


2018

**DRAFT SCOPING REPORT FOR THE PROPOSED
CONSTRUCTION OF THE ESKOM SHONGWENI 2X500MVA
400/132kV SUBSTATION, APPROXIMATELY 15KM 2X400KV
HECTOR – SHONGWENI POWERLINES AND ASSOCIATED
INFRASTRUCTURES WITHIN THE JURISDICTION OF
ETHEKWINI METROPOLITAN MUNICIPALITY IN KWAZULU-
NATAL PROVINCE**

MAY 2018

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EXECUTIVE SUMMARY

Nsovo Environmental Consulting (hereafter referred to as Nsovo) has been appointed by Eskom Holdings SOC Ltd (hereafter referred to as Eskom) to undertake the Environmental Impact Assessment for the proposed Shongweni substation, powerline and associated infrastructures, collectively referred to as the “Shongweni Project”. The Shongweni project will consist of the following activities and infrastructure:

- Development of a new 2 x 500MVA 400/132kV substation within four proposed sites whereby one location with minimal environmental impacts will be considered; and
- Development of the proposed Shongweni 2x400KV powerline of approximately 15km and associated infrastructure.

The proposed Shongweni project will be carried out in Ward 4 within the jurisdiction of the eThekweni Metropolitan Municipality situated in the KwaZulu-Natal Province. In terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (as amended) (herein referred to as NEMA), as read with the amended EIA Regulations of GN 327, GN R325 and GN R324, the proposed development triggers activities which require the Scoping and the full Environmental Impact Assessment (EIA) process to be undertaken. The descriptions of listed activities which are triggered by the proposed Shongweni project are listed in Table 6. This includes *Activity 9 (i.e. the development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex)*.

This Scoping Report has been prepared in accordance to the requirements of the Regulations and contains the following:

- The details and expertise of the Environmental Assessment Practitioner (EAP) who prepared the report;
- The location of the proposed activities;
- A plan which locates the proposed activities to be undertaken;
- Description of the scope of the proposed project including the listed activities and the associated structures and infrastructures;

- Description of Policy and Legislative content within which the development is located and an explanation of how the development complies with and responds to the legislation and policy context;
- A motivation for the need and desirability of the proposed development;
- A full description of the process followed to reach the proposed preferred activities, site and proposed location of the development footprint within the site;
- A plan of study for undertaking the environmental impact assessment process to be undertaken; and
- An undertaking under oath or affirmation by the Environmental Assessment Practitioner (EAP).

For the proposed Eskom Shongweni substation, three site alternatives were identified which are Shongweni site alternatives E, F and G. One alternative will be considered based on the outcomes of the minimal environmental impacts and the recommendations from the specialist and assessment of the impacts by the EAP. For the 400kV Shongweni powerline, three corridors were identified and assessed which are corridors 1, 2 and 3. Detailed information of all the alternatives considered including lay-out, technology and no-go alternatives are discussed in section 7.1 of this draft scoping report.

The draft Scoping Report (DSR) shall be made available to all potential or registered Interested and Affected Parties (I&APs) as well as Organs of State for a period of at least thirty (30) days to afford them an opportunity to review and comment on the report. All comments received on the DSR shall be included in the Comments and Response Report (C&RR) and incorporated in this Final Scoping Report (FSR) to be submitted together with the Plan of Study for the EIA to the Competent Authority (CA) which is Department of Environmental Affairs in terms of section 24C of National Environmental Management Act (NEMA). DEA will assess the final scoping report within 43 days of the report and advise on the way forward as to whether the project should proceed or continue with the tasks contemplated in the plan for EIA or refuse environmental authorisation.



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DOCUMENT CONTROL

The proposed construction of the Eskom Shongweni 2x500MVA 400/132kV substation, approximately 15km Hectar – Shongweni 2x400kv powerline and associated infrastructures within the jurisdiction of EThekweni Metropolitan Municipality In Kwazulu-Natal Province

Quality Control

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ACRONYMS AND ABBREVIATION

ARC	Agricultural Research Council
CBA	Critical Biodiversity Area
CLN	Customer Load Network
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
EMA	EThekweni Municipality Area
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
HV	High Voltage
IDP	Integrated Development Plan
I&APs	Interested and Affected Parties
km	Kilometers
kV	Kilovolts
MTS	Main Transmission Substation
mm	Millimetre
NEMA	National Environmental Management Act
NFEPA	The National Freshwater Ecosystem Priority Areas
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
Tx	Transmission
WULA	Water Use Licence Application

1. INTRODUCTION OF THE PROPOSED PROJECT

Nsovo Environmental Consulting has been appointed by Eskom Holdings SOC Limited (hereafter referred as Eskom) to undertake the Scoping and Environmental Impact Assessment (EIA) studies in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations of 2014 (as amended in April 2017) for the proposed development of the Eskom Shongweni 2X500MVA 400/132kV substation, an approximately 15km 2x400kV Hector – Shongweni power-lines and associated infrastructures within the jurisdiction of eThekweni Metropolitan Municipality in KwaZulu-Natal Province.

The eThekweni Electricity network forms part of the Pinetown CLN (Customer Load Network) within the KwaZulu-Natal Operating unit (KZN OU). Currently, the eThekweni electricity network has four 275kV Transmission in-feeds from Geogedale, Hector, Ilovo and Avon substations to the substations listed below:

- Avon Substation supplies Ottawa and Durban North Substations;
- Geogedale and Hector Substations supply Klaarwater Substation; and
- Ilovo Substation supplies Durban South and Lotus Park Substations.

Subsequently, the load forecast shows load demand doubling in the geographical area supplied by Ottawa and Durban North Substations in the next 20 years. The area supplied by Klaarwater is expected to grow by 20% and the area supplied by Durban South and Lotus Park Substations is expected to grow by 30% over the same period. Consequently, Eskom has proposed to construct the new 2X500MVA 400/132kV Shongweni Substation and the 2x400kV Hector-Shongweni powerlines in order to cater for future electricity demands.

The fundamental aim of the proposed project is to develop the Shongweni substation, 400kV powerlines and associated infrastructure in order to meet the electricity demands in KwaZulu-Natal. The proposed project will directly and indirectly improve the standard of living for Kwazulu-Natal communities as it will create employment opportunities, generate income and contribute to local economy as well as the country at large.

In summary, the proposed project will consist of the following activities and infrastructure:

- Establishment of the proposed Shongweni 2 x 500MVA 400/132kV substation;
- Development of the proposed 2X400kV powerlines from the existing Hector substation to the proposed Shongweni substation and associated infrastructures.

Three powerline corridors and three substation locations have been proposed wherein one corridor and one substation location will be considered for the proposed project. The study area required for the proposed substation is approximately 800m x 800m (i.e. 340 000m²) in extent, as such; the substation footprint will be anywhere within the study area. The proposed 2 x 400kV single circuit lines will be approximately 15km in length, however, the final distance will be determined by the substation location.

In terms of National Environmental Management Act (NEMA) Section 24C, the Competent Authority for this proposed project is the National Department of Environmental Affairs (DEA) as the applicant is a State Owned Enterprise (SOE). The Environmental Impact Assess (EIA) process will be undertaken in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA) and the EIA Regulations of 2014 as amended (hereafter referred as the Regulations). Other applicable Acts and Legislation will be equally considered.

2. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nsovo Environmental Consulting meets the general requirements for an independent Environmental Assessment Practitioner (EAP) as contemplated in regulation 13 (1) of the EIA Regulations of 2014. Accordingly, Nsovo has been appointed by Eskom as an independent EAP for the proposed project and is thus:

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

Table 1 below provides details of the EAP and relevant experience. A detailed CV and Qualifications are attached as Appendix E.

Table 1: Details of the Environmental Assessment Practitioner (EAP)

Name of Company	Nsovo Environmental Consulting
Person Responsible	Munyadziwa Rikhotso
Professional Registration	South African Council for Natural Scientific Professions (SACNASP)
Postal Address	P/Bag x29 Postnet Suite 697 Gallo Manor 2052
Telephone Number	011 041 3689
Fax Number	086 602 8821
Email	munyadzi@nsovo.co.za
Qualifications and Experience	B.Sc. Honours Environmental Management 13 years of experience
Project Related Expertise	In terms of project related expertise the EAP has completed the following projects: <ul style="list-style-type: none"> • EMPr, WULA and EA amendment for the proposed Juno Gromis 400kV power line • Basic Assessment for the proposed Decommissioning and Demolition of Verwoedberg Substation and 275kV power. • BAR for the proposed Abersethin Substation and loop in and out power lines in Bethlehem. • Basic Assessment for Bloemendal Substation and loop in and out lines. • BAR for the proposed Abersethin Substation and loop in and out power lines in Bethlehem. • EIA, EMP and WULA for Senakangwedi-Senakangwedi B Integration in Limpopo. • EIA for the proposed Tubatse strengthening phase 1 – Senakangwedi B integration within the

	jurisdiction of Greater Tubatse Local Municipality in Limpopo Province.
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3. DESCRIPTION OF LOCALITY AND THE PROPERTY ON WHICH THE ACTIVITY IS TO BE UNDERTAKEN AND LOCATION OF ACTIVITY ON THE PROPERTY

This section provides detailed information of the proposed location of the substation, power-line and associated infrastructure. The primary objective of this section is to provide a detailed description of the environmental aspects found within the proposed study area and its surroundings.

3.1 LOCALITY OF THE PROPOSED PROJECT

3.1.1 PROVINCE OF THE PROPOSED PROJECT

The proposed project is located in KwaZulu-Natal Province which is located South-East of South Africa along the Indian Ocean. The KwaZulu Natal province borders on three other provinces such as:

- Eastern Cape;
- Free State; and
- Mpumalanga provinces.

3.1.2 MUNICIPAL WARD WITHIN THE PROPOSED PROJECT

The proposed project will traverse various farms within Wards 4 and 103 which fall within the jurisdiction of eThekweni Metropolitan Municipality. Figure 1 below and Appendix A show the Locality map which depicts the proposed study area at a scale of 1:50 000. The proposed area is fairly steep with undulating hills which suddenly rise from the surrounding environment and it is currently used for various purposes including farming, residential and other related activities.

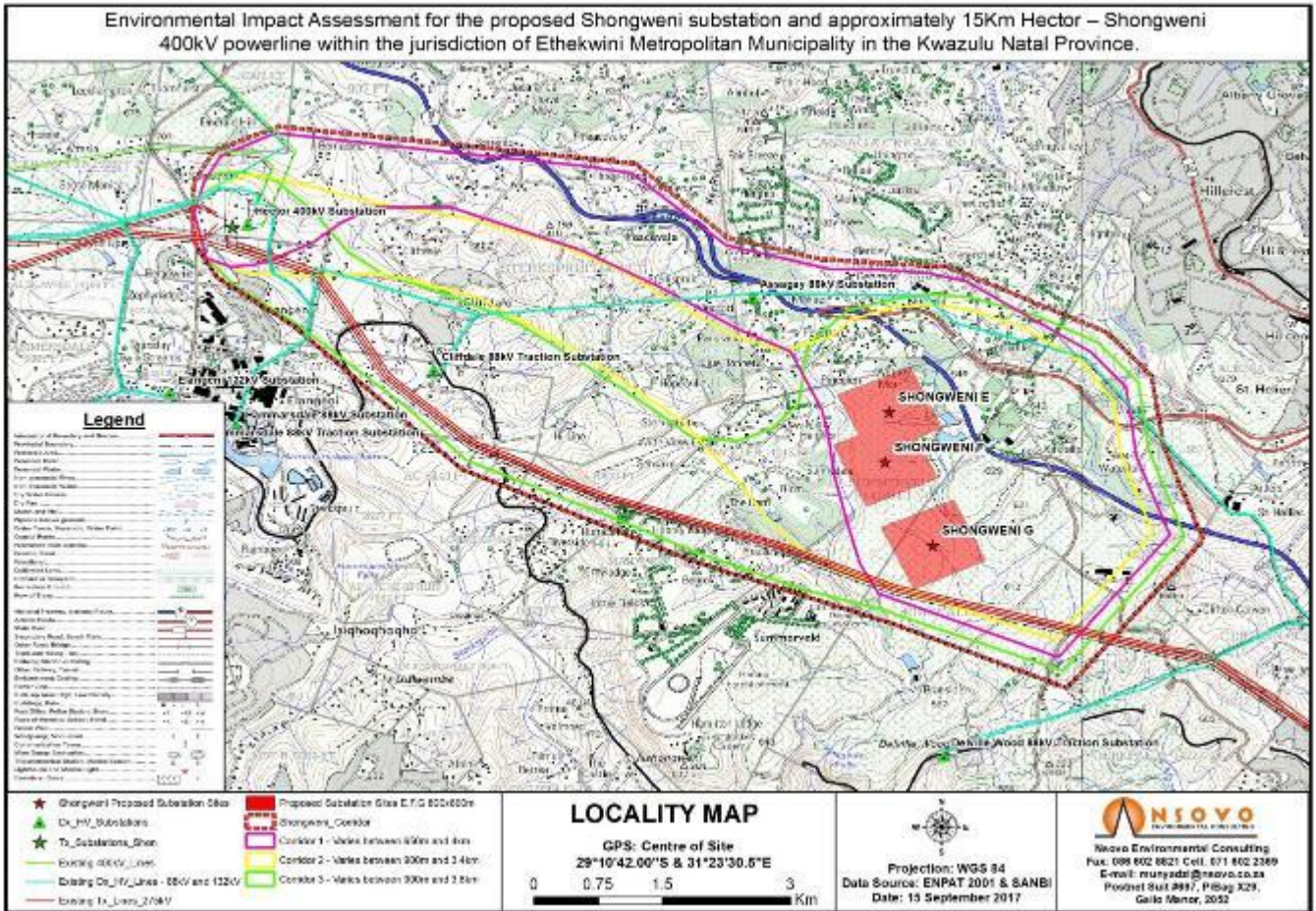


Figure 1: Locality map of the proposed project showing site alternatives and proposed corridors of the proposed power-line

3.1.3 AFFECTED FARMS

The farms affected by the proposed project together with the 21 digit Surveyor General Code are shown in Appendix G.

3.1.4 COORDINATES

Tables 2 and 3 below provide coordinates of the proposed substation sites as well as the powerline corridors.

Table 2: The GPS coordinates of the centre points for the substation alternative sites

Substation Alternative Site	Latitude	Longitude
Alternative E	29°47'54.07"S	30°43'47.01"E
Alternative F	29°48'13.11"S	30°43'45.40"E
Alternative G	29°48'44.77"S	30°44'03.54"E
Existing Hector substation	29°46'43.91"S	30°39'38.62"E

Table 3: The start, middle and end coordinate of the 3 corridors under consideration

Alignment	Start	Middle	End
Corridor 1	29°46'52.67"S	29°47'04.50"S	29°49'28.19"S
	30°39'30.29"E	30°42'52.47"E	30°44'50.50"E
Corridor 2	29°46'37.04"S	29°47'31.47"S	29°48'40.36"S
	30°39'25.27"E	30°42'26.29"E	30°45'26.25"E
Corridor 3	29°46'24.55"S	29°48'11.06"S	29°48'08.09"S
	30°39'29.17"E	30°42'09.17"E	30°45'25.04"E

3.2 SURROUNDING LAND USES

This section provides the surrounding infrastructures and structures as well as the activities that are already taking place within the proposed study area.

3.2.1 FARMING

The majority of the proposed locations within the study area have been transformed by intensive agriculture practices with all three substation site alternatives falling within agricultural land. As shown in Figure 2 below, most of the agricultural land is mainly used for the sugarcane cultivation in the area. Sugarcane farming appears to be the largest contributor, while other farming practises such as horse rearing and subsistence farming are also taking place.

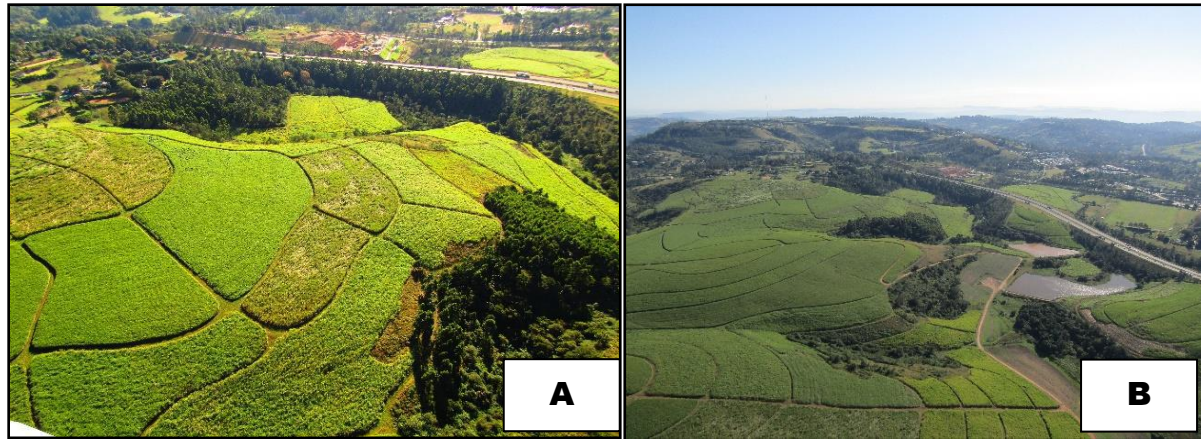


Figure 2: Sugarcane farming within the proposed location of the substation, powerline and associated infrastructures.

3.2.2 RESIDENTIAL

The residential properties located in proximity to the proposed site are both rural and urban households and are shown below in Figures 3A and 3B respectively. Subsistence farming activities is also taking place within low density residential areas as well as within the rural households. The proposed corridor stretches across small towns and villages that are used for residential purposes. Such towns include:

Table 4: List of residential areas along the study area

Municipality	Town/Suburb	Description
City of eThekhwini Metropolitan Municipality	Elangeni	Elangeni is a township where the existing Hector substation is located.
	Cliffdale	The residential settlement is a township next to the existing Hector substation.
	Summerveld	The settlement is suburban located next to the proposed Shongweni substation.



