	-6	-8	-6	-9	-7
Flora and Fauna: Vegetation clearance	-9	-8	-9	-8	-10	-8
Flora and Fauna: Re-vegetation	-7	-5	-7	-5	-7	-5
Flora and Fauna: Disturbance to livestock	-7	-6	-7	-6	-7	-6

IMPACTS	Alternative 1 - Green Route: Without Mitigation	Alternative 1 - Green Route: With Mitigation	Alternative 2 - Red Route: Without Mitigation	Alternative 2 - Red Route: With Mitigation	Alternative 3- Purple Route: With Mitigation	Alternative 3 - Purple Route: Without Mitigation
Flora and Fauna: Fire	-8	-6	-8	-6	-8	-6
Avifauna: Disturbance of birds, impact on Red Data and other avifaunal species	-7	-6	-7	-6	-7	-6
Avifauna: Destruction or alteration of bird habitat, impact on Red Data and other species	-11	-9	-11	-9	-11	-9
Heritage	-8	-8	-8	-8	-8	-8
Waste	-8	-5	-8	-5	-8	-5
Dust	-8	-5	-8	-5	-8	-5
Noise	-8	-5	-8	-5	-8	-5
Social: Land-use	-11	-	-9	-	-9	-
Social: Loss of land and relocation of households	-10	-10	-12	-11	-12	-11
Visual	-10	-8	-10	-8	-7	-6
Average Total	-9.09	-6.91	-9.22	-6.95	9.17	-7.00
			INDIRECT			
Flora: Alien and exotic species encroachment	-8	-6	-8	-6	-8	-6
Wetlands	-8	-6	-8	-6	-8	-6
Social	+7*	-	+7*	-	+7*	-
Average Total	-8.00	-6.00	-8.00	-6.00	-8.00	-6.00
			CUMULATIVE			
None.						

*Not included as part of calculation.

Alternative 1: Tsakani Substation - Construction phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Topography and Soils The direct impact on landforms with the establishment of distribution lines and additional Substation components is mainly one of disruption of surface soils. Potential erosion impacts are anticipated to be limited to the construction phase during site clearing activities.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated immediately to prevent soil erosion. • Limit construction, maintenance and inspection activities to dry periods in order to curb occurrence/ augmentation of erosion in areas of existing erosion. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • Remove and store topsoil separately in areas where excavation/degradation takes place. Topsoil should be used for rehabilitation purposes in order to facilitate re-growth of species that occur naturally in the area.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
2. Wetlands and Surface Water Bodies This proposed Substation site is located immediately to the west of the perennial Khokhovela River. A non-perennial drainage line occurs to the south of the site.	Extent: Local (-2) Duration: Permanent (-4) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-12)	• The Substation and towers should be located outside the riparian areas of the Khokhovela River and the non-perennial drainage line. A 32 m buffer zone from the outer edge of the riparian zone must be maintained (Refer to the Wetland Delineation Report – Appendix D).	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
3. Water Resources Pollution of groundwater and surface water resources	Extent: Regional (-3) Duration: Short-term (-1) Intensity: High (-3) Probability: Highly Probable (-3) Significance: High (-10)	• Waste water should be directed into the proper systems. • Sewage water should not be channelled through surface water bodies or be allowed to flow freely or stagnate on the soil surface. • Adequate sanitary facilities and ablutions must be provided for construction workers. • Use and or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
4. Flora The proposed Tsakani Substation site is dominated by degraded, transformed bushveld and the forb layer is overgrazed. The proposed Substation site is adjacent to fallow agricultural lands and livestock enclosures. Construction and operational activities are not expected to result in significant impacts on the floristic environment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)	• No mitigation proposed.	
5. Heritage Impact on sites of cultural significance, e.g. graves.	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1)	• If during construction any cultural heritage resources or graves are unearthed, all work has to be	Extent: Local (-2) Duration: Permanent (-4) Intensity: Low (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Archaeological material, by its very nature, occurs below ground. The applicant and contractors should therefore keep in mind that archaeological sites might be exposed during the construction work.	Probability: Improbable (-1) Significance: Medium (-8)	stopped until the site has been inspected and mitigated by a cultural heritage practitioner. • Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted. Permits must be obtained from the South African Heritage Resources Agency. • Any mitigation measures applied by an archaeologist, in the sense of excavation and documentation, should be published in order to bring this information into the public domain.	Probability: Improbable (-1) Significance: Medium (-8)
6. Waste Waste generation during the construction phase will have a negative impact on the environment, if not controlled adequately. Waste includes general construction rubble and hazardous waste (used oil, cement and concrete etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Where possible, construction waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
7. Dust Dust emissions will vary from day to day depending on the phase of construction, the level of activity, and the prevailing meteorological conditions. The following possible sources of fugitive dust have been identified as activities which could potentially generate dust during construction operations at the site: vehicle activities associated with the transport of equipment to the site; preparation of the surface areas which may be required prior to the set up of new infrastructure; and the removal of construction equipment from site after the set up of new equipment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Frequent and effective dust-suppression is advised, particularly along dirt roads. Dust must be suppressed on the construction site during dry periods by the regular application of water. Water used for this purpose must be used in quantities that will not result in the generation of run-off.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
8. Noise During the construction phase there is likely to be an increase in noise pollution. The following possible sources of noise could potentially generate noise pollution during construction: construction activities (excavating and site clearing); construction vehicles; and construction staff.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: Medium (-8)	• Surrounding communities and adjacent landowners are to be notified in advance of noisy construction activities. • Provide all equipment with standard silencers. Maintain silencer units on vehicles and equipment in good working order. • Construction staff working in areas where the 8-hour ambient noise levels exceed 85 dBA should wear ear protection equipment.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
9. Visual Most of the area surrounding the project area has been disturbed and	Extent: Local (-2) Duration: Medium term (-1) Intensity: Low (-1)	• By taking advantage of natural topographic features, cut and fill slopes can be greatly minimized.	Extent: Local (-2) Duration: Short term (-1) Intensity: Low (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
severely impacted by human activity such as overgrazing by livestock, collection of vegetation for various uses, settlements and cultivation: Impact on potential sensitive viewing locations such as rural residences, roads, and protected areas.	Probability: Highly probable (-3) Significance: Medium (-7)	• Partial clearing at the limits of construction rather than clearing the entire area – leaving islands of vegetation results in a more natural look. • Use irregular clearing shapes. • Feather/thin the edges of the cleared areas. Feathering edges reduces strong lines of contrast. To create a more natural look along an edge, a good mix of tree/shrub species and sizes should be retained. • Establish limits of disturbance that reflect the minimum area required for construction. • Locate construction staging and administrative areas in less visually sensitive areas. • Colours on smooth structures need to be two or three shades darker than the background colours to compensate for shadow patterns created by natural textures that make colours appear darker. The colour selection for all structures should be made to achieve the best blending with the surrounding landscape in the winter and summer. • Use earth-tone paints and stains. Colours that blend with or are in harmony with the existing colours of the surrounding earth, rocks and vegetation, are usually more visually	Probability: Possible(-2) Significance: Low (-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		pleasing and attract less attention than colours that are chosen to match the colour of the sky. • Galvanized steel on structures should be darkened to prevent glare. Low lustre paints should be used wherever possible to reduce glare. • Select paint finishes with low levels of reflectivity. • Screen the structure from view through the use of natural landforms and vegetation. • Minimize the number of structures and combining different activities in one structure where possible. • Attempt to repeat the form, line, colour and texture of the surrounding landscape to reduce the contrast between the landscape and the proposed infrastructure. • Use natural stone in wall surfaces if possible. • Haul in or haul out excessive earth cut or fill in sensitive viewing areas. • Bend slopes to match existing landforms. • Retain existing rock formations, vegetation, drainage, etc., whenever possible. • Tone down freshly broken rock faces through the use of asphalt emulsions, rock stains, etc.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		• Protect roots from damage during excavations. • Avoid soil types that will generate strong contrasts with the surrounding landscape when they are disturbed. • Prohibit dumping of excess earth/rock on downhill slopes.	
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Alternative 1 (132 kV power line – Green Route Alignment) – Operational Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct impacts			
1. Access Roads Access roads used for maintenance might impact on vegetation and water bodies.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• Use should be made of existing roads as far as possible and proper maintenance/upgrade should be ensured. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • All buffers around wetlands and rivers should be maintained.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
2. Avifauna a) Collisions with overhead power lines. Collisions with the proposed	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2)	• A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
line of certain large flying bird species such Secretary Bird, Kori Bustard, various Stork species, and Southern Ground Hornbill, is a possibility. b) Possible bird electrocution, impact on Red Data and other species.	Probability: Possible (-2) Significance: Medium (-9)	be used for the tower structures. Any deviation should be reported to EWT as it will alter this impact rating.	Probability: Improbable (-1) Significance: Medium (-7)
3. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Where possible, operational waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste material will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
Indirect Impacts			
1. Flora and Fauna Surrounding areas and species present in the direct vicinity of the study area could be affected by indirect impacts resulting from operation activities.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)	• No mitigation proposed.	
2. Socio-economic The proposed new Substation and 132 kV power line will improve	Extent: Local (+2) Duration: Long-term (+3) Intensity: High (+3)	• No mitigation proposed.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
accessibility of electricity in the area. The reliable power source will also encourage new investments, within the area, in turn contributing to an increase in GDP.	Probability: Possible (+2) Significance: High (+10)		
3. Electromagnetic Fields Magnetic fields that naturally emanate from sources such as power lines are directly proportionate to the amount of current flowing through the power lines at any given time. A higher loading condition such as may be present in hot summer months will result in increased magnetic field levels. According to the World Health Organisation (WHO) it has become increasingly unlikely (based on the existing body of research) that exposure to Electromagnetic Fields (EMFs) constitutes a serious health hazard, although some uncertainty remains.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Improbable (-1) Significance: Medium (-8)	• In general, it is not recommended that humans should live under power lines due to the effects of EMF. However, the radiation decreases with an increase in distance from the source. The EMFs are insignificant on the servitude border.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
4. Safety There is the potential risk of electrocution (people and livestock) if access to the site is not controlled.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• Safety and security issues should be addressed as a priority by Eskom. It is recommended that the landowners and affected community members be contacted in advance to ensure that they are forewarned of the construction and maintenance activities planned in the area. In addition, the local community must be educated about the dangers of high voltage electricity.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
5. Visual The power lines could have an impact on potential sensitive viewing locations such as rural residences, roads, and protected areas.	Extent: Local (-2) Duration: Long term (-3) Intensity: Moderate (-2) Probability: Highly Probable (-3) Significance: High (-10)	• Indigenous vegetation should be planted to achieve landscape patterns that emulate in part existing mixes of tree and grass cover in the surrounding landscape. • An internal landscape plan for rehabilitation areas should be prepared. • Exposure of work areas should be as minimal as possible.	Extent: Local (-2) Duration: Long term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)
Cumulative Impacts			
1. Socio-economic	Extent: Regional (+3) Duration: Long term (+3) Intensity: Moderate (+2) Probability: Highly Probable (+3) Significance: High (+11)	• The availability of reliable electricity will stimulate the establishment of economic activities in the area. The proposed power lines and Substation will strengthen the distribution of electricity in the general area.	