Figure 3: Photograph A showing the semi-urban (Cliffdale) and photograph B showing the urban households (Summerveld) where the proposed project is to be undertaken.

3.2.3 COMMERCIAL AND INDUSTRIAL

The main economic sectors within the Municipality are indicated in Table 5 below as follows:

Table 5: Main economic sectors (Integrated Development Plan (IDP), 2017)

Economic Sectors	Percentage Contribution
Finance	22%
Manufacturing	22%
Community services	18%

Economic Sectors	Percentage Contribution
Trade	16%
Transport	16%
Construction	3%
Electricity	2%

3.2.4 SAND MINING

Several human activities were identified within the proposed project site and this includes sand mining which is causing several environmental problems such as dust pollution, degradation, habitat destruction for the immediate communities



Figure 4: Sand mining taking place on top of the mountain within the proposed location

3.2.5 TOURISM

There is emphasis on ecotourism and cultural heritage tourist activities within the eThekhwini Municipality with major tourism activities taking place in Durban. Studies have shown that Durban Tourism is the leading domestic destination in South Africa with estimated visitor number averaging 9, 95 million per annum. The value of the domestic tourism economic impact on the region's GDP is estimated to be 8% per annum. This industry characterised by fine hotels, nightspots, shopping malls, ethnic attractions, traditional villages, craft markets, sparkling dams, and game parks.

3.3 SURFACE INFRASTRUCTURE

3.3.1 ROAD NETWORK

The proposed study area is located along the N3 and R613. The N3 is a national route in South Africa that connects Johannesburg and Durban, which are South Africa's largest and third-largest cities respectively. Durban is South Africa's key port and one of the busiest ports in the Southern Hemisphere and is also a holiday destination. Durban is the port through which Johannesburg imports and exports most of its goods. As a result, the N3 is a very busy highway and has a high volume of traffic.

3.3.2 POWER LINES AND ASSOCIATED INFRASTRUCTURE

There are several other existing power lines and substations located in the proposed area. The existing substations include the Hector 400/275Kv substation; further there are other Transmission and distribution substations, traction stations as well as powerlines of varying capacity and length.

Other infrastructure would include the existing road networks which currently form the primary access to the proposed sites.

4. DESCRIPTION OF THE SCOPE PROPOSED ACTIVITIES

This section provides the description of the proposed activities which include the scope of the proposed project with specific focus on the listed activities which triggers the EIA process. As indicated in Appendix 2 of the amended EIA Regulation under section 1 (d) (ii), activities to be undertaken including the associated structures and infrastructure for the proposed project are detailed below.

4.1 BACKGROUND AND THE PROPOSED SCOPE OF WORK

The eThekweni Electricity forms part of the Pinetown CLN within the KwaZulu Natal Operating Unit. Currently, the eThekweni Electricity network has four 275kV Transmission in-feeds from the Eskom Transmission network including Georgedale, Hector, Illovo and Avon Substations as discussed above. The load forecast shows load demand to be doubling in these geographical areas. Consequently, Eskom

proposes the development of the Shongweni Substation and associated Hector Shongweni powerline in order to cater for future electricity demands.

The proposed scope of work entails the following developments and associated infrastructure:

- The proposed construction and operation of Shongweni 2 x 500MVA 400/132kV substation within three proposed sites whereby one site with minimal environmental impacts will be considered;
- The proposed construction of approximately 15km, 2x 400Kv Hector-Shongweni powerlines; and
- The requisite infrastructure to allow for proper integration into the existing network.

Three (3) approximately 4km corridors are proposed for the Hector Shongweni powerline which will require 55m servitude each and the powerlines will be 3.5m apart.

4.2 ACTIVITIES ASSOCIATED WITH THE PROJECT

This section describes the structures, activities and infrastructures to be undertaken as part of the proposed project. The description is for activities that will take place during the pre-construction, construction and rehabilitation phases. It is anticipated that the construction phase of the proposed project will take approximately 3 years and the activities will entail the following:

4.2.1 CORRIDOR WALK-DOWN

Prior to commencement of construction phase, a corridor walk down survey will be undertaken with ecological and heritage specialists who will identify sensitive flora species and heritage artefacts within the corridor as to inform the compilation of the final construction EMP. The main aim of the corridor walk-down will be to ensure that sensitive areas are identified, avoided and buffers are created for conservation purposes.

4.2.2 ACCESS ROADS

Primary access to the proposed sites will be through the N3 and/or R613 while secondary access will be through the public roads as well as the private farm roads negotiated with land owners. However, where there is no access, roads may need to be established. Therefore the establishment phase will entail the

development of roads wider than 4 metres with a reserve less than 13, 5 metres. The access roads will be compliant with minimum Type 6 or 7A/B gravel road; which comprises of approximately 6 meter wide raised gravel extended with meadow drainage in flat terrain, with additional meters to cater for the 'V' type drainage in rolling terrain. Where necessary, suitable erosion control measures such as the construction of gabions and culverts to control storm-water will be implemented. Temporary access roads will be constructed for the construction phase (6m wide gravel road) and permanent access road (7m wide gravel) for the operation phase.

4.2.3 VEGETATION CLEARANCE

Fifty five meter (55m) servitude is required for each of the proposed 400kV power line; as such, a total of 110m servitude will need to be cleared for construction purposes. Clearance will be in accordance with requirements of the Environmental Management Programme (EMPr) as well as Eskom's policies and guidelines with regard to clearance of vegetation.

4.2.4 CONSTRUCTION OF SUBSTATION AND ERECTION OF PYLONS

The civil works comprises of the setting out and construction of the concrete plinth to support the electrical infrastructure that will be installed. The civil works will include the establishment of foundations for the Shongweni substation and for installation of pylons.

4.2.5 STEELWORKS STRUCTURES

Various types of pylons are under consideration and the final selection will depend on the terrain and the possible visual aspects of the selected pylon will be taken into consideration. Pylons are usually transported in segments and assembled on site; which is likely be the case for the proposed project. Anti-vandalism bolts will be installed up to the antic limb.

4.2.6 STRINGING

Following erection of pylons, electrical conductors will be threaded between pylons and bird guards to be installed as per recommendation of the Avifauna specialists.

4.2.7 FEEDER BAYS

Feeder bays will be erected within the existing Hector substation and proposed Shongweni substation near Elangeni and Pinetown respectively.

4.2.8 TELECOMMUNICATION MAST

The proposed development will also include the installation of a telecommunication lattice mast at the Shongweni substation that will be used for communication purposes.

4.2.9 COMPLETION OF CONSTRUCTION WORK

Once construction work is complete, the site will be rehabilitated as per the specifications of the EMPr and approved Method Statements. The rehabilitation activities will include:

- Removal of excess building material and waste;
- Repairing any damage caused by construction activities;
- Rehabilitating the area affected by temporary access roads;
- Reinstating existing roads; and
- Replacing topsoil and planting indigenous vegetation where necessary.

4.3 LISTED ACTIVITIES APPLICABLE TO THE PROJECT

The Listed Activities applicable to this project are listed in **Table 6** below:

Table 6: Listed Activities described in Government Notice No 983, 984 and R985 applicable to this project (as per numbering in the Government Notice)

Listed activities	Activity/Project description
<p><u>GN R. 984 Item 9:</u></p> <p><i>The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —</i></p> <p><i>(a) temporarily required to allow for maintenance of existing infrastructure;</i></p> <p><i>(b) 2 kilometres or shorter in length;</i></p> <p><i>(c) within an existing transmission line servitude; and</i></p> <p><i>(d) will be removed within 18 months of the commencement of development.</i></p>	<p>The proposed project entails the construction of Eskom Shongweni 2 × 500MVA 400/132kV substation. Further to this, 2x400kV powerlines will be erected outside urban areas.</p>
<p><u>GN R. 984 Item 12:</u></p> <p><i>“The development of—</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</i></p> <p><i>Where such development occurs –</i></p> <p><i>(a) Within a watercourse”.</i></p>	<p>The proposed project entails the construction of Eskom Shongweni 2x500MVA 400/132kV substation with a physical footprint of more than 100 square metres. Further to this, a proposed substation will occur within a watercourse.</p> <p>The proposed 15km 2x400kV powerlines will require 55m servitude each; it is therefore anticipated that some of this pylons may be developed within or in proximity to watercourses.</p>
<p><u>GN R. 327 Item 27:</u></p> <p><i>“The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation”.</i></p>	<p>The proposed project entails the construction of a substation covering an extent of approximately 800 x 800m. A total of 1.5ha of indigenous</p>

Listed activities	Activity/Project description
	vegetation will be cleared.
<p><u>GN R. 324 Item 3</u></p> <p><i>“The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes, where the mast or tower-</i></p> <ul style="list-style-type: none"> <i>a) Is to be placed on as site not previously used for this purpose; and</i> <i>b) Will exceed 15m in height.</i> <p><u><i>d. KwaZulu-Natal</i></u></p> <ul style="list-style-type: none"> <i>vi) a protected area identified in terms of NEMPAA, excluding conservancies;</i> <i>viii) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by competent authority or in bioregional plans”</i> 	<p>The proposed Shongweni substation will require installation of a telecommunication lattice mast of more than 15m that will be used for communication purposes. The mast will be placed on a site that that was not previously used for this purpose in proximity to protected areas.</p>
<p><u>GN R. 324 Item 4:</u></p> <p><i>“The development of a road wider than 4 metres with a reserve less than 13, 5 metres.</i></p> <p><u>d. KwaZulu-Natal</u></p> <ul style="list-style-type: none"> <i>(vi). A protected area identified in terms of NEMPAA</i> <i>(vii). Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans</i> <i>(xii) Outside the urban areas;</i> <i>(aa) Areas within 10 kilometres from the national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core areas of biosphere reserve”.</i> 	<p>The proposed project entails the construction of a substation, powerline and associated infrastructure. Further to this, additional access road wider than 4 metres with less than 13.5 meters will be constructed within a protected areas and CBA outside urban areas. Moreover, the road would be used during both construction and operations of the proposed substation and loop in and loop out power lines.</p>

5. APPLICABLE LEGISLATION AND GUIDELINES

The amended EIA Regulation 1 (e) under Appendix 2 requires description of applicable legislations in the Scoping Report. Therefore, this section list and describe the acts and legislations applicable to the proposed development of the Shongweni Substation, powerline and associated infrastructures. Documented in the subsequent section is a list of the current South African environmental legislation, which is considered to be pertinent to the development and operation of the proposed project. A description of legislation pertaining to the project is summarised in **Table 7** below. The list of legislations that are applicable to the project is not an exhaustive analysis; however, it provides a guideline to the relevant aspects of the Acts.

Table 7: Legislation pertaining to the proposed project

Aspect	Relevant Legislation	Brief Description
Environment	<ul style="list-style-type: none"> <li data-bbox="488 932 760 1226">• National Environmental Management: Act 1998, (Act No. 107 of 1998) as amended. <li data-bbox="488 1528 760 1885">• Environmental Impact Assessment Regulations, December 2014 as amended in April 2017 	<p data-bbox="795 932 1430 1331">The overarching principles of sound environmental responsibility are reflected in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) apply to all listed projects. Construction and operation of activities have to be conducted in line with the generally accepted principles of sustainable development, integrating social, economic and environmental factors.</p> <p data-bbox="795 1362 1430 1885">The Environmental Impact Assessment (EIA) process followed is in compliance with the NEMA and the Environmental Impact Assessment Regulations of December 2014 as amended. The proposed development involves “listed activities”, as defined by NEMA. Listed activities are an activity which may potentially have detrimental impacts on the environment and therefore require Environmental Authorisation (EA) from the relevant Competent Authority, in this case DEA.</p>

Aspect	Relevant Legislation	Brief Description
Biodiversity	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	<p>The purpose of the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.</p> <p>The proposed study area is transformed and considered to have low sensitivity.</p>
Protected Areas	National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)	The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.
Heritage Resources	National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The National Heritage Resources Act, 1999 (Act No. 25 of 1999) legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 ha. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).
Air quality management and control	National Environmental Management: Air Quality Act, 2004(Act	The objective of the Act is to protect the environment by providing reasonable measures for the protection and enhancement of air quality and to prevent air pollution.

Aspect	Relevant Legislation	Brief Description
	39 of 2004)	<p>The Act makes provision for measures to control dust, noise and offensive odours.</p> <p>Section 32 of The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004) deals with dust control measures in respect of dust control. Whilst none are promulgated at present, it provides that the Minister or MEC may prescribe measures for the control of dust in specified places or areas, either in general or by specified machinery or in specified instances, the steps to be taken to prevent nuisance or other measures aimed at the control of dust.</p>
Noise Management and Control	Noise Control Regulations in terms of the Environmental Conservation, 1989 (Act 73 of 1989)	The assessment of impacts relating to noise pollution management and control, where appropriate, must form part of the EMP. Applicable laws regarding noise management and control refer to the National Noise Control Regulations issued in terms of the Environment Conservation, 1989 (Act 73 of 1989).
Water	National Water Act, 1998 (Act 36 of 1998)	<p>This Act provides for fundamental reform of law relating to water resources and use. The preamble to the Act recognises that the ultimate aim of water resource management is to achieve sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users.</p> <p>There are watercourses located around site E, F and</p>

Aspect	Relevant Legislation	Brief Description
		<p>G. An investigation of aerial imagery as well as the fly-over identified a Seep and Channelled Valley Bottom wetland system approximately 50m to the south of the proposed centre point of the substation site E. Further to this, a Seep system is situated approximately 400m to the west of the proposed centre point of the site. It is highly likely that proposed project will traverse or encroach on water resources; therefore the necessary licence will be obtained in due course.</p>
Agricultural Resources	<p>Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)</p>	<p>The Act aims to provide for control over the utilization of natural agricultural resources in order to promote the conservation of the soil, water resources and vegetation and to combat weeds and invader plants. Section 6 of the Act makes provision for control measures to be applied in order to achieve the objectives of the Act.</p> <p>Agriculture has been identified as one of the primary activities within the study area; predominantly sugar cane farming. It is highly likely that the proposed activities will impact the agricultural activities.</p>
Human	<p>The Constitution of South Africa, 1996 (Act No. 108 of 1996)</p>	<p>The Constitution of South Africa, 1996 (Act No. 108 of 1996) provides for an environmental right (contained in the Bill of Rights, Chapter 2). The state is obliged “to respect, protect, promote and fulfil the social, economic and environmental rights of everyone...”</p> <p>The environmental right states that: “Everyone has the right - a) To an environment that is not harmful to their</p>

Aspect	Relevant Legislation	Brief Description
		<p>health or well-being; and</p> <p>b) To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -</p> <ul style="list-style-type: none"> -Prevent pollution and ecological degradation; -Promote conservation; and -Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.”
Waste	National Environmental Management: Waste Act 59 of 2008	<p>This act provide fundamental reform of the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This act also ensures the provision of national norms and standards for regulating the management of waste by all spheres of government. The National Environmental Management: Waste Act provides for specific waste management measures; licensing and control of waste management activities; remediation of contaminated land; compliance and enforcement; and for matters connected therewith.</p>

In preparation of the scoping report, these Acts were not read in isolation, they were read with absolute consideration of municipal policies, plans and by-laws as well as consideration of Eskom policies and world best practices.

6. DESCRIPTION OF THE NEED AND DESIRABILITY OF THE PROPOSED ACTIVITY

This section provides the justification for the need of the proposed project to be undertaken mainly focusing on the benefits and importance of the proposed project to the KwaZulu-Natal communities and the country as a whole. The motivation and the need of the proposed project are discussed as follows:

6.1 MOTIVATION FOR THE DEVELOPMENT

Eskom Transmission's ten years plan indicates that a reliable electricity supply of acceptable quality is essential for the economic development of South Africa. It is also a pre-requisite for socio-economic development, as it paves the way to access to education, improved nutrition and health care, as well as jobs, amongst others. The transmission system plays a vital role in the delivery of a reliable, high quality electricity supply throughout the region and South Africa at large, by delivering electricity in bulk to load centres and end-users. From there, the distribution networks owned by Eskom and Municipalities deliver electricity to end-users. The transmission system needs to be well-maintained to deliver a reliable supply of electricity, and it also needs to be strengthened to meet changing customer needs.

Consequently, the proposed Shongweni substation and the powerline form part of the Network Strengthening which is driven by industries and agriculture (i.e. mainly sugarcane plantation around proposed location) and it forms part of the new infrastructures that Eskom has planned. The main aim being to respond to the demand and ensure reliable electricity supply to their customers (i.e. eThekhwini Electricity). Accordingly the proposed project is a customer application wherein eThekhwini Municipality highlighted the need to strengthen their network

The proposed project will ensure the following:

- That the supply link between the existing Hector substation and the proposed Shongweni substation and powerline supply network is strengthened; and
- Improvements in reliability of electricity supply which will benefit agriculture, tourism, residential and industries in the area; thus improve South Africa's socio-economic status.

6.2 BENEFITS OF THE PROJECT

The proposed project is beneficial as it will allow for load growth in the region. It is envisaged that the proposed project would ensure reliable supply to industry, predominantly the agricultural, tourism, residential and manufacturing industries in the area. This will indirectly benefit communities as reliable

electricity will result in uninterrupted production and therefore growth in industry, which could potentially yield additional jobs. The overarching impact will be positive economic spinoffs, which benefit the community, the region and country at large.

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

- Enables economic and human social development; and
- Encourages small and medium enterprise development, and as a result, contributes to a possible increase in disposable income.

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

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

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

For individuals and communities:

- Electrification of homes (for cooking, heating and lighting of homes which improves the lives of the individuals within the home).

- Encourages small and medium enterprise development, and as a result, contributes to a rise in disposable income.

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

6.2.1 SUPPORTING STRATEGIES

At the **regional level**, the proposed project would contribute to reliability of power supply. There would also be less tangible but nonetheless important benefits of positioning the Municipality ahead in terms of sustainable energy supply. At the **national level**, the proposed project would contribute to implementing South Africa's new energy policy as embodied in the White Paper on Energy (DME, 1998). The priorities to which this project would contribute are laying the groundwork for enhancing power supply and electrification capacity.

7. DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ACTIVITY, SITE AND LOCATION WITHIN THE SITE

The identification of alternatives is an important component of the EIA process. The identified alternatives are assessed in terms of environmental acceptability, technical as well as economic feasibility during the process wherein the preferred alternative is highlighted and presented to the Authorities.

Three alternative substation sites and the no-go alternative are being considered for the proposed Shongweni 2 x 500 MVA 400/132kV substations. Further, three corridors are considered for the proposed 2x400kV single circuit power lines which are planned to connect the proposed Shongweni substation and the existing Hector substation. The length of the powerline corridor will be determined by the location of the substation site. The project has considered technical alternatives (Section 7.1.1) which were found to be economically and environmentally viable compared to the other options. The alternatives are presented as part of this scoping report and will be scrutinised further during the EIA phase.

The selection of project alternatives was primarily based on Eskom's prefeasibility study that technically determined the broad location based on the need. Subsequent site visits were undertaken by the engineering, the designers, environmental and specialist teams. Further a detailed public consultation is being undertaken to assess the viability of the selected alternative sites which resulted in the identification of more sites for consideration to assess the economic need and desirability of the project, the site selection process also focused on reviewing the municipal Integrated Development Plan, Eskom's 10 Year Development Plan and associated documents that address current and future development in and around the area.

The selection of the preferred location will also take into consideration the eThekhwini Electricity's strengthening plan which highlights the requirement of the proposed establishment of the Shongweni 2x 500 MVA 400/132kV substation and the construction of the two 400kV single circuit lines as proposed. Further the plan indicates that the associated scope of work for eThekhwini Municipality entails the following:

- Two 132kV circuits to Hillcrest 132/11kV substation;
- Two 132kV circuits to Stockville 132kV switching station
- Two 132kV circuits to Umngeni 132/33kV substation;
- Two 132kV circuits to Shongweni development; and
- The upgrade of Shongweni-Stockville 132 kV lines.

It is therefore imperative that the selection of the preferred alternatives considers the customers plans to connect; however, it must be noted that the Municipalities distribution lines do not form part of this application. In an effort to ensure that the most suitable site is selected, the eThekhwini Municipality has been involved in the planning phase and they have been identified as a key stakeholder in the project.

7.1 DETAILS OF ALTERNATIVES CONSIDERED

This section describes in detail the alternatives considered for the proposed substation, powerline and associated infrastructures. This includes the technical, structural, site and no-go alternatives which are discussed as follows:

7.1.1 TECHNICAL ALTERNATIVES

7.1.1.1 UNDERGROUND VS ABOVE GROUND

Two technical alternatives have been identified for the proposed project, this include the overhead powerline and underground cabling. Instead of constructing the proposed powerline above ground, underground construction is considered to be an alternative option. The advantages of the underground alternative would include a reduced impact on bird interaction and distinct visual impact benefit. However, for the proposed project the underground powerline alternative would not be the most feasible owing to the undulating nature of the area. This could cause major technical problems and would have major cost implications. Technically, underground cables need to be insulated against the surrounding soil. On low voltage reticulation networks (11kV & 22kV) the heat generated by the cable is low enough for standard insulation to be used; however, on larger power lines (e.g. 400kV as proposed) the method of electrical and heat insulation becomes more burdensome.

Control of electrical losses and heat control are critical for underground cables. As a result, cables are as much as 4 times the diameter and 10 times the weight of equivalent overhead lines. Heat control is also a factor in the laying of the cables. The three phases of low and medium voltage cables (up to 132kV) can be placed in the same trench, while the phases for high voltage cables must be spaced apart, typically in a flat formation.

Bush fires, lightning strikes and bird related faults make up 80% of faults on overhead transmission power lines in South Africa; however, such risks are not associated with underground cables. Further, faulting on underground cable is rare. When faults occur on overhead lines they are usually re-energised by automatically reclosing the circuit-breaker within a few seconds of the fault. More serious faults, such as a damaged line may be easily found and repaired within a few days at most. Underground cables have faults that are almost exclusively permanent, requiring inspection and correction on site. This usually requires excavating a section of the powerline. As a result, finding the location of faults is not easy unless there is clear evidence of excavation damage. Therefore, the search and repair of underground cables can take several weeks. This may severely compromise the network of the operation.

Economically, costs vary and are dependent on terrain, land use and size of line. However, underground cabling is in orders of magnitude greater than overhead power lines. Underground 132kV is 3 to 10 times

more expensive than overhead lines. There is not much expertise for higher voltage underground cabling in the country; as a result such expertise would have to be sourced from the international market.

In terms of maintenance, underground cables are reported to be much more reliable, but outages are more difficult to fix as it is harder to find the faults, and therefore the outages last much longer. The lifespan for underground cables is reported to be much shorter, about half that of overhead power lines.

None of the two alternatives are dismissed, as such; they will be assessed further during the EIA phase.

7.1.1.2 SINGLE CIRCUIT VS. DOUBLE CIRCUIT

Other technical alternatives that were considered include the single circuit and the double circuit wherein the single circuit has been selected as the most feasible from a technical perspective; subsequently structural designs considered and presented hereunder are for single circuit structures.

7.1.2 STRUCTURAL ALTERNATIVES

Several design alternatives have been proposed, and they include one or more of the following single circuit pylons:

- Cross-Rope suspension type;
- Self-supporting type; and
- Guyed V towers.

These are illustrated in Figures 5 to 10 below. It is important to note that the topography will largely dictate the types of towers to be used. From this perspective, it should be noted that where the line crosses undulating terrains and when it changes direction at an angle, there will be a need to use self-supporting towers.

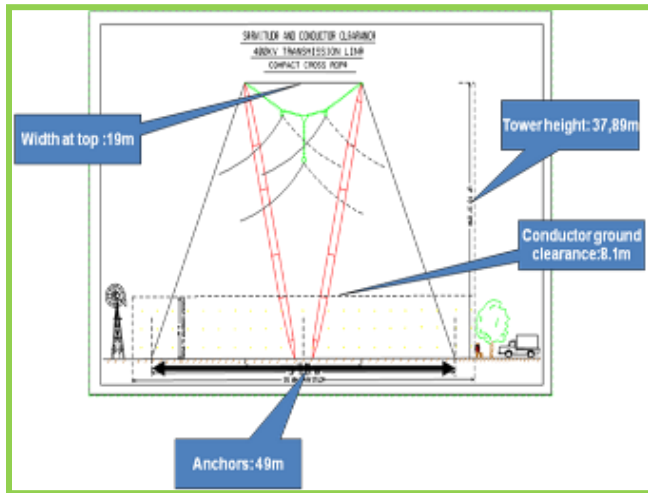


Figure 5: Guide V tower



Figure 6: Photographic Guide V tower

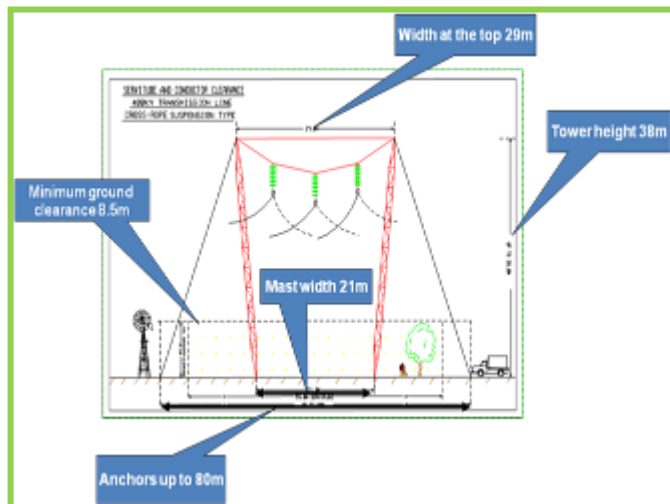


Figure 5: Cross rope suspension tower.

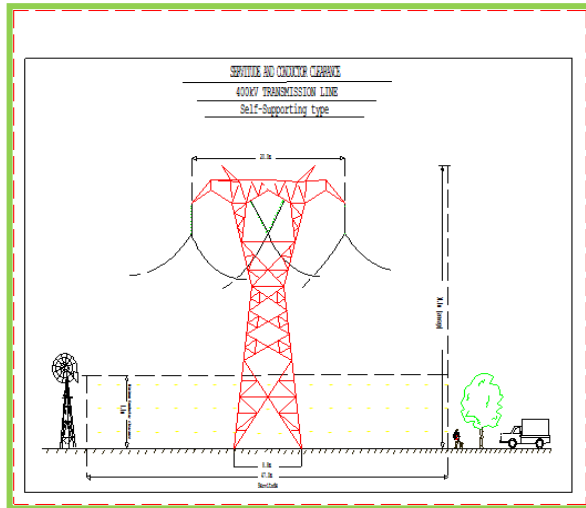


Figure 6: Photographic illustration of a Cross rope suspension tower.



Figure 7: Self-supporting suspension tower.

Figure 8: Photographic Self-supporting suspension tower.

None of the above options have been dismissed and they remain alternatives depending on the terrain and topography. Given the comments received from stakeholders regarding the visual impacts of the proposed project, the selection of the pylons to be used for the proposed powerline will take the potential impacts into consideration.

7.1.3 SITE ALTERNATIVES

This section provides detailed information of the site alternatives considered for the proposed substation. This entails the description of three site alternatives which are discussed hereunder. Three areas are proposed for substation and are referred to as Shongweni E, F and G. The proposed substation alternatives are located south-eastwards from the proposed corridors and are all within the same vicinity; which is characterised by predominantly agriculture, undulating topography, as well as critical endangered ecosystems.

7.1.3.1 SUBSTATION SITE ALTERNATIVE E

Site alternative E is the most northerly substation site of the three and is situated within an area cultivated for sugarcane in close proximity to Winston Park and other residential areas. This substation alternative is closest to the N3 and also close to Wekeweke River as depicted in the figure below.

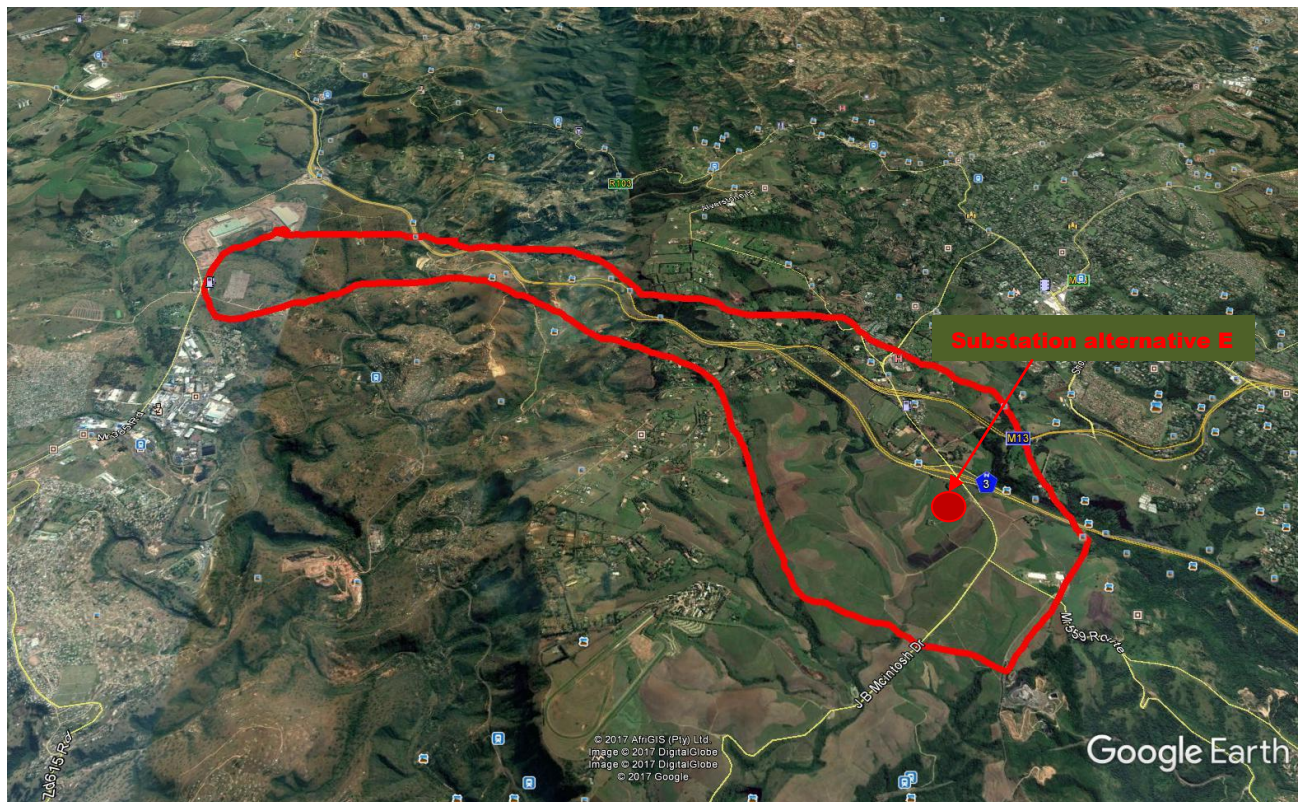


Figure 9: Proposed Alternative site E

Table 8 : Summary of Specialist Findings-Site Alternative E

Specialist	Description
Agricultural Potential	Substation Alternative E occurs within land type Aa11, which has a generally high agricultural potential and fairly level terrain. The site is situated within an area cultivated for sugarcane.
Aquatic ecology	Site E is associated with two quaternary catchments (U60C and U60F). The site is located on the eastern side of the Wekeweke River.
Biodiversity (Fauna & Flora)	Site E is located within the study area which extends over five vegetation types. Two of these five feature more prevalently, namely the Savanna Biome,

Specialist	Description
	<p>comprised of KwaZulu-Natal Sandstone Sourveld and the Grassland biome, comprised of Dry Coast Hinterland Grassland and Moist Coast Hinterland Grassland. The substation site footprint is within transformed habitat and there are no significant features within 200m of the proposed site.</p>
Avifauna	<p>The most sensitive of the micro habitats within the study areas are the rivers, wetlands, waterbodies and woodland vegetation which may provide foraging, roosting and breeding habitat for the waterbird, raptors and passerine species recorded in the area. There are no Important Bird Area's (IBAs) within the immediate study area, further, the closest IBA to the proposed project (SA078 – KwaZulu Natal Mistbelt Grasslands) is located approximately 30km to the west.</p>
Eco-Tourism	<p>Tourism in the study area is highly clustered around Botha's Hills and Shongweni Dam areas and relatively diverse. Tourism directly within the proposed Site E substation is very limited; however, activities in the broader context of the receiving environment have been included.</p>
Wetland	<p>Seepage and Channelled Valley Bottom wetland systems were noted approximately 50m to the south of the proposed centre point of the substation site. Further, a Seep system is situated approximately 400m to the west of the proposed centre point of the site.</p>
Heritage	<p>Site E is located on undulating plains which are significantly transformed by the plantation of sugarcane. Given the nature of the site, ancestral graves may remain undetected underground until such time that construction commences.</p>

7.1.3.2 SUBSTATION SITE ALTERNATIVE F

Similar to Site E, Site F is also located along the N3 and R613 on agricultural land wherein sugar cane is being extensively cultivated, especially on the eastern section. The closest town to this site is Summerveld, which is characterised by medium to high density residential settlements as well as industries.

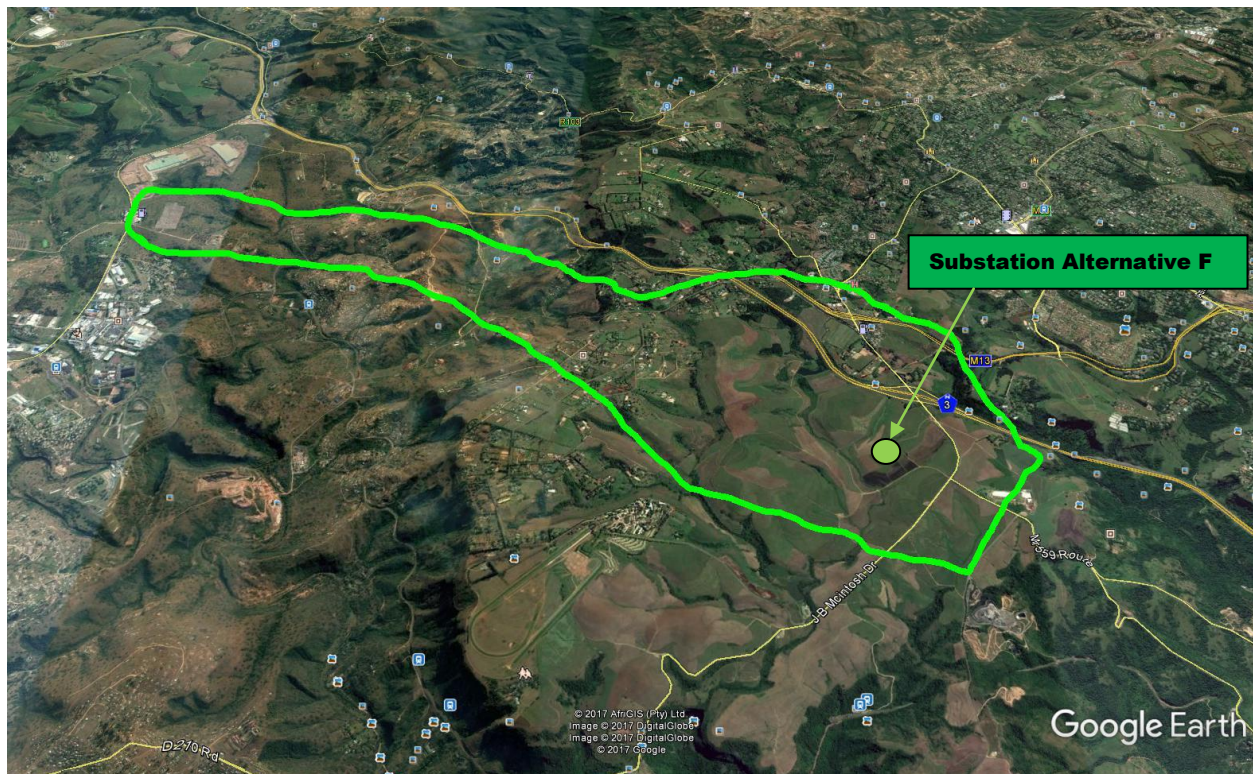


Figure 10: Proposed Alternative Site F

Table 9: Summary of Specialist Findings-Site Alternative F

Specialist	Description
Agricultural Potential	Similar to substation alternative Site E; Site F also occurs within land type Aa11, which has a generally high agricultural potential and level terrain.
Aquatic ecology	Site F will be located on the western side of the identified Wekeweke, thus the proposed power lines will connect into the substation without crossing the River.
Biodiversity (Flora and Fauna)	The biodiversity on Site F is located within the study area which extends over five vegetation types, two of which feature more prevalently, namely the Savanna Biome, comprised of KwaZulu-Natal Sandstone Sourveld and the Grassland biome, comprised of Dry Coast Hinterland Grassland and Moist Coast Hinterland Grassland. Studies highlight that the remaining extent of listed ecosystems layer indicates that there is significant remnant vegetation in the vicinity of substation Alternative F. However, there appear to have been significant changes since the layer was made as the site visit indicated that there was very little intact vegetation in this area apart from a narrow belt

Specialist	Description
	of vegetation along the drainage line that occurs north of the substation site
Avifauna	<p>The most sensitive of the micro habitats within the study areas are the rivers, wetlands, waterbodies and woodland vegetation which may provide foraging, roosting and breeding habitat for the waterbird, raptors and passerine species recorded in the area. There are no Important Bird Area's (IBAs) within the immediate study area, further, the closest IBA to the proposed project (SA078 – KwaZulu Natal Mistbelt Grasslands) is located approximately 30km to the west.</p> <p>In recent years, anthropogenic impacts, mostly in the form of cultivation and urbanisation have largely transformed the landscape resulting in a negative impact on avifaunal diversity and abundance within the study area.</p>
Eco-tourism	Tourism in the study area is highly clustered around Botha's Hills and Shongweni Dam areas and relatively diverse. Similar to Site E, tourism directly within the proposed Site F substation is limited.
Wetland	This site alternative is situated to the south of site alternative E within an area utilised for sugarcane cultivation. A seep and channelled valley bottom wetland systems were noted approximately 80m to the east of the proposed centre point of the site as well as a seep system approximately 500m to the west of the proposed centre point of the site.
Heritage	Site F is neighboring site E and it is located on a fairly steep area which is concentrated with commercial sugarcane farming activities. No obvious sites of heritage significance were noted.