Alternative 2 (132 kV power line – Red Route Alignment) – Operational Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Access Roads Access roads used for maintenance might impact on vegetation and water bodies.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• Use should be made of existing roads as far as possible and proper maintenance/upgrade should be ensured. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing,	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		taking care to prevent any impact (particularly erosion) in surrounding habitat. • All buffers around wetlands and rivers should be maintained.	
2. Avifauna a) Collisions with overhead power lines. Collisions with the proposed line of certain large flying bird species such Secretary Bird, Kori Bustard, various Stork species, and Southern Ground Hornbill, is a possibility. b) Possible bird electrocution, impact on Red Data and other species.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)	• A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. Any deviation should be reported to EWT as it will alter this impact rating.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
3. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Where possible, operational waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste material will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
Indirect Impacts			
1. Flora and Fauna	Extent: Local (-2)	• No mitigation proposed.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Surrounding areas and species present in the direct vicinity of the study area could be affected by indirect impacts resulting from operation activities.	Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)		
2. Socio-economic The proposed new Substation and 132 kV power line will improve accessibility of electricity in the area. The reliable power source will also encourage new investments, within the area, in turn contributing to an increase in GDP.	Extent: Local (+2) Duration: Long-term (+3) Intensity: High (+3) Probability: Possible (+2) Significance: High (+10)	• No mitigation proposed.	
3. Electromagnetic Fields Magnetic fields that naturally emanate from sources such as power lines are directly proportionate to the amount of current flowing through the power lines at any given time. A higher loading condition such as may be present in hot summer months will result in increased magnetic field levels. According to the World Health Organisation (WHO) it has become increasingly unlikely (based on the existing body of research) that exposure to Electromagnetic Fields (EMFs) constitutes a serious health hazard, although some uncertainty remains.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Improbable (-1) Significance: Medium (-8)	• In general, it is not recommended that humans should live under power lines due to the effects of EMF. However, the radiation decreases with an increase in distance from the source. The EMFs are insignificant on the servitude border.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
4. Safety There is the potential risk of electrocution (people and livestock)	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2)	• Safety and security issues should be addressed as a priority by Eskom. It is recommended that the landowners	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
if access to the site is not controlled.	Probability: Possible (-2) Significance: Medium (-9)	and affected community members be contacted in advance to ensure that they are forewarned of the construction and maintenance activities planned in the area. In addition, the local community must be educated about the dangers of high voltage electricity.	Probability: Possible (-2) Significance: Medium (-8)
5. Visual The power lines could have an impact on potential sensitive viewing locations such as rural residences, roads, and protected areas.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Highly probable (-3) Significance: High (-10)	• Indigenous vegetation should be planted to achieve landscape patterns that emulate in part existing mixes of tree and grass cover in the surrounding landscape. • An internal landscape plan for rehabilitation areas should be prepared. • Exposure of work areas should be as minimal as possible.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)
Cumulative Impacts			
1. Socio-economic	Extent: Regional (+3) Duration: Long term (+3) Intensity: Moderate (+2) Probability: Highly Probable (+3) Significance: High (+11)	• The availability of reliable electricity will stimulate the establishment of economic activities in the area. The proposed power lines and Substation will strengthen the distribution of electricity in the general area.	