7.1.3.3 SUBSTATION SITE ALTERNATIVE G

This is the southernmost substation alternative as depicted in the figure below and is also situated within an area used for the cultivation of sugarcane. Substation alternative G is located close to the existing 275 kV powerline as well as the moderately modified perennial river (Wekeweke River).

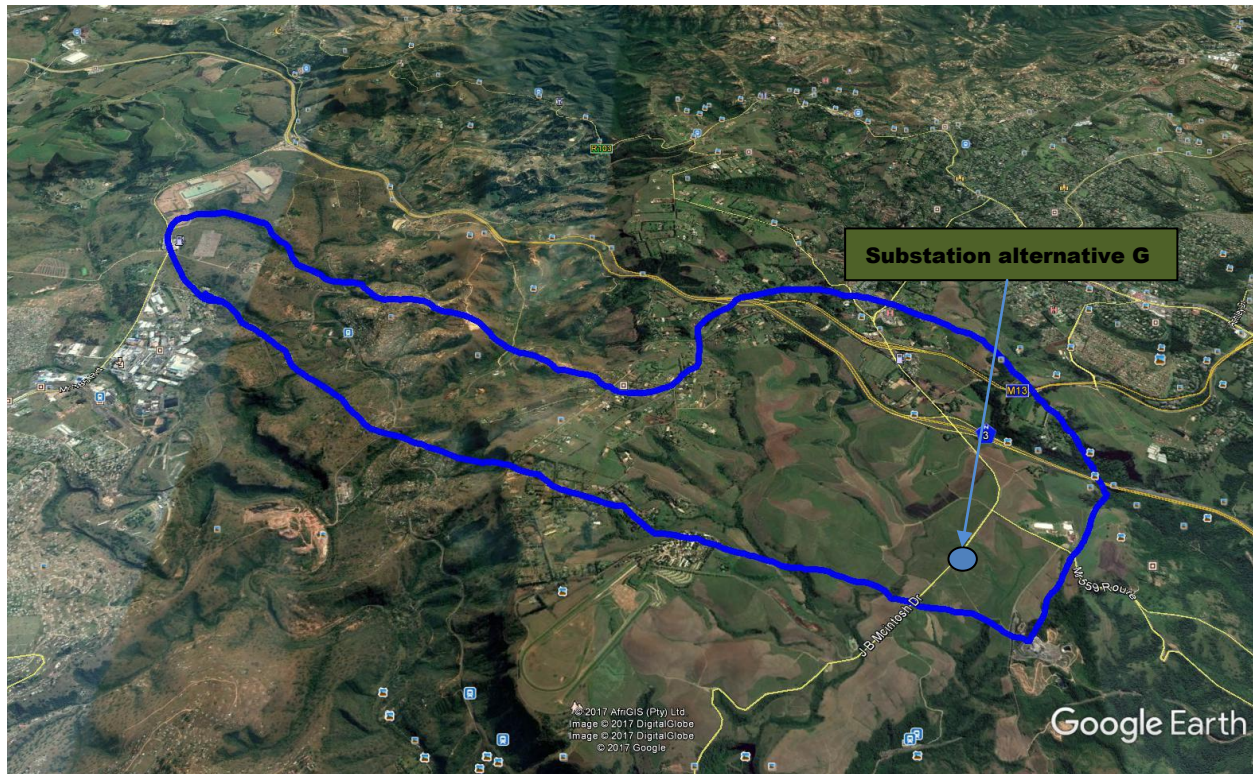


Figure 11: Proposed Alternative Site G

Table 10: Summary of Specialist Findings-Site Alternative G

Specialist	Description
Agricultural potential	The sites are within the same vicinity, therefore similar to substation alternative E and F, the site alternative G also occurs within land type Aa11, which has a generally high agricultural potential and level terrain.
Aquatic ecology	Site G situated directly adjacent to a channelled valley bottom system, with a second channelled valley bottom system identified approximately 500m east of the proposed centre point of the site. This alternative is located within a spring and a direct tributary of the NFEPA River (Wekeweke River).
Biodiversity (flora & fauna)	Similar to Sites E and F, Site G is located within the study area which extends over five vegetation types, two of which feature more prevalently, namely the Savanna Biome, comprised of KwaZulu-Natal Sandstone Sourveld and the Grassland biome, comprised of Dry Coast Hinterland Grassland and Moist Coast Hinterland Grassland. Site G is located within a critically endangered ecosystem; however, the footprint of the site is within

Specialist	Description
	transformed habitat.
Avifauna	<p>The most sensitive of the micro habitats within the study areas are the rivers, wetlands, waterbodies and woodland vegetation which may provide foraging, roosting and breeding habitat for the waterbird, raptors and passerine species recorded in the area. There are no Important Bird Area's (IBAs) within the immediate study area, further, the closest IBA to the proposed project (SA078 – KwaZulu Natal Mistbelt Grasslands) is located approximately 30km to the west.</p> <p>In recent years, anthropogenic impacts, mostly in the form of cultivation and urbanisation have largely transformed the landscape resulting in a negative impact on avifaunal diversity and abundance within the study area. Given the presence of existing habitat degradation and disturbance, it is anticipated that the proposed Shongweni substation can be constructed within the study area with acceptable levels of impact on the resident avifauna.</p>
Ecotourism	Tourism in the study area is highly clustered around Botha's Hills and Shongweni Dam areas and relatively diverse. Similar to Sites E and F, tourism directly within the proposed Site G substation is very limited; however, activity in the broader context of the receiving environment has been included.
Wetland	Site G is a southern most substation alternative and similar to F it is situated within an area used for the cultivation of sugar cane. The centre point of the substation is situated directly adjacent a channelled valley bottom system, with a second one identified approximately 500m east of the site.
Heritage	Site G is located on an area which is transformed by the plantation of sugarcane. No obvious sites of heritage significance were noted.

7.1.3.4 CORRIDOR ALTERNATIVES OF THE PROPOSED POWER-LINES

The proposed project entails the development of approximately 15km, 2 x 400kV single circuit Hector powerlines. The coordinates of the three corridors proposed as well as the total distance of each corridor is presented in the Table below.

Table 11: Corridor coordinates

Corridor	Latitude	Longitude	Approximate length of the corridor
Corridor 1			
Start	29°46'52.67"S	30°39'30.29"E	12km
Middle	29°47'4.50"S	30°42'52.47"E	
End	29°49'28.19"S	30°44'50.50"E	
Corridor 2			
Start	29°46'37.04"S	30°39'25.27"E	10.56km
Middle	29°47'31.47"S	30°42'26.29"E	
End	29°48'40.36"S	30°45'26.25"E	
Corridor 3			
Start	29°46'24.55"S	30°39'29.17"E	11km
Middle	29°48'11.06"S	30°42'9.17"E	
End	29°48'8.09"S	30°45'25.04"E	

7.1.3.4.1. Alternative corridor 1

Alternative Corridor 1 is approximately 4km wide and stretches over a 12km distance. The N3 and R613 intersect this corridor.

The corridor starts at the existing Hector substation near Elangeni towards a south westerly direction toward the proposed Shongweni substations sites and traverses sugar cane farms. The corridor crosses perennial river sensitive zones approximately 4 times. It further, crosses Class C and D of perennial rivers namely the Wekeweke and Mlatukuzana Rivers and passes through the Quaternary catchment boundary on the eastern section of the proposed study area.

There is an existing substation (Assagay 88kV substation) and powerlines (Dx HV 88kV and 132kV powerlines) which pass through the proposed corridor towards southerly direction to the Dellville wood 88kV traction substation.

7.1.3.4.2. Alternative corridor 2

Corridor 2 is approximately 3.4km wide and stretches over a 10.56km distance. It follows the same alignment as Corridor 1 in a more southerly direction and sections of this corridor overlaps Corridor 1.

The corridor follows the existing 275kV Tx powerlines for approximately 3km before it turns to the northerly direction. The corridor traverses Class C and D of perennial rivers (Wekeweke and Mlatukuzana rivers) approximately 4 times on the eastern section of the study area. It also passes through the Quaten catchment boundary on the eastern section of the proposed study area and directly intersects Groovy Balls Adventure as well as sugar cane farms. .

7.1.3.4.3. Alternative corridor 3

Alternative Corridor 3 is the southernmost corridor which varies between 900m to 3.8km in width and stretches over an 11km distance. The corridor starts at the existing Hector substation in Empangeni close to the existing Elangeni 132kV substation as well as Hammarsdale 88kV substation. It continues in a south-easterly direction towards the Tungati area. Within the proposed Corridor 3 there are other existing servitudes which include the 275kV Tx powerline, Cliffdale 88kV Traction substation and Dx Hv 88kV as well as 132kV powerlines which goes to Deville wood 88kV Traction substation in the southerly direction.

The Corridor also crosses Class C and D perennial rivers (Wekeweke and Mlatukuzana) approximately 4 times on the eastern section of the study area. It also traverses sugar cane farms and the N3 as well as the R613 roads are on the eastern section of the study area. .

The table below provides a high level summary of the specialist findings within the proposed corridors for the proposed development.

Table 12: Summary of Specialist Findings Corridors Alternatives

Specialist	Description of the alternatives corridors		
	Corridor 1	Corridor 2	Corridor 3
Agricultural potential	This is the northern most corridor alternative, from an agricultural perspective, it is considered feasible for the proposed development.	Corridor 2 is a northerly route alternative. The agricultural specialist found this corridor to be feasible for the proposed development.	This is the southern corridor alternative, from an agricultural perspective, it is also considered feasible for the proposed development.
Aquatic ecology	All corridors including Corridor 1 are viable from aquatic ecology perspective as long as they proceed in the most direct route to the proposed substation.	The Aquatic Ecology specialist indicated that all the proposed corridors including Corridor 2 are viable as long as they proceed in the most direct route to the proposed substation.	According to Aquatic Ecology specialist, all the proposed corridors including Corridor 3 are viable only if they proceed in the most direct route to the proposed substations.
Avifauna	The specialist highlighted that this corridor has a higher potential of increase the collisions of Red List avifauna with the earth-wire. Furthermore, resulting in a negative direct mortality impacts (i.e. particularly large terrestrial, waterbirds and to a lesser extent raptors). However, given the presence of existing habitat degradation and disturbance, it is anticipated that the proposed Corridor 1 can	This corridor is similar to corridor 1. The specialist highlighted that this corridor has a higher potential of increase the collisions of Red List avifauna with the earth-wire. Furthermore, resulting in a negative direct mortality impacts (i.e. particularly large terrestrial, waterbirds and to a lesser extent raptors). However, it is anticipated that the proposed Corridor 2 can be constructed within the study area with acceptable levels of impact on the resident avifauna subject to recommendations made by	According to the Avifauna specialist, Corridor 3 emerged as the preferred power line corridor from a bird impact assessment perspective. Given the presence of existing habitat degradation and disturbance, it is anticipated that the proposed Hector-Shongweni 275kV powerline can be constructed within the study area with acceptable levels of impact on the resident avifauna.

Specialist	Description of the alternatives corridors		
	Corridor 1	Corridor 2	Corridor 3
	be constructed within the study area with acceptable levels of impact on the resident avifauna subject to recommendations made by the specialist.	the specialist.	
Biodiversity	The Biodiversity specialist indicated that there are several areas of mesic grassland along the route that cannot easily be avoided. This corridor is therefore not the most preferred from a biodiversity perspective.	This route is the most preferred alternative from biodiversity perspective as it has the greatest scope to avoid impact to the sensitive features available. It also has the lowest abundance of habitats of concern.	According to the biodiversity specialist, there are several areas of high sensitivity along the route of corridor 3 that would need to be avoided to make this a viable and favorable corridor alternative from biodiversity perspective.
Eco-tourism	Corridor 1 is expected to have minimal direct impact on existing tourism products. The proposed corridor intersects only one tourism product which is Durban Shongweni. It is, however, worth considering the impact of the powerlines on this product as it serves as a hub for many sporting routes/trails.	Corridor 2 directly intersects Groovy Balls Adventure Park. An existing high voltage powerline already cuts through this product so the direct impact of the proposed powerline is negligible.	Corridor 3 will have impacts on the tourism products as it is closer to the existing Tx 275kV powerlines. However, it will only have direct impacts on the Summerveld Equestrian Center but the overall impact of this corridor will be minor. This is the most preferred corridor route from the ecotourism perspective because it is much closer to existing power lines.
Wetland	Any of the three proposed corridors (i.e. including alternative Corridor 1) can be	According to wetland specialist, any of the three proposed corridors including alternative	From wetland perspective, any of the three proposed corridors including alternative

Specialist	Description of the alternatives corridors		
	Corridor 1	Corridor 2	Corridor 3
	utilized from wetland perspective.	Corridor 2 can be utilized.	Corridor 3 can be utilized.
Heritage	Corridor 1 is significantly transformed and it is dominated by informal settlement which provides residence for migrant workers. No obvious graves were noted on site during the site visit.	Corridor 2 is located on agricultural land wherein sugar cane is extensively cultivated, especially on the eastern section. The western section is dominated by residential land. Similar to Corridor 1, this site is fairly steep and there are well defined access roads that intersect the study area. Furthermore, this site was found to be seriously degraded by previous farming activities, such that no archaeological material could have remained <i>in situ</i> on the affected property.	Corridor 3 has a high percentage of residential settlements and as a result it has high potential for graves as most villagers in the province still conduct their burials at their place of residence. No heritage resources were identified, it is however possible that ancestral graves and burial grounds located in areas of dense vegetation along drainage lines and watercourses can be found.

7.1.3.5 NO-GO ALTERNATIVE

In accordance with GN R.326, consideration must be given to the option not to act. This option is usually considered when the proposed development is envisaged to have significant negative environmental impacts that mitigation measures cannot ameliorate effectively. The no-go alternative would be the option of not undertaking the development of the proposed project. It would imply that the current electricity supply network is not strengthened, industrial development in the area will be hindered and the integration of any potential renewable energy in the area will not be possible. Should the no-go alternative be adopted, the KwaZulu-Natal grid will be deprived of the much needed essential service, particularly given the already existing energy supply challenge countrywide.

8. PUBLIC PARTICIPATION PROCESS

The EIA Regulations, require that during the Scoping and EIA process, the organs of State together with interested and affected persons and the general public be informed of the application for Environmental Authorisation (EA) and also be afforded an opportunity to comment on the application.

Public Participation Process (PPP) is any process that involves the public in problem solving and decision-making and it forms an integral part of the Scoping and EIA process. The PPP provides people who may be interested in or affected by the proposed development, with an opportunity to provide comments and to raise issues or concern, or to make suggestions that may result in enhanced benefits for the project.

Chapter 6, regulation 39 through 44 of the EIA Regulations stipulates the manner in which the PPP should be conducted as well as the minimum requirements for a complaint process. These requirements include but not limited to:

- (a) Fixing a notice board 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;
- (b) Giving written notice to—
 - (i) 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;

- (ii) The owners or persons in control of that land occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;
- (iii) The municipal councillor of the ward in which the site and alternative site is situated and any organisation of rate payers that represent the community in the area;
- (iv) The municipality which has jurisdiction in the area;
- (v) any organ of state having jurisdiction in respect of any aspect of the activity; and
- (vi) any other party as required by the competent authority;

(b) Placing an advertisement in-

- (i) One local Newspaper

The primary purpose of the report is as follows:

- To outline the PPP that was undertaken;
- To synthesise the comments and issues raised by the key stakeholders, interested and affect parties; and
- To ensure that the EIA process fully address the issues and concerns raised, if any.

8.1.1 PUBLIC PARTICIPATION PRINCIPLES

The principle of the Public Participation holds that those who are affected by a decision have the right to be involved in the decision-making process (i.e. the public's contribution will influence the decision). One of the primary objectives of conducting the PPP is to provide interested and affected parties with an opportunity to express their concerns and views on issues relating to the proposed project. The principles of public participation are to ensure that the PPP:

- Communicates the interests of and meet the process needs of all participants.
- Seek to facilitate the involvement of those potentially affected.
- Involves participants in defining how they participate.
- Is as inclusive and transparent as possible, it must be conducted in line with the requirements of regulation 39 - 44 of the April 2017 EIA Regulations.

8.1.2 APPROACH AND METHODOLOGY

The Public Participation approach adopted in this process is in line with the processes contemplated in regulation 39 - 44 of the EIA Regulations of 2014, in terms of the National Environmental Management Act, 1998 (Act 107 of 1998) ("the Act"), which provides that:

8.1.3 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) identified include pre-identified stakeholders (government department), landowners and the general public.

Notification and request for comments were submitted to the following key stakeholders:

- EThekweni Metropolitan Municipality;
- South African Heritage Resource Agency;
- KwaZulu-Natal Department of Transport and Public Works;
- KwaZulu-Natal Department of Water and Sanitation;
- Wildlife and Environmental Society of South Africa;
- KwaZulu-Natal Department Economic Development, Tourism and Environmental Affairs;
- National Department of Environmental Affairs; and
- National Department of Water and Sanitation.

The notifications were sent by registered mail; refer to **Appendix D3**

8.1.4 PUBLIC PARTICIPATION DATABASE

In accordance with the requirements of the EIA Regulations under Section (24) 5 of NEMA, regulation 42 of GN R. 982, a Register of I&APs must be kept by the public participation practitioner. In fulfilment of this requirement, such a register is compiled and details of I&APs including their comments will be updated throughout the project cycle. The database is attached as **Appendix D5**.

8.1.5 SITE NOTICES

A2 size notices were fixed at different conspicuous locations within and around the proposed project study area on 21 – 25 November 2016 and 22 – 24 May 2017, in the EThekweni Metropolitan Municipality, including the Hector substation site as well as at the sites E, F, and G along N3. Photographic evidence of the site notices is attached as **Appendix D1**.

8.1.6 DISTRIBUTION OF NOTICES TO SURROUNDING LAND OWNERS/ OCCUPIERS

Notification letters were posted via registered mail to stakeholders on the 10th December 2016 (Refer to **Appendix D3** for proof of postage), whereas site notices were hand delivered to landowners/occupiers on the 22nd – 25th November 2016. These notifications were informing government stakeholders and the public of the project as well as affording them an opportunity (30 days as per the NEMA Regulations) to register as I&AP and also to comment or raise any issue.

8.1.7 PLACEMENT OF ADVERTISEMENT IN THE LOCAL NEWSPAPER

An advertisement was placed on the Daily News on the 11th November 2016. The advertisement was aimed at further informing I&APs of the proposed activity. A 30 day period was allowed for the public to submit their comments, issues and concerns. Proof of newspaper advertisement is attached as **Appendix D2**.

8.1.8 PLACEMENT OF DRAFT SCOPING REPORT FOR COMMENTS

The availability of the draft scoping report will be advertised in local newspaper/s and copies of the report will also be published on the Nsovo website. Furthermore, copies of the draft Scoping report will be submitted to various departments for review and comments, these include the KwaZulu-Natal Department of Economic Development, Tourism and Environmental Affairs, Department of Water Affairs and eThekweni Metropolitan Municipality.

8.1.9 PUBLIC MEETINGS

Public and focus group meetings will be scheduled accordingly during the EIA phase to address and iron out all issues and comments raised during the scoping phase.

8.2 A SUMMARY OF ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Appendix D4 contains the comments, issues and concerns raised together with the responses provided by the Environmental Assessment Practitioner (EAP).

9. DESCRIPTION OF THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES FOCUSING ON THE GEOGRAPHICAL, PHYSICAL, BIOLOGICAL, SOCIAL, HERITAGE AND CULTURAL ASPECTS

This section outlines the socio-economic and biophysical environment that could be affected by the proposed development. Using the project description, and knowledge of the existing environment, potential interactions between the project and the environment are identified in the next section. The potential effects of the project on the human environment, socio-economic conditions, physical and cultural resources are included. Below is the description of the receiving environment.

9.1.1 SOCIO-ECONOMIC DESCRIPTION

9.1.1.1 PROVINCIAL DESCRIPTION

The proposed project will be undertaken in KwaZulu-Natal province which is located in the south-east of South Africa, along the Indian Ocean. It also borders other provinces including Eastern Cape, Free State and Mpumalanga provinces. It also borders on the following countries: The province stretches from the lush subtropical east coast washed by the warm Indian Ocean, to the sweeping savannah in the east and the majestic Drakensberg Mountain Range in the west.

The KwaZulu-Natal province covers an area of 94 361km² and is the third-smallest in South Africa., It has a population of 11 065 240, making it the second most heavily populated province in the country of South Africa. The capital is Pietermaritzburg while the largest city is Durban. Other major cities and towns include Richards Bay, Port Shepstone, Newcastle, Escort, Ladysmith and Richmond.

The province's manufacturing sector is the largest in terms of contribution to GDP. Richards Bay is the centre of operations for South Africa's aluminium industry. The Richards Bay Coal Terminal is instrumental in securing the country's position as the second-largest exporter of steam coal in the world. The province has undergone rapid industrialisation owing to its abundant water supply and labour resources.

Agriculture is also central to the economy. The sugar cane plantations along the coastal belt are the mainstay of KwaZulu-Natal's agriculture. The coastal belt is also a large producer of subtropical fruit, while the farmers inland concentrate on vegetable, dairy and stock farming. Another source of income is forestry in the areas around Vryheid, Eshowe, Richmond, Harding and Ngome. KwaZulu-Natal is a Metropolitan Municipality (eThekweni Metropolitan Municipality) and comprises of 10 district municipalities as shown in Figure 14 below, which are further subdivided into 43 local Municipalities.

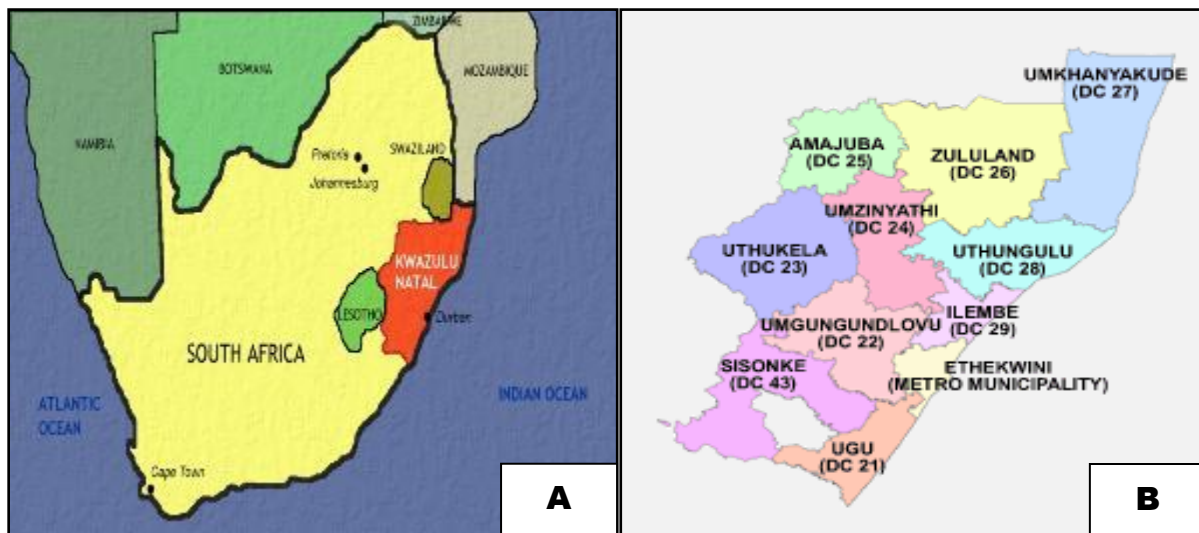


Figure 12: Photograph A showing the province of KwaZulu-Natal within South Africa while Photograph B is showing the EThekweni Metropolitan Municipality with surrounding districts (Source: www.odm.org.za)

The eThekweni Metropolitan Municipality is a sophisticated, cosmopolitan city and is well known as the home of Africa's best-managed, busiest port. The eThekweni consist of ten districts namely; Amabuja, Harry Gwala, iLembe, Ugu, King Cetshwayo, uMgungundlovu, uMkhanyakude, uMzunyathi, uThukela and Zululand districts. However, this Metropolitan Municipality is surrounded by four districts which are: iLembe to the north, the Indian Ocean to the east, Ugu to the south and lastly, Umgungundlovu to the west. The

population of the municipal area is relatively young with 73.6% of the population being younger than 39 years of age while the gender division for the area is 48.87% male and 51.13% female.

9.1.1.2 ETHEKWINI METROPOLITAN MUNICIPALITY

The eThekweni Metropolitan Municipality is a Category “A” municipality situated within the KwaZulu-Natal province in South Africa. Durban (eThekweni) is the largest city of the KwaZulu-Natal province and the third-largest city in the country of South Africa. It is 229 193 ha in extent, bounded by the Tongati River in the north, the aMahlongwa River in the south and the Indian Ocean to the east. The western, landward boundary is narrowest at both the northern and southern limits becoming progressively wider toward the vicinity of Cato Ridge, where it is at its broadest, approximately 50 km inland. This metropolitan municipality has the land area which is comparatively larger than other South African cities. Geographically, the eThekweni Metropolitan Municipality is topographically hilly, with many gorges and ravines and almost no true coastal plain.

According to the 2016 and 2011 census the EThekweni Metropolitan Municipality has a population of 3 702 231 in 1 125 767 households. Of this population, 73.80% are "Black African", 16.66% as "Indian/Asian", and 6.64% as "white", 2.50% as coloured and 0.14%. The first language of 62.82% of the population is isiZulu, while 26.77% speak English and 3.91% speak isiXhosa.

This municipality is a major centre of tourism because of the City's warm, subtropical climate and extensive beaches. EThekweni tourism (i.e. Durban) is the leading domestic destination in South Africa. The estimated visitor number for the financial year 2010/11 is 9, 95 million. The value of the domestic tourism economic impact on the region's GDP is estimated to be 8% per annum. The hospitality industry consists of many fine hotels, nightspots, shopping malls, ethnic attractions, traditional villages, craft markets, sparkling dams, and big-game parks. The main economic sectors are finance (22%) and manufacturing (22%) followed by the community services (18%), trade and transport (16%) while 3% and 2% are for construction and electricity respectively (IDP, 2017).

In summary the socio-economic context associated with eThekweni municipality is discussed as follows:

The eThekweni Municipality is the third largest metropolitan area in South Africa, following Johannesburg and Cape Town, with a population of approximately 3.4 million (Statistics South Africa 2011). Of the major South African cities, Durban has the highest percentage of people subject to conditions associated with poverty. The Gini coefficient for Durban, a metric describing the relative inequality in household income, is

also high relative to the other major cities (eThekweni Municipality 2015). The EMA accounts for 65.5% of the Gross Domestic Product (GDP) of KZN, a disproportionately high figure given that the EMA makes up only 2.5% of the surface area of KZN. Key economic activities driving this include: manufacturing, wholesale and retail trade, transport, storage and communication, financial and business services, and community services (eThekweni Municipality, 2015).



Figure 13: The EThekweni Metropolitan Municipality with surrounding towns (Source: www.odm.org.za)

9.1.2 CLIMATIC CONDITION OF THE PROPOSED AREA

Generally, the climate of the eThekweni Municipality is subtropical with humid warm summers and mild winters. Temperatures are generally warmest at the coast and get progressively cooler as one move inland. Temperature seasonality (i.e. the degree to which average temperatures change between seasons) is

greatest in two regions: in the outer west (largely related to altitude), and at the central and northern coastal region. Rainfall is generally more abundant in the south and at the coast. There is strong seasonality in rainfall in the outer west regions with most of the rain falling in the summer months. The predominant winds blow parallel to the coastline in a north-easterly and south-westerly direction and frost is limited to a few days in inland, high altitude, areas.

The eThekweni area is characterised by a summer rainfall pattern with sporadic rainfall events in the winter months. As shown in Table 10, the mean annual precipitation of the proposed location is approximately 973mm. Frost is infrequent and often occurring in valleys where cold air is trapped. The wettest time of the year is February with an average of 127mm and the driest is July with 26mm). The seasonality of precipitation is a driving factor behind the hydrological cycles of rivers and drainage lines within the area. Typically, rivers and drainage lines have a higher flow rate during the summer months. Temperatures are also relatively high with maximum temperatures ranging from 22.9°C in July to 28.4°C in February. The region is coldest in July with minimum temperatures of 9.8°C on average (Mucina and Rutherford, 2006; climatologically data; BRU Ya13).

Table 13: The annual precipitation of the proposed location

	Annual	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean annual rainfall	973	126	127	114	70	55	33	26	42	68	91	111	110

Table 14: The mean, maximum and minimum temperatures as well as the evaporation of the proposed area

	Annual	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Mean Temp (°C)	20.5	23.9	24.2	23.3	21.2	18.8	16.5	16.3	20.1	19.1	20.1	21.6	23.0
Max Temp (°C)	25.5	28.0	28.4	27.7	26.2	24.7	23.1	23.1	22.9	23.2	24.7	25.9	27.3
Min	15.4	19.8	20.0	18.9	16.2	12.9	9.9	9.8	11.4	15.6	15.6	17.3	18.8

	Annual	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Temp (°C)													
Evap (A Pan mm)	1690	183	160	160	126	108	90	100	120	132	161	165	185
Temp = Temperature, Max = Maximum, Min = Minimum. Evap= Evaporation °C = Degree Celsius													

9.1.3 GEOLOGY OF THE AREA

The geology of the proposed study area is associated with the Karoo Super group (including significant Dwyka tillites and intrusive Karoo dolerites). Dominant rock types of these formations include sandy shales, siltstone and sandstone. Shallow sandy soils are derived from Natal Group Sandstone (Scott-Shaw and Escott, 2011). Common soil forms include Glenrosa, Mispah and Oakleaf soils as well as compact clayey soils of the Katspruit form. Moreover, the area is underlain by varying parent materials, as shown in Figure 16. Most of the southern parts of the corridors are underlain by arenite (sandstone) of the Natal Formation, with small areas of gneiss of the Mapumulo Formation.

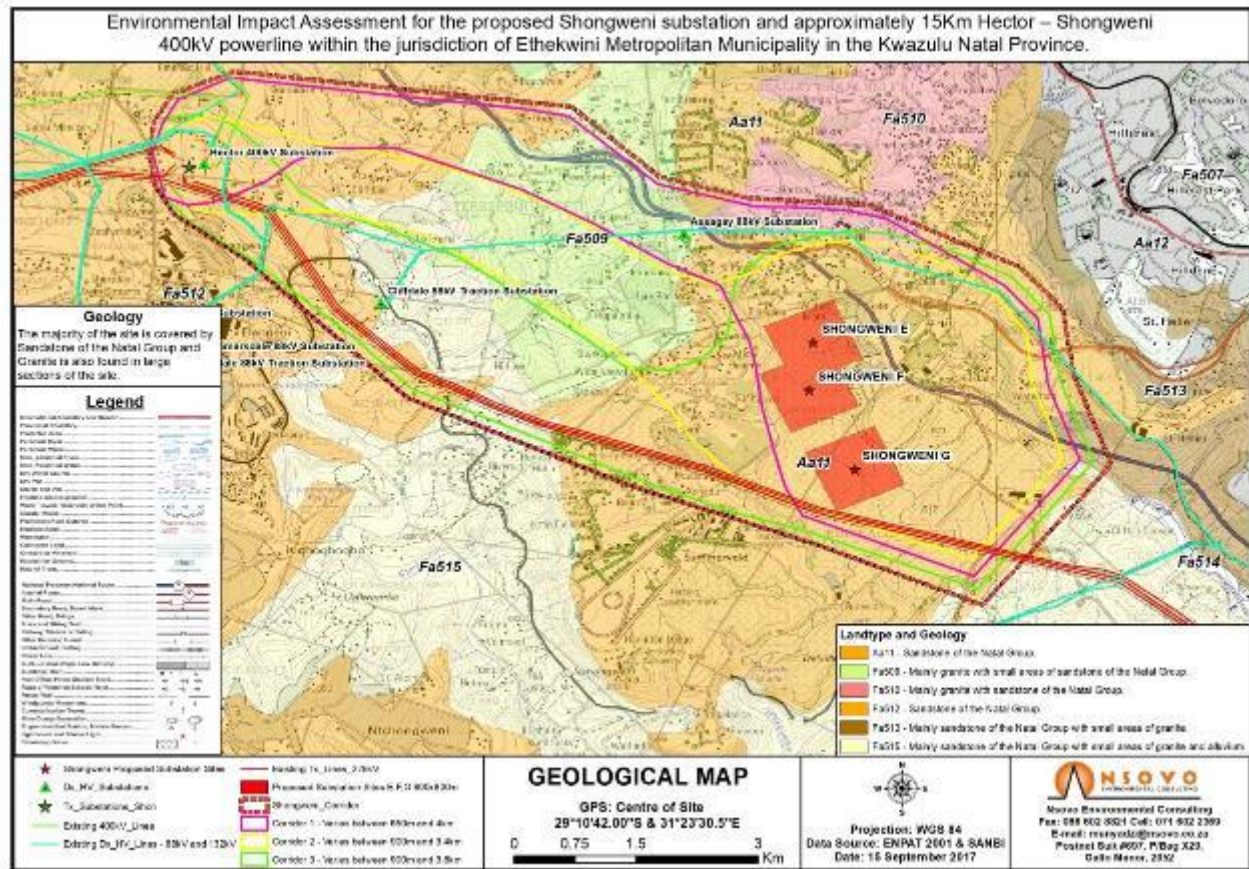


Figure 14: Geological map of the proposed location

9.1.4 TOPOGRAPHY

The main topographical unit within the proposed area consists of moderately undulating plains and ridgelines with rolling hills which are characteristic of the study area. These topographical units often give rise to wetlands and watercourse systems.