Alternative 3 (132 kV power line – Purple Route Alignment) – Operational Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Access Roads Access roads used for maintenance might impact on vegetation and water bodies.	Extent: Local (-2) Duration: Long-term (-3) Intensity: High (-3) Probability: Possible (-2) Significance: High (-10)	• Use should be made of existing roads as far as possible and proper maintenance/upgrade should be ensured. • No vehicles should be allowed to cross rivers or streams in any area other than an approved crossing, taking care to prevent any impact (particularly erosion) in surrounding habitat. • All buffers around wetlands and rivers should be maintained.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Improbable (-1) Significance: Medium (-8)
2. Avifauna a) Collisions with overhead power lines. Collisions with the proposed line of certain large flying bird species such Secretary Bird, Kori Bustard, various Stork species, and Southern Ground Hornbill, is a possibility. b) Possible bird electrocution, impact on Red Data and other species.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Very High (-4) Probability: Possible (-2) Significance: High (-11)	• Mark the identified sections of line with anti-collision marking devices on the earth wire to increase the visibility of the line and reduce likelihood of collisions as indicated in the Avifaunal Report (see Appendix D). Marking devices should be space 10 m apart. The sections of the line that pose a concern and require marking should be finalised in a site "walkthrough" by EWT once the final route is decided and the towers/pylons are pegged. • A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Improbable (-1) Significance: Medium (-8)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		Any deviation should be reported to EWT as it will alter this impact rating.	
3. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Where possible, operational waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of waste as prescribed in the applicable environmental legislation. • Burning of waste material will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
Indirect Impacts			
1. Flora and Fauna Surrounding areas and species present in the direct vicinity of the study area could be affected by indirect impacts resulting from operation activities.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)	• No mitigation proposed.	
2. Socio-economic The proposed new Substation and 132 kV power line will improve accessibility of electricity in the area. The reliable power source will also encourage new investments, within the area, in turn contributing to an	Extent: Local (+2) Duration: Long-term (+3) Intensity: High (+3) Probability: Possible (+2) Significance: High (+10)	• No mitigation proposed.	