9.1.5 SURFACE WATER

This section provides the description of the surface water within the proposed location of the proposed substation, power-line and associated infrastructures. The description of surface water is mainly focusing on the alternatives of the proposed sites as follows:

9.1.5.1 CHARACTERISTICS AND WATERCOURSES OF THE PROPOSED AREA

The three powerline corridor alternatives traverse the North Eastern Coastal Belt Eco-region and the South-Eastern Uplands Eco-region (**Figure 17**). Further to this, the route alternatives are located within the following three quaternary catchments:

- U60C
- U60D
- U60F

These three quaternary catchments are located within the Mgeni Sub Water Management Area and the Mvoti to Umzimkulu Water Management Area (WMA). The Mvoti to Umzimkulu WMA lies along South Africa's eastern coast, primarily within KwaZulu-Natal. The landscape is characterised by rolling terrain with the Drakensberg escarpment forming the main topographical feature (National Water Resource Strategy, 2004). The Mvoti to Umzimkulu WMA is comprised of a diverse economic sector with forestry, agriculture (both subsistence and commercial) and eco-tourism forming the primary land use activities. The quaternary catchments are associated with a Moderate ecological sensitivity status (www.dwa.gov.za/war/systems.html). The Wekeweke Rivers and the Mhlatuzana Rivers are the main watercourses within the three corridor alternatives.

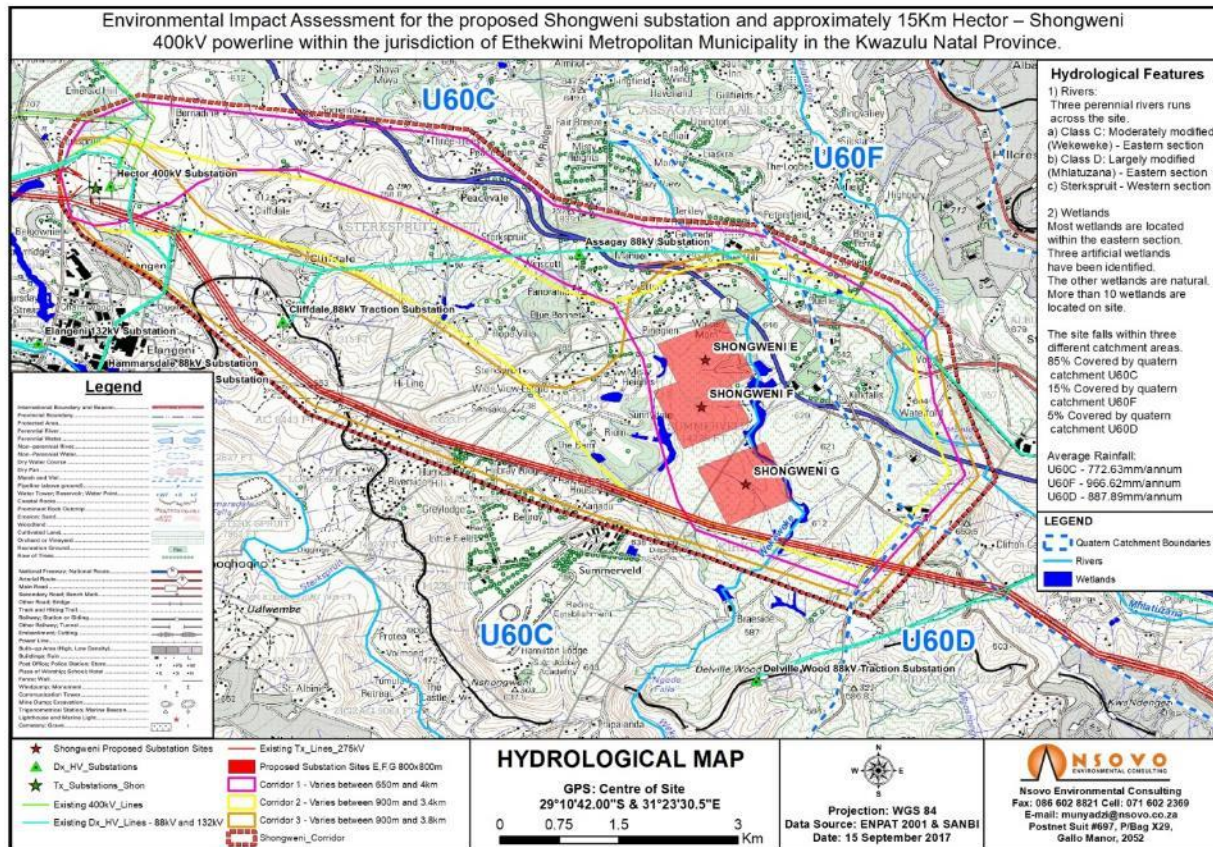


Figure 15: Hydrological map of the proposed project

9.1.5.2 NATIONAL FRESHWATER ECOSYSTEM PRIORITY AREAS (NFEPA)

The NFEPA project was developed to provide strategic spatial priorities for conserving South Africa’s freshwater ecosystems and supporting sustainable use of water resources. These strategic spatial priorities are known as Freshwater Ecosystem Priority Areas, or FEPAs (Driver, *et al.*, 2011). An examination of the NFEPA database revealed that a number of FEPA wetlands were identified throughout the proposed corridors of the proposed Shongweni powerline. Wetlands have been classified as both natural and artificial in nature and consist of Seeps, Channelled Valley Bottom wetlands as well as a Wetland Flat. Artificial wetlands are agricultural dams. Natural wetlands are classified as FEPA wetlands due to their moderately modified to largely natural condition as depicted in **Figures 18 to 20**.

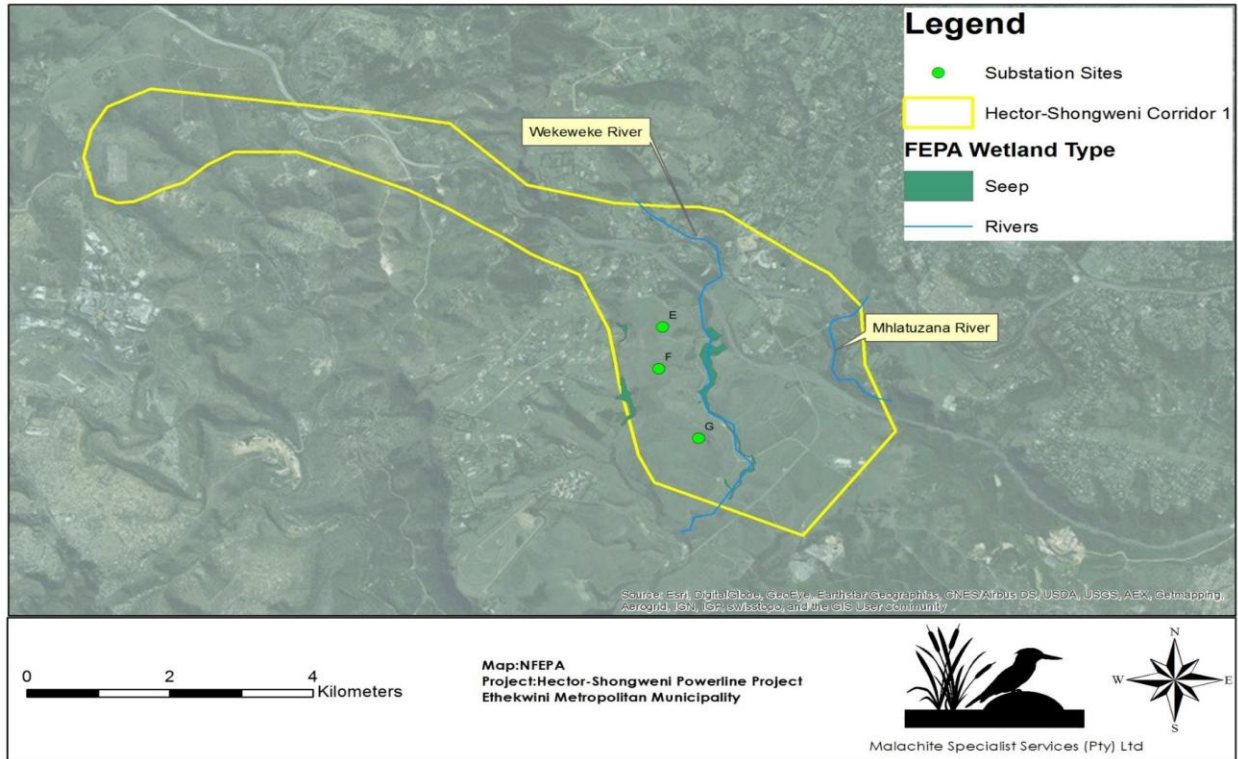


Figure 16: FEPA wetlands within corridor alternative E

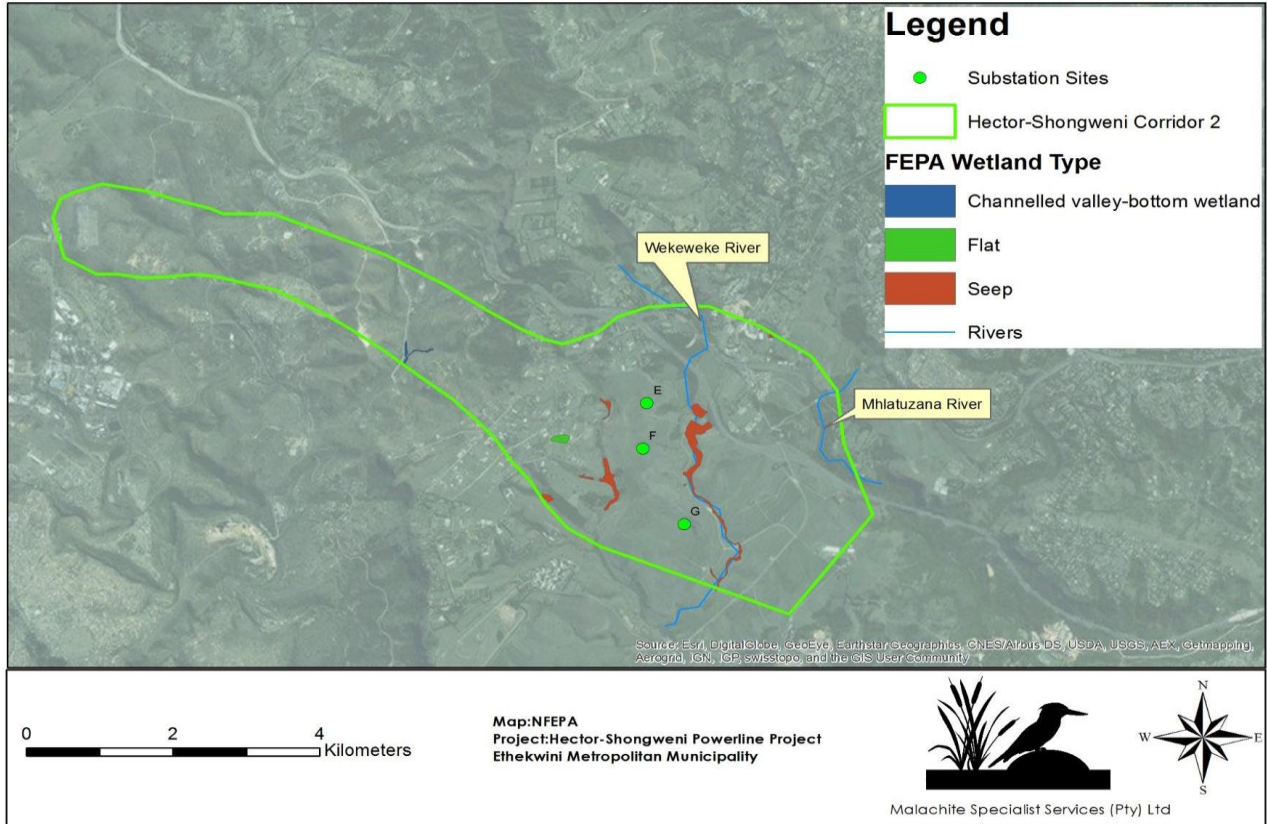


Figure 17: FEPA wetlands within corridor alternative F

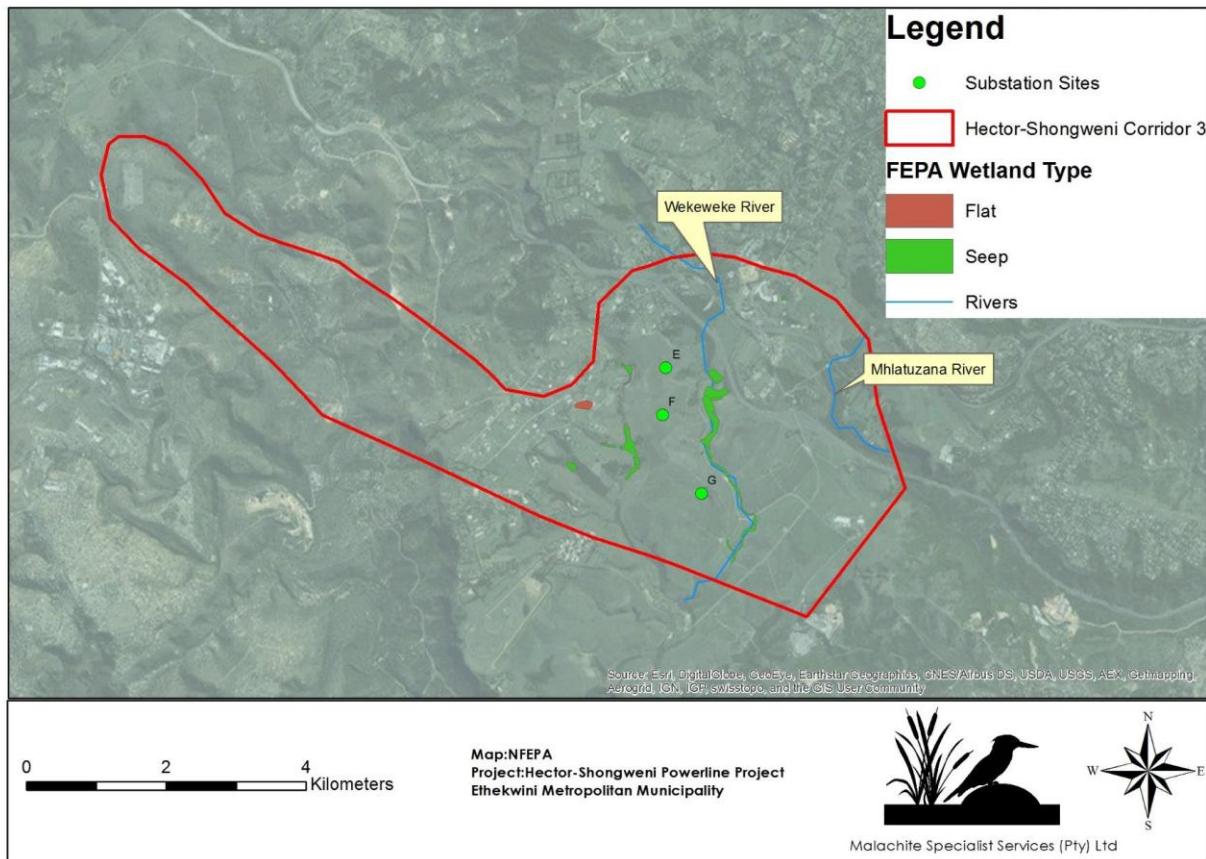


Figure 18: FEPA wetlands within corridor alternative G

9.1.6 AIR QUALITY AND POLLUTION

Air quality is defined to include noise and odour and addresses all sources of air pollution (i.e. point, area and mobile sources). The Air Quality Management Plan for the Shongweni proposed project has been developed to comply with the National Environmental Management: Air Quality Act, 39 of 2004 and more specifically, to provide guidance on Air Quality Management in the eThekweni metropolitan municipality.

The Plan identifies air pollution sources in the proposed locations as follows:

- Dust from the sand mining taking place within the proposed location;
- Clay brick manufacturing;
- Agricultural activities such as crop burning and spraying;
- Agricultural activities such as sugarcane farming;
- Biomass burning (veld fires);
- Domestic fuel burning (wood and paraffin);
- Vehicle emissions;

- Waste treatment and disposal;
- Dust from infrastructural development;
- Dust from unpaved roads; and
- Other fugitive dust sources such as wind erosion of exposed areas

There are few sources of air pollutants in the eThekweni Metropolitan Municipality and even fewer within the immediate proposed area. The ambient air quality is generally good; however, emissions from industrial boilers are likely to result in local areas of elevated concentrations of air pollutants. Ambient particulate concentrations are likely to be high in low – income residential areas where wood is used as primary fuel source. The motor vehicle congestion in holiday towns and along the N3 road results in elevated ambient concentrations of particulates and NO₂ (Nitrogen Oxides) at times.

9.1.7 TYPES OF VEGETATION (FLORA)

The study area is located within three broad vegetation types within the Savanna and the Grassland Biomes (Mucina and Rutherford, 2006). The three broad vegetation types which include, KwaZulu-Natal Sandstone Sourveld, Moist Coast Hinterland Grassland and Dry Coast Hinterland Grassland are discussed below. Patches of the Highveld Alluvial Vegetation type and the Scarp Forest vegetation type are interspersed within these broad vegetation types (**Figure 21**).

9.1.7.1 KWAZULU-NATAL SANDSTONE SOURVELD

This vegetation type is distributed on elevated coastal inland sandstone plateaus with altitudes of between 500m to 1100m above sea level. The vegetation consists of short, species rich grassland with scattered low shrubs. Proteaceae trees and shrubs can also be locally common. The dominant topographical features are flat or rolling plateau tops and steep slopes forming Table Mountains. This vegetation type is considered Endangered with only 0.2% conserved (Mucina and Rutherford, 2006).

9.1.7.2 THE DRY COAST HINTERLAND GRASSLAND

Dry Coast Hinterland Grassland is distributed within the KwaZulu-Natal and Eastern Cape Provinces. Other vegetation units often associated with the Hinterland Grassland include the KwaZulu-Natal Hinterland

Thornveld, Bisho Thornveld and Eastern Valley Bushveld (Scott-Shaw and Escott, 2011). Dry Coast Hinterland veld is comprised of Sourveld wiry grassland assemblages dominated by *Aristida junciformis* (Ngongoni Grass), however veld in a healthy condition are dominated by *Themeda triandra* and *Tristachya leucothrix* (Scott-Shaw and Escott, 2011). The mono-dominance displayed by this vegetation unit is associated with low species diversity. This vegetation unit is typically associated with undulating plains and hilly landscape within the drier coast hinterland valleys (in the rain-shadow of the rain-bearing frontal weather systems) (Scott-Shaw and Escott, 2011). Patches of wooded vegetation is often confined to valleys and ridgelines embedded within the Sub Escarpment Grassland assemblages. Termitaria support bush clumps within this grassland unit including *Acacia* spp, *Cussonia spicata*, *Ehretia rigida*, *Grewia occidentalis* and *Coddia rudis*. Herbaceous species richness is not as abundant as adjoining vegetation units namely KwaZulu-Natal Sandstone Sourveld and Moist Coast Hinterland Grassland. This vegetation type is considered Vulnerable (Mucina and Rutherford, 2006).

9.1.7.3 THE MOIST COAST HINTERLAND GRASSLAND

The Moist Coast Hinterland Grassland is distributed within the KwaZulu-Natal and Eastern Cape Provinces. Hinterland veld is comprised of tall dense Sourveld grassland assemblages with mono-dominance associated with low species diversity. The mono-dominance is by *Aristida junciformis* (Ngongoni Grass), however veld in a healthy condition are dominated by *Themeda triandra* and *Tristachya leucothrix* (Scott-Shaw and Escott, 2011). As with the Dry Coast Hinterland Grassland, this vegetation unit is typically associated with rolling and hilly landscapes. Patches of wooded vegetation is often confined to valleys and ridgelines embedded within the Sub Escarpment Grassland assemblages. This vegetation unit is statutorily conserved in Vernon Crookes and Entumeni Nature Reserve and is considered Vulnerable (Mucina and Rutherford, 2006).

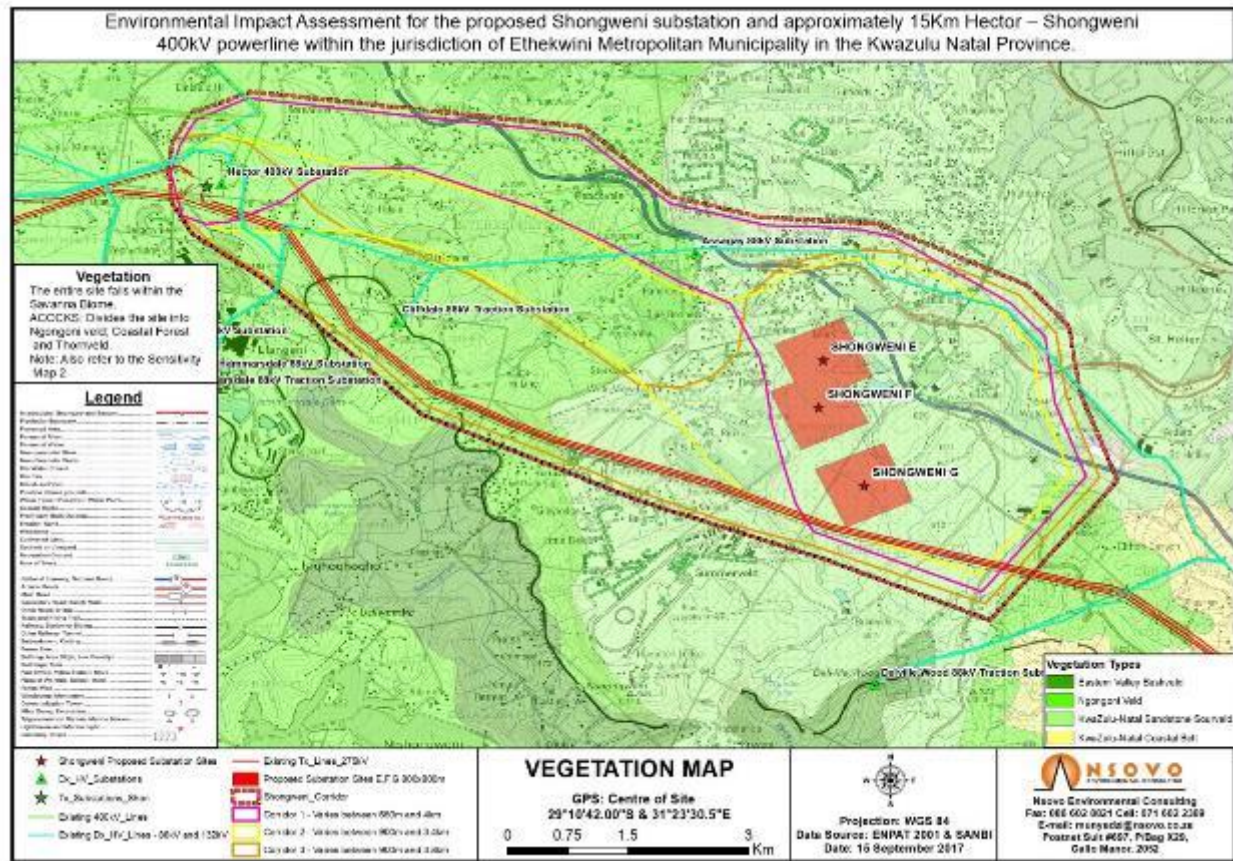


Figure 19: Vegetation types associated with the proposed area

9.1.7.4 LISTED AND PROTECTED SPECIES

According to the SANBI SIBIS database, more than 1300 indigenous species have been recorded from the two quarter degree squares containing the site. This includes 54 species of high conservation concern (Table 11), illustrating the high diversity of the area and potential for impact on species of conservation concern. This impact can be minimized through avoidance of the sensitive features and habitats at the site, especially areas of forests, wetlands and drainage lines. The majority of the intact habitat that would be affected by the development would be in the western section of the site around the Hector Substation where the vegetation was in a generally poor state and the likely abundance of species of conservation concern would be low.

Table 15: Numbers of the species within the different conservation status categories as indicated below, data derived from the SANBI SIBIS database.

Status/ IUCN Red List Category	No. Species
Critically Endangered (CR)	3
Endangered (EN)	6
Vulnerable (VU)	19
Near Threatened (NT)	10
Rare	2
Declining	10
Data Deficient - Insufficient Information (DDD)	0
Data Deficient - Taxonomically Problematic (DDT)	4
Least Concern	1336
Total	1390

9.1.7.5 CRITICAL BIODIVERSITY AREA

The KwaZulu-Natal (2016) CBA map for the general area surrounding the site is depicted below in Figure 22. Although there are some irreplaceable CBAs within the study area, the overall density of these areas within the power line corridors is relatively low. This can be ascribed to the highly impacted and transformed nature of a significant proportion of the study area. While the majority of the CBAs can be avoided, some impact to these areas may occur as a result of the power lines. However, these CBAs are considered irreplaceable and are not very extensive; they would be vulnerable to cumulative habitat loss. As a result these areas should be avoided as much as possible to avoid significant risk to the biodiversity of these areas.

The remaining extent of listed ecosystems layer indicates that there is significant remnant vegetation in the vicinity of substation Alternative F. However, there appear to have been significant changes since the layer was made as the site visit indicated that there was very little intact vegetation in this area apart from a narrow belt of vegetation along the drainage line that occurs north of the substation site. Although the drainage line is some distance from the drainage line and would not be directly affected by the substation, access roads may be required to traverse the drainage line and as a result, this not considered a favorable alternative compared to Alternative E and G which are confined to extensive areas of sugarcane.

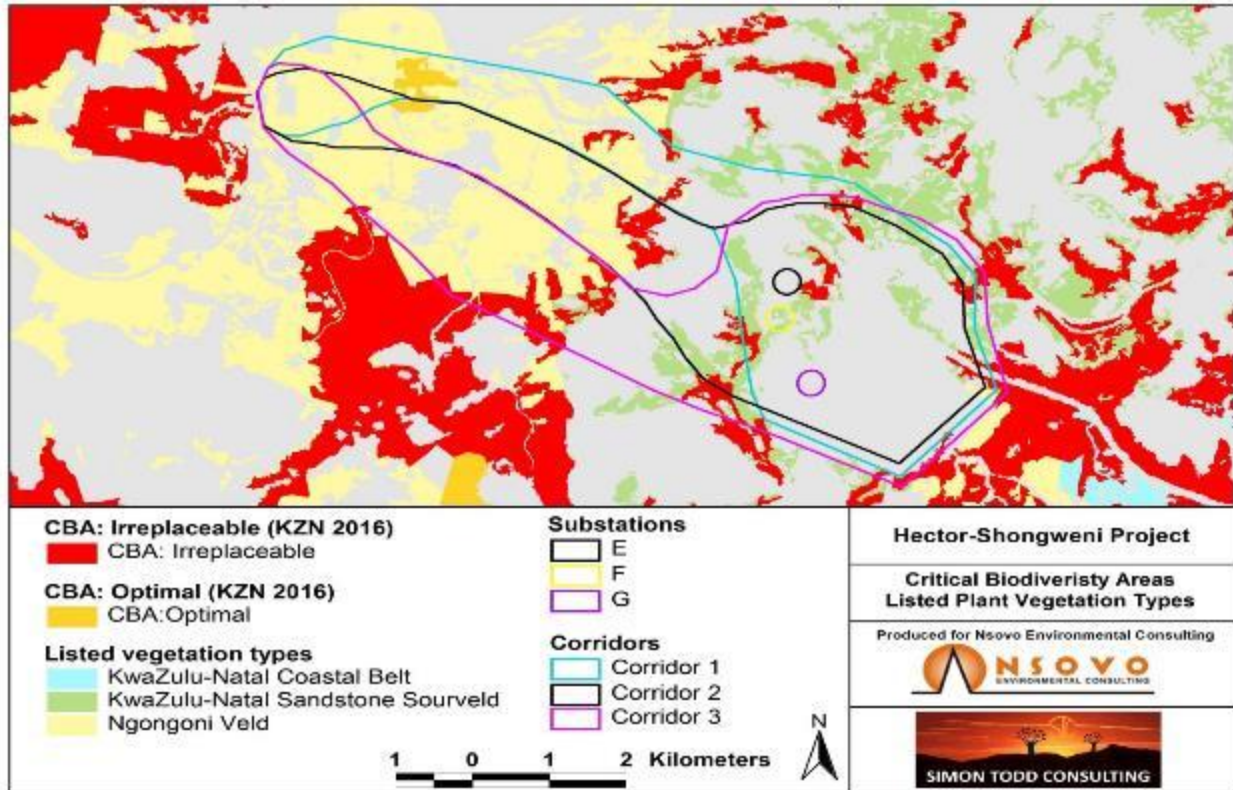


Figure 20: Critical Biodiversity Areas within proposed location of the activity

9.1.8 FAUNA

9.1.8.1 MAMMALS

According to the Mammal Map database, 51 mammal species have been recorded from the area (Annex 2), including several conservation dependent species such as Blesbok, Nyala, and Plains Zebra, which would not be encountered in the study area outside of conservation areas. The study area has been significantly impacted by transformation and development with the result that the remnant areas of intact grassland or forest are high fragmented and exposed to anthropogenic influences. As a result, species that are not tolerant of human disturbance are not likely to present and the remnant fauna consists largely of smaller and more wary nocturnal species.

In terms of listed species, Oribi *Ourebia ourebi* (Endangered), Blue Duiker *Philantomba monticola* (Vulnerable), Serval *Leptailurus serval* (Near Threatened), African Striped Weasel *Poecilogale albinucha* (Near Threatened) and Leopard *Panthera pardus* (Vulnerable) are species of conservation concern that occur in the wider area. However, of these only the African Striped Weasel and possibly the Blue Duiker

are likely to be present as the area is too disturbed or no longer suitable for the other species due to habitat changes and fragmentation. The intact grasslands would originally have contained Serval and Oribi but the extent of intact grassland is not sufficient to support viable populations of these species and it is also likely that hunting pressure on these species would have extirpated them from the area some time ago. There are some relatively intact and inaccessible forests remaining at the site especially in the east and these potentially support remnant Blue Duiker populations (McLean *et al.* 2016).

As a result of the high levels of transformation of the area the development is likely to generate low levels of impact on mammals. All of the substation sites are within transformed habitat and it is likely that the power line can also be routed so as to minimize loss of currently intact habitat, with the result that overall impacts on fauna can be mitigated to low levels.

9.1.8.2 REPTILES

According to the Reptile Map database, 58 reptile species have been recorded from the quarter degrees covering the site which indicates the high diversity of the area as this is not an exhaustive list. Five species are considered of conservation concern. The Durban Dwarf Burrowing Skink *Scelotes inornatus* (CE) is an endemic and McLean *et al.* (2016) recognize this species as a flagship species for the region. It occurs in coastal habitat on Berea red sands from Canelands in the north to Clansthal in the south (Marais 2011, in McLean *et al.* 2016). The KwaZulu Dwarf Chameleon *Bradypodion melanocephalum* (VU) is also endemic and has much of its range within the eThekweni District Municipality, particularly more open habitat near the coast (McLean *et al.* 2016). The ranges of both species overlap built up areas and are thus susceptible to habitat transformation and degradation. McLean *et al.* (2016) recommends that in order to conserve these species, a matrix of connected and genetically viable populations will need to be protected and managed.

The Green Mamba *Dendroaspis angusticeps* (VU) is considered an indicator of dune forest health and is fairly specialist in its habitat requirements with the result that it is not likely to be widely distributed within the study area and would potentially only occur in the far east of the site, but as a result of the near-total transformation of this area is not likely to be present. The Natal Black Snake *Macrelaps microlepidotus* (Near Threatened) and Large-scaled Grass Lizard *Chamaesaura macrolepis* (Near Threatened) are reptile species which also have more specialist than generalist habitat requirements (McLean *et al.* 2016) and are likely to still occur within the intact parts of the site.

The most important habitats in the area for reptiles would be the intact remnants of grassland and Thornveld in the west and the forests and drainage systems of the east. Provided that loss of currently intact habitat is kept to a minimum, then impacts on reptiles are likely to be relatively low and no significant long-term impacts are likely occur.

9.1.8.3 AMPHIBIANS

The broader area has exceptional frog species richness, with as many as thirty-two frog species known from the area. This includes four species of conservation concern. Pickersgill's Reed Frog *Hyperolius pickersgilli* (EN) inhabits densely vegetated, stagnant valley bottom wetlands from the coast to ca. 200 m above sea level (McLean *et al.* 2016). As this habitat is not present at the site which is almost all above 500m above sea level, it is highly unlikely that this species is present at the site and an impact on this species can be excluded as a likely outcome of the development. The Endangered Kloof Frog *Natalobatrachus bonebergi* is under threat due to the degradation of riverine gorge systems (Minter *et al.* 2004) as a result of over-exploitation and pollution. Other species of concern include the Spotted Shovel-nosed Frog *Hemisus guttatus* (VU), a potential flagship species that is endemic and occurs in wooded and open habitat adjacent wetlands, but is extremely difficult to locate due to its fossorial habits (McLean *et al.* 2016).

It is not likely that there would be impact on the habitat of this species as the majority of the site is disturbed and there would be minimal impact on areas of good condition habitat. The Natal Leaf-folding Frog *Afrivalus spinifrons* (VU) is more likely to occur at the site as it is relatively tolerant of some land-use changes. However as it is associated with wetlands and water bodies, it is not likely to be impacted by the development as the power lines would specifically avoid these features. Overall, impacts on amphibians are likely to be relatively as their most important habitats, wetlands and other drainage features are likely to be minimally impacted by the development and the major footprint areas would be in areas that are already heavily transformed.

9.1.9 AVIFAUNA

This section provides the avifauna assessment within the proposed location of the proposed project mainly focusing on the bird population that are situated within the proposed area. The population of the birds' within the areas is discussed as follows:

9.1.9.1 IMPORTANT BIRD AREAS (IBA's)

Some sites are exceptionally important for maintaining the taxa dependent upon the habitats and ecosystems in which they occur. Vigorous protection of the most critical sites is one important approach to conservation. Sites that are carefully identified on the basis of the bird numbers and species complements they hold, are termed Important Bird Areas (IBAs) and are selected such that, taken together, they form a network throughout the species' biogeographic distributions. IBAs are key sites for conservation – small enough to be conserved in their entirety and often already part of a protected-area network.

There are no IBA's within the immediate study area. The closest IBA to the proposed project (SA078 – KwaZulu-Natal Mistbelt Grasslands) is located approximately 30km to the west and it consists of a series of disconnected grassland patches on farms located in the KwaZulu-Natal Midlands (Marnewick et al, 2015). It has been declared an IBA based on its breeding population of globally threatened Blue Swallows *Hirundo atrocaerulea*. The distance of the IBA from the study area and the unlikely occurrence of the associated trigger species (only Southern Bald Ibis, Martial Eagle and African Marsh Harrier have been recorded in the study area in low number of between one and five individuals over a ten-year period) within the project boundary, means that the IBA will not have a significant impact on the establishment of the proposed Shongweni substation and powerline. .

9.1.9.2 COORDINATED WATER BIRD COUNT (CWAC) DATA

The Animal Demography Unit (ADU) launched the Coordinated Waterbird Counts (CWAC) project in 1992 as part South Africa's commitment to International waterbird conservation. A CWAC site is any body of water, other than the oceans, which supports a significant number (set at approximately 500 individual water birds, irrespective of the number of species) of birds which use the site for feeding, and/or breeding and roosting (Young *et al*, 2003). This definition includes natural pans, vleis, marshes, lakes, rivers, as well as a range of man-made impoundments (i.e. sewage works). The presence of a CWAC site within a study area is an indication of a large number of water dependent species occurring there and the overall sensitivity of the area. However, there are no CWAC sites within the immediate study area.