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
increase in GDP.			
3. Electromagnetic Fields Magnetic fields that naturally emanate from sources such as power lines are directly proportionate to the amount of current flowing through the power lines at any given time. A higher loading condition such as may be present in hot summer months will result in increased magnetic field levels. According to the World Health Organisation (WHO) it has become increasingly unlikely (based on the existing body of research) that exposure to Electromagnetic Fields (EMFs) constitutes a serious health hazard, although some uncertainty remains.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Improbable (-1) Significance: Medium (-8)	• In general, it is not recommended that humans should live under power lines due to the effects of EMF. However, the radiation decreases with an increase in distance from the source. The EMFs are insignificant on the servitude border.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Improbable (-1) Significance: Medium (-7)
4. Safety There is the potential risk of electrocution (people and livestock) if access to the site is not controlled.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-9)	• Safety and security issues should be addressed as a priority by Eskom. It is recommended that the landowners and affected community members be contacted in advance to ensure that they are forewarned of the construction and maintenance activities planned in the area. In addition, the local community must be educated about the dangers of high voltage electricity.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)
5. Visual The power lines could have an impact on potential sensitive viewing locations such as rural residences,	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2)	• Indigenous vegetation should be planted to achieve landscape patterns that emulate in part existing mixes of tree and grass cover in the	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
roads, and protected areas.	Significance: Medium (-8)	surrounding landscape. • An internal landscape plan for rehabilitation areas should be prepared. • Exposure of work areas should be as minimal as possible.	Significance: Medium(-8)
Cumulative Impacts			
1. Socio-economic	Extent: Regional (+3) Duration: Long term (+3) Intensity: Moderate (+2) Probability: Highly Probable (+3) Significance: High (+11)	• The availability of reliable electricity will stimulate the establishment of economic activities in the area. The proposed power lines and Substation will strengthen the distribution of electricity in the general area.	

Summary of Impacts and Average Points allocated to each Power Line Alternative during the Operational Phase

IMPACTS	Alternative 1 - Green Route: Without Mitigation	Alternative 1 - Green Route: With Mitigation	Alternative 2 - Red Route: Without Mitigation	Alternative 2 - Red Route: With Mitigation	Alternative 3- Purple Route: With Mitigation	Alternative 3 - Purple Route: Without Mitigation
DIRECT						
Access Roads	-9	-7	-9	-7	-10	-8
Avifauna	-9	-7	-8	-7	-11	-8
Waste	-7	-5	-7	-5	-7	-5
Average Total	-8.33	-6.33	-8.00	-6.33	-9.33	-7.00
INDIRECT						
Flora and Fauna	-8	-	-8	-	-8	-
Electromagnetic Fields	-8	-7	-8	-7	-8	-7
Safety	-9	-8	-9	-8	-9	-8
Visual	-10	-8	-10	-8	-8	-8

Socio-economic	+10*	-	+10*	-	+10*	-
Average Total	-8.75	-7.67	-8.75	-7.67	-8.25	-7.67
CUMULATIVE						
Socio-economic	+11*	-	+11*	-	+11*	-

*Not included as part of the calculation.

Alternative 1: Tsakani Substation - Operation Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the operation phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste (used oil etc.).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Where possible, construction waste on site must be reused or recycled. • Disposal of waste must be in accordance with relevant legislative requirements. • The Contractor must familiarise themselves with the definitions of waste and the handling, storage and transport of it as prescribed in the applicable environmental legislation. • Burning of waste material will not be permitted. • Further detailed mitigation measures are included in the EMPr (Appendix F).	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
2. Visual The Substation could have an impact on potential sensitive viewing locations such as rural residences, roads, and protected areas.	Extent: Local (-2) Duration: Long term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)	• Indigenous vegetation should be planted to achieve landscape patterns that emulate in part existing mixes of tree and grass cover in the surrounding landscape. • An internal landscape plan for rehabilitation areas should be	Extent: Local (-2) Duration: Medium term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low(-6)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		prepared. • Exposure of work areas should be as minimal as possible.	
Indirect Impacts			
1. Fauna and Flora Surrounding areas and species present in the direct vicinity of the study area could be affected by indirect impacts resulting from operation activities.	Extent: Local (-2) Duration: Long-term (-3) Intensity: Low (-1) Probability: Possible (-2) Significance: Medium (-8)	• No mitigation proposed.	
Cumulative Impacts			
1. Socio-economic	Extent: Regional (+3) Duration: Long term (+3) Intensity: Moderate (+2) Probability: Highly Probable (+3) Significance: High (+11)	• The availability of reliable electricity will stimulate the establishment of economic activities in the area. The proposed power lines and Substation will strengthen the distribution of electricity in the general area.	

Alternative 1 (132 kV power line – Green Route Alignment) – Decommissioning and Closure Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
2. Erosion All areas disturbed during construction and operation are to be re-vegetated to avoid erosion.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-8)	• Rehabilitation of areas affected by construction and operation activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All partially constructed areas should be completed and prepared for final rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of mono poles should be landscaped in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Alternative 2 (132 kV power line – Red Route Alignment) – Decommissioning and Closure Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct impacts			
1. Waste Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
2. Erosion All areas disturbed during construction and operation are to be re-vegetated to avoid erosion.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-8)	• Rehabilitation of areas affected by construction and operation activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All partially constructed areas should be completed and prepared for final rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of mono poles should be landscaped in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Alternative 3 (132 kV power line – Purple Route Alignment) – Decommissioning and Closure Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
2. Erosion All areas disturbed during construction and operation are to be re-vegetated to avoid erosion prior to operation.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-8)	• Rehabilitation of areas affected by construction and operation activities should ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All partially constructed areas should be completed and prepared for final	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
		rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of mono poles should be landscaped in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

Summary of Impacts and Average Points allocated to each Power Line Alternative during the Decommissioning and Closure Phase

IMPACTS	Alternative 1 - Green Route: Without Mitigation	Alternative 1 - Green Route: With Mitigation	Alternative 2 - Red Route: Without Mitigation	Alternative 2 - Red Route: With Mitigation	Alternative 3- Purple Route: With Mitigation	Alternative 3 - Purple Route: Without Mitigation
DIRECT						
Waste	-7-	5	-7	-5	-7	-5
Erosion	-8	-5	-8	-5	-8	-5
Average Total	-7.50	-5.00	-7.50	-5.00	-7.50	-5.00

INDIRECT
None.
CUMULATIVE
None.

Alternative 1: Tsakani Substation - Decommissioning and Closure Phase

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
Direct Impacts			
1. Waste Waste generation during the decommissioning phase will have a negative impact on the environment, if not controlled adequately. Waste includes general waste or hazardous waste.	Extent: Local (-2) Duration: Short-term (-1) Intensity: High (-3) Probability: Highly Probable (-3) Significance: Medium (-9)	• Disposal of waste must be in accordance with relevant legislative requirements. • Waste must be disposed off in the appropriate manner at a licensed disposal site.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Possible (-2) Significance: Low (-6)
2. Removal of equipment Equipment not adequately removed from the site after decommissioning will have a negative impact on the environment if not mitigated.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Moderate (-2) Probability: Possible (-2) Significance: Medium (-7)	• All structures comprising of the construction camp are to be removed from site. • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc, and these shall be cleaned up and contaminants disposed of appropriately. • All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and landscaped.	Extent: Local (-2) Duration: Short-term (-1) Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
3. Erosion: All areas disturbed during decommissioning are to be re-	Extent: Local (-2) Duration: Short-term (-1)	• Rehabilitation of areas affected by decommissioning activities should	Extent: Local (-2) Duration: Short-term (-1)

Potential impacts	Significance rating of impacts before mitigation	Proposed mitigation	Significance rating of impacts after mitigation
vegetated to avoid erosion.	Intensity: High (-3) Probability: Possible (-2) Significance: Medium (-8)	ideally commence at the start of the rainy season. • Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction. • All partially constructed areas should be completed and prepared for final rehabilitation and re-vegetation. • All areas where topsoil was removed or placing of monopoles should be landscaped in order to reflect surrounding conditions. • Erosion monitoring and control should be conducted. This should be in the form of inspections subsequent to rains. Topsoil should be replaced in all areas that were eroded. It is critical that adequate topsoil remains in construction areas, implying that topsoil might need to be supplemented in some areas until such time that a layer of vegetation has stabilised the soil.	Intensity: Low (-1) Probability: Improbable (-1) Significance: Low (-5)
Indirect Impacts			
None.			
Cumulative Impacts			
None.			

3. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that summarises the impact that the proposed activity and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account, with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

After taking into account the assessment of potential impacts associated with the 132 kV sub-transmission line alternatives and the proposed Tsakani substation, the summary of average planning and design, construction, operation and decommissioning and closure impacts is presented below with preference indicated according to the key hereunder.

1st Preference
2nd Preference
3rd Preference
No Preference

Without Mitigation (WoM)
With Mitigation (WM)
Please note: The greater the negative rating, the higher the impact.

	Green Route WoM	Green Route WM	Red Route WoM	Red Route WM	Purple Route WoM	Purple Route WM
Planning - Direct	-12.33	-7.33	-12.33	-8.00	-13.00	-8.25
Planning - Indirect	0.00	0.00	0.00	0.00	0.00	0.00
Planning - Cumulative	0.00	0.00	0.00	0.00	0.00	0.00
Construction - Direct	-9.09	-6.91	-9.22	-6.95	-9.17	-7.00
Construction - Indirect	-8.00	-6.00	-8.00	-6.00	-8.00	-6.00
Construction - Cumulative	0.00	0.00	0.00	0.00	0.00	0.00
Operation - Direct	-8.33	-6.33	-8.00	-6.33	-9.33	-7.00
Operation - Indirect	-8.75	-7.67	-8.75	-7.67	-8.25	-7.67
Operation - Cumulative	0.00	0.00	0.00	0.00	0.00	0.00
Decommissioning - Direct	-7.50	-5.00	-7.50	-5.00	-7.50	-5.00
Decommissioning - Indirect	0.00	0.00	0.00	0.00	0.00	0.00
Decommissioning - Cumulative	0.00	0.00	0.00	0.00	0.00	0.00

Alternative 1 (preferred alternative - Green Route)

The aim of the project is to construct a 17 km 132 kV powerline and substation in order to provide sufficient capacity for new clients and improve the reliability of energy supply. Based on the impact identification and proposed mitigation measures, including the proposed rehabilitation measures (EMPr) the EAP is of the view that Alternative 1 (Green Route) be approved. From the impact analysis table shown above, during the planning and design, construction, and operation phases the green route has the lowest rating (with mitigation values).

This alternative will originate near the site of the existing Mbumbu substation and run south traversing a wetland. From here it will continue and join Alternative 2 (Red Route) and thereafter proceed to the north east and terminate just north of the site of the proposed Tsakani substation.

According to the impact identification and assessment, the EAP supports Alternative 1 as it will be located in an area that is mainly degraded and transformed and there are existing power line servitudes, access roads, informal tracks, sand mining activities and livestock pathways with limited habitat diversity.

From a water resource perspective, even though this alternative crosses a number of wetlands and rivers (these include Sephiriri, Mphyanyana, Molapakgomo and Khokhovela rivers), much of the riparian vegetation in the marginal zone has been disturbed through wood harvesting. A wetland buffer zone and development setback should be established, where no construction activities should take place within 32 m of wetlands edges for all identified water features (wetlands and Sand River seasonal tributaries). For the Sephiriri River, a buffer of at least 50 m on each side of the river edge should be adopted as a no-go area.

Furthermore, the avifauna assessment indicates that this alternative is also preferred as it has few remaining natural areas which form habitats for birds

In terms of the heritage impact assessment, no objects of heritage significance / importance have been found along this alignment.

Therefore, the level of disturbance and habitat destruction will be minimal considering the current status of the study area. Construction and decommissioning impacts for this alternative are short-term impacts and can be effectively mitigated by the measures and recommendations contained in the Environmental Management Programme.

Alternative 2 (Red Route)

This alternative will originate from the same point as Alternative 1 (Green Route) and run in between Edinburgh (a settlement) and then towards the south east at which point it connects to Alternative 1 and terminates at the same point as Alternative 1.

Based on the impact identification and proposed mitigation measures, including the proposed rehabilitation measures (EMPr) the EAP is of the view that Alternative 2 (Red Route) is the second most preferred after Alternative 1. From the impact analysis table shown above, during the planning and design, construction, and operation phases the green route has the second lowest rating.

Majority of the vegetation along this alternative has been transformed or degraded with few remaining natural areas. The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula). A permit will be required from the Department of Forestry and the Provincial Nature Conservation for the removal of any protected tree species.

From a water resource perspective, this alternative crosses significant water bodies (these include Sephiriri, Mphyanyana, Molapakgomo and Khokhovela rivers) in which much of the riparian vegetation in the marginal zone has been disturbed through wood harvesting. A wetland buffer zone and development setback should be established, where no construction activities should take place within 32 m of wetlands edges for all identified water features (wetlands and Sand River seasonal tributaries). For the Sephiriri River, a buffer of at least 50 m on each side of the river edge should be adopted as a no-go area.

Furthermore, the avifauna assessment indicates this alternative is the most preferred (by a very small margin – *1 point)* since it traverses large areas of human habitation, as well as over grazed and disturbed lands with few remaining natural areas which form bird habitats.

In terms of the heritage impact assessment, no objects of heritage significance have been found along this alignment.

Construction and decommissioning impacts for this alternative are short term impacts and can be effectively mitigated by the measures and recommendations contained in the Environmental Management Programme.

Alternative 3 (Purple Route)

This alternative will originate from same point as Alternative 1 and run in a north eastern direction terminating at the same point as Alternative 1.

Based on the impact identification and proposed mitigation measures, including the proposed rehabilitation measures (EMPr) the EAP is of the view that Alternative 3 (Purple Route) is the least most preferred alternative. From the impact analysis table shown above, during the planning and design, construction, and operation phases the purple route has the highest rating.

This alternative traverses an area that is largely natural with natural species composition with more abundant large tree and shrub species and with very few disturbed areas. The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula). A permit will be required from the Department of Forestry and the Provincial Nature Conservation for the removal of any protected tree species.

This area has limited access with few tracks, pathways and fenced sections which restrict activities such as wood harvesting, poaching, hunting and sand mining. This alternative if approved will have a greater impact on ecology than the other two alternatives (i.e. Green and Red Routes).

From a water resource perspective, this alternative crosses significant water bodies include Sephiriri,

Mphyanyana, Molapakgomo and Khokhovela rivers.

However, the avifauna assessment indicates that this alternative is the least preferred since it traverses large areas of relatively undisturbed woodland which form bird habitats and as such the following mitigation measures were recommended:

- Mark the identified sections of line with anti-collision marking devices on the earth wire to increase the visibility of the line and reduce likelihood of collisions as indicated in the Avifaunal Report (see Appendix D). Marking devices should be space 10 m apart. The sections of the line that pose a concern and require marking should be finalised in a site "walkthrough" by EWT once the final route is decided and the towers/pylons are pegged.
- A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures. Any deviation should be reported to EWT as it will alter this impact rating.

Construction and decommissioning impacts for this alternative are long term impacts which would require very strict adherence to the measures and recommendations contained in the Environmental Management Programme.

Alternative 1 (Tsakani Substation)

The proposed Tsakani substation will be situated in a low lying valley area within transformed and degraded bushveld habitat adjacent to fallow agricultural lands and livestock enclosures. The Khokhovela River is located immediately to the east of the substation site. The substation must be sufficiently located outside the riparian area with a buffer of 32 m adhered to from the stream edge on each side of the river.

No-go alternative (compulsory)

The *no go option* would be not to construct the 132 kV power line and Tsakani substation. Currently, the existing infrastructure is overloaded with a large number of users / customers per line which results in frequent interruptions and outages. Therefore, the proposed power line and substation will aid in reducing the load on the feeders in the area and at the same time provide reliable energy supply.

SECTION E. RECOMMENDATION OF PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the environmental assessment practitioner)?	YES [redacted]

If "NO", indicate the aspects that should be assessed further as part of a Scoping and EIA process before a decision can be made (list the aspects that require further assessment):

[redacted]

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

- If during construction any cultural heritage resources or graves are unearthed all work has to be stopped until the site has been inspected and mitigated by a cultural heritage practitioner.
- A bird friendly monopole structure should be used to avoid electrocution of large raptors which are abundant in the proposed study area. In addition, thorough line marking is required to avoid bird collision.
- A wetland buffer zone and development setback should be established in the identified wetlands and rivers. For the perennial Sephiriri River in the western side of the proposed development, a buffer of at least 50 m on each side of the river edge should be adopted as a no-go area. For the seasonal Mphyanyana, Molapakgsma and Khokhovela rivers, a buffer of at least 32 m should be adopted.
- The alignment of towers and the power line should be adjusted to prevent the destruction of remaining large (>4 m) indigenous tree species including the two protected tree species (*Pterocarpus angloensis* – Wild teak and *Sclerocarya birrea* – Marula). A permit will be required from the Department of Forestry and the Provincial Nature Conservation for the removal of any protected tree species.
- Remaining indigenous bulbous geophytes and aloes should be retained or replanted as far as possible.
- If the purple route alignment is selected, the identified sections of line should be marked with anti-collision marking devices on the earth wire to increase the visibility of the line and reduce likelihood of collisions as indicated in the Avifaunal Report (see Appendix D). Marking devices should be space 10 m apart. The sections of the line that pose a concern and require marking should be finalised in a site "walkthrough" by EWT once the final route is decided and the towers/pylons are pegged.
-

Is an EMPr attached?	YES [redacted]

The EMPr must be attached as Appendix F.

SECTION F: APPENDIXES

The following appendixes must be attached as appropriate:

Appendix A: Site plan(s) / Locality Map

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Specialist reports (including terms of reference)

Appendix E: Comments and responses report

Appendix F: Environmental Management Programme (EMPr)

Appendix G: Other information