The identified CWAC sites are located approximately 20km east of the project boundary. Therefore given the distance from the study area and the relatively low numbers of water birds recorded at these locations,

the aforementioned CWAC sites will not have a significant impact on the establishment of the proposed Shongweni substation and the routing of the final Hector-Shongweni 400kV alignments.

9.1.9.3 COORDINATED AVIFAUNAL ROAD-COUNT (CAR) DATA

Cranes, bustards, storks and other large birds that spend most of their time on the ground, need wide, open spaces and are certainly not restricted to protected areas. Agricultural habitats are used extensively for feeding, roosting and breeding, often because no natural, pristine habitats are available, and sometimes because the agricultural habitats are especially attractive to birds. Because of their size and conspicuous nature, these birds can be monitored using a relatively simple technique i.e. the road count. The Coordinated Avifaunal Road counts (CAR) project monitors the populations of 36 species of large terrestrial birds in agricultural habitats, in addition to game birds, raptors and corvids along 350 fixed routes covering over 19 000km (<http://car.adu.org.za/>). Although CAR road counts do not give an absolute count of the all the individuals in a population, they do provide a measure of relative abundance in a particular area.

There are no CAR routes within the confines of the study area. The closest CAR route (KM03) is located approximately 50km north-west of study area, near Howick. Despite the absence of CAR counts within the study area, it is important to note that several of the large terrestrial and raptor species that the CAR counts consider have been observed in the study area. These include i.e. Southern Bald Ibis, Helmeted Guineafowl *Numida meleagris*, Spur-winged Goose *Plectropterus gambensis*, Black-headed Heron *Ardea melanocephala*, Long-crested Eagle *Lophaetus occipitalis*, Steppe Buzzard *Buteo vulpinus* and Jackal Buzzard *Buteo rufofuscus* which are vulnerable to interactions with power line infrastructure.

9.1.9.4 South African bird atlas project 2 data (sabap2)

A total of 346 bird species have been recorded within the relevant pentads during the SABAP2 atlas sing period to date. The presence of these species in the broader area provides an indication of the diversity of species that could potentially occur within the areas earmarked for the proposed developments, particularly where pockets of natural vegetation/habitats persist. Of the 346 species, 22 of these are considered to be of conservation concern (Red Data), according to the 2015 Eskom Red Data Book of Birds of South Africa, Lesotho and Swaziland (Taylor *et al* 2015) and the IUCN Red List (2016). The White Stork *Ciconia ciconia*,

which is not listed, but is protected internationally under the Bonn Convention on Migratory species, was also recorded

9.1.10 AGRICULTURAL POTENTIAL

9.1.10.1 SOIL PATTERN WITHIN THE PROPOSED AREA

Two broad soil pattern classes have been noted within the study areas as follows:

- **Aa** Humic topsoils overlying red and/or yellow apedal sub soils; and
- **Fb** Shallow, and/or rocky, often steep, highly leached (very little lime)

The summarized soil patterns of the land types that occur within one or more of the various route corridors or substation study areas are shown in the table below and the dominant class of agricultural potential is shaded in bold. The distribution of the land types across the three corridors within the study area is further described in the Table below and further depicted in **Figure 21**.

Land Type	Dominant soils	Depth (mm)	Percent of land type	Characteristics	Agric. Potential (%)
Aa11	Inanda 10/11	800-1200+	33%	Red, loamy, structureless soils with humic topsoil	High: 69.3 Mod: 16.6 Low: 14.1
	Nomanci 10	500-800	21%	Brown to dark red, loamy, structureless soils with humic topsoil	
Fa509	Glenrosa 17/18	300-700	36%	Reddish-brown, loamy, structureless soils	High: 31.9 Mod: 53.0 Low: 16.1
	Hutton 16	600-1200	16%	Red, loamy, structureless soils	
Fa510	Glenrosa 14/15/17/18	150-300	25%	Reddish-brown, sandy/loamy, structureless soils	High: 43.7 Mod: 10.8 Low: 45.5
	Hutton 16/17	1000-1200	24%	Red, loamy, structureless soils	
Fa512	Cartref 21/31	600-800	53%	Grey-brown, sandy, structureless soils	High: 8.9 Mod: 64.7 Low: 26.4
	Glenrosa 13/16	200-400	10%	Reddish-brown, sandy, structureless soils	
Fa513	Cartref 21/22	350-500	38%	Grey-brown, sandy, structureless soils	High: 0.0 Mod: 13.6 Low: 86.4
	Glenrosa 14/17	150-500	21%	Reddish-brown, sandy, structureless soils	
Fa515	Glenrosa 14/15	200-500	37%	Reddish-brown, sandy/loamy, structureless soils	High: 7.1 Mod: 32.9 Low: 60.0
	Cartref 21/31	300-650	29%	Grey-brown, sandy/loamy, structureless soils	

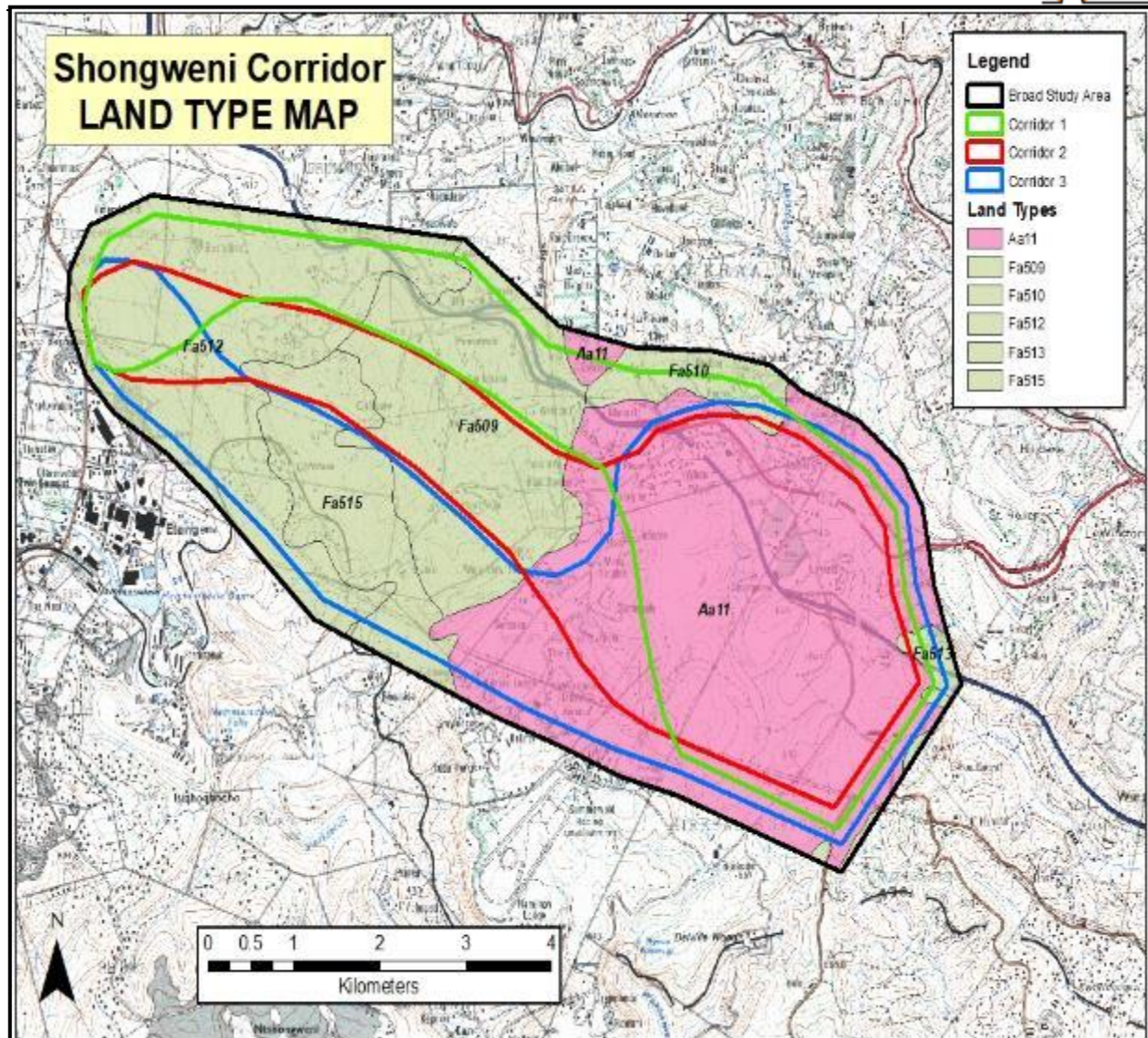


Figure 21: Land type map of the proposed location

9.1.10.2 TRANSMISSION LINE CORRIDORS AND SUBSTATION SITES

The occurrence and characteristics of the soils occurring in each land type have been summarized and assessed in terms of broad agricultural potential. This is expressed in the percentage of soils within a land type that can be regarded as being of high potential, so that land types with a higher potential of such soils would be regarded as more suitable for agriculture, especially cultivation. Soils falling into this category will include freely-drained, loamy soils with a sufficient rooting depth (generally >900 mm), lacking strong structure, stoniness or any signs of wetness.

The major area with high potential soils (>60% of the landscape) occurs in the east of the study area, where deep, apedal soils with a humic (more organic-rich) topsoil predominate. Towards the western end of the study area, the soils become shallower which, coupled with slightly more undulating terrain, leads to a lower class of agricultural potential.

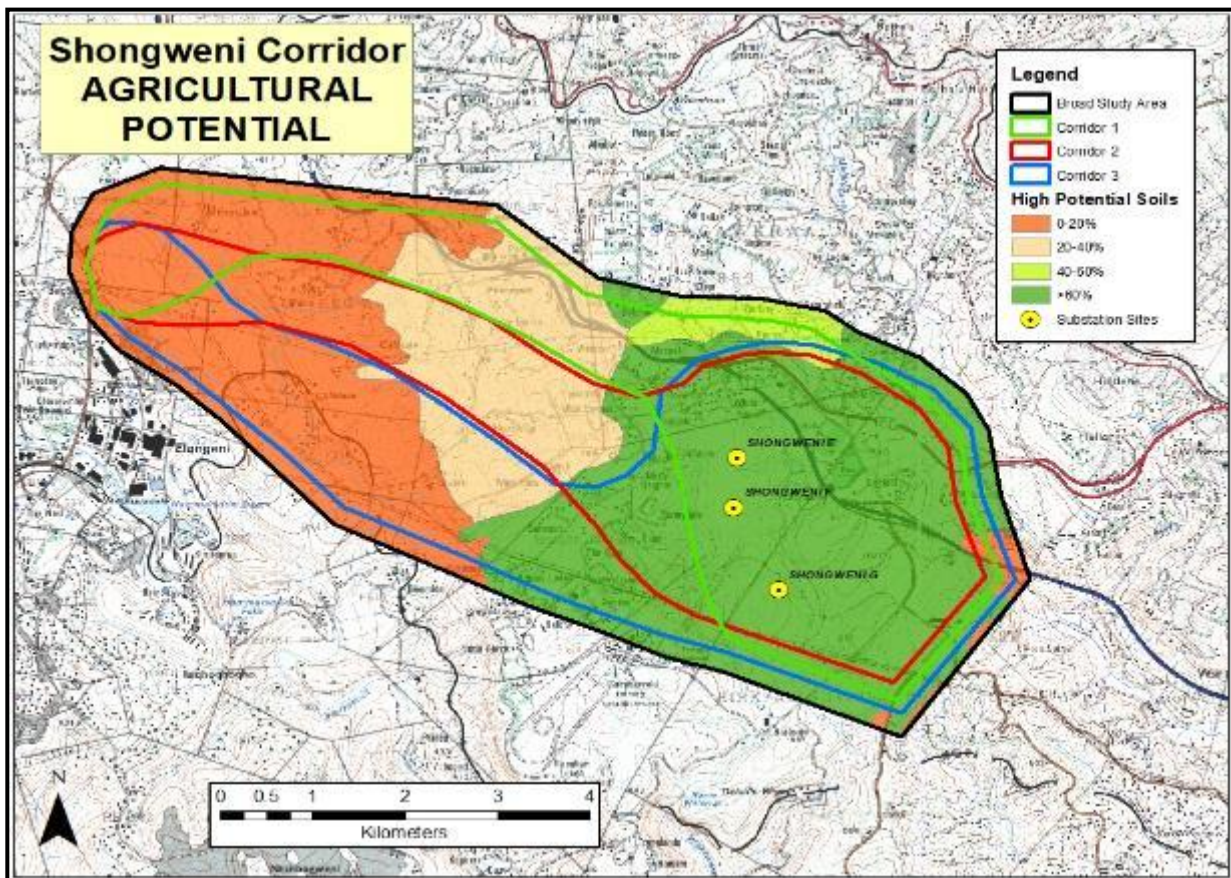


Figure 22: Broad agricultural potential indicating the corridors and substation sites

9.1.11 VISUAL ASPECTS

Visual appreciation or dislike is subjective and thus what is aesthetically pleasing to one can be displeasing to another. The visual analysis of a landscape, the impact of new developments and structures tend to be complicated and it is evident from previous experience that when dealing with reaction to landscape changes, a large diversity of opinion exists. Much of the proposed area is utilised for purposes of agriculture (i.e. sugarcane plantation).

The agricultural landscapes of much of the proposed location or sites are not necessarily sensitive but are important to preserve for their aesthetics. It is thus necessary to maintain a near natural visual landscape, with limited effect on aesthetic, to enable the continuation of nature-based economic activities such as ecotourism in the area.

As such, it is an imperative that Eskom be sensitive from a visual impact perspective, to the requirements of the local people, notably rural communities, farmers and operators involved in eco-tourism activities. Many topographical features influence this environment and these features will need to be utilised when selecting substation location and loop alignment so as to minimise visual impacts and intrusions.

9.1.12 SITES OF ARCHAEOLOGICAL AND CULTURAL SIGNIFICANCE

The archaeological and cultural heritage impact assessment for the proposed development revealed no obvious archaeological (Stone and Iron Ages) or historical material that will need to be mitigated prior construction in the footprint of the study area. This however could be two fold, firstly and most likely it could have been that there are no archaeological sites in the proposed area, secondly, it could have been as a result of bush encroachment, wherein materials could have been hidden in some of the dense vegetation that had been noted in the area. It should be borne in mind that, none of the materials that can be found here can be considered to be of such significance that can prevent the proposed development from proceeding. Noteworthy that houses (structures) which bears historical significance where noted in the proposed area. Although no significant archaeological materials were identified on the proposed area for substation and power-line, the recommendation from the heritage specialist will be considered.

10. METHODOLOGY FOR ASSESSING SIGNIFICANCE OF POTENTIAL IMPACTS

The assessment of impacts is largely based on the Department of Environmental Affairs and Tourism's (1998) Guideline Document: Environmental Impact Assessment Regulations. The assessment will consider impacts arising from the proposed activities of the project both before and after the implementation of appropriate mitigation measures.

The impacts are assessed according to the criteria outlined in this section. Each issue is ranked according to extent, duration, magnitude (intensity) and probability. From these criteria, a significance rating is

obtained, the method and formula is described below. Where possible, mitigation recommendations have been made and are presented in tabular form.

The criteria given in the table below will be used to conduct the evaluation. The nature of each impact will be assessed and described in relation to the extent, duration, intensity, significance and probability of occurrence attached to it. This will be assessed in detail during the EIA phase.

Table 16: Methodology used in determining the significance of potential environmental impacts

Status of Impact

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

Extent of the Impact

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

Duration of the Impact

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

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

Magnitude of the Impact

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

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

Probability of Occurrence

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

- (0) None (the impact will not occur),
- (1) improbable (probability very low due to design or experience)
- (2) low probability (unlikely to occur),
- (3) medium probability (distinct probability that the impact will occur),
- (4) high probability (most likely to occur), or
- (5) Definite.

Significance of the Impact

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

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

The significance ratings are given below

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

10.1 DESCRIPTION OF THE ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS INCLUDING CUMULATIVE IMPACTS IDENTIFIED

This section of the Scoping Report describes the potential impacts that the proposed project may pose on the receiving environment. Impacts associated with the relevant environmental components within the study area as identified, have been assessed based on the consultant’s opinion after numerous visits to the site and previous experience on similar undertakings as well as consultation with specialist studies. Refer to **Table 17** below, for the potential impacts identified. These impacts are similar for all three alternatives and will be comprehensively assessed during the EIA phase of the project and associated mitigation measures proposed

10.1.1 POTENTIAL ENVIRONMENTAL IMPACTS IDENTIFIED

Table 17 : Summary Potential Environmental Impact Identified

Issue	Rating	Description
Employment	Positive-No mitigation required	Job creation and investments into the proposed project will result in opportunities during the planning and design phase. This impact will typically be limited to skilled engineers and planning professionals. Proposed project will result in very limited opportunities to the skilled local community during the construction phase. This impact will be positive and provincial in extent.
Air Pollution	Neutral	Potential air pollutant during construction may be dust emanating from site preparation and excavations during construction. Given the nature and magnitude of the proposed project it is anticipated that if not mitigated the impact will be local in extent, and short term. Mitigation measures such as regular dust suppression can reduce the impact to become site specific.

Issue	Rating	Description
Visual Impact	Negative	<p>The visual impact of an object in the landscape decreases quickly as the distance between the observer and the object increases. The visual impact at 1km is approximately a quarter of the impact viewed from 500m; and the visual impact at 2km is one eighth of the impact viewed from 500m. Therefore, objects appear insignificant in any landscape beyond 5km.</p> <p>The visibility of the proposed structure and infrastructure would be a function of several factors, including: landform, vegetation, views and visibility, genius loci (or sense of place), visual quality, existing and future land use, landscape character and scale.</p> <p>The proposed activity will change the visual character of the site particularly considering that the proposed site is located in an area that is undulating; the elevated points of the site can be viewed from the nearby roads, however, it must be noted that there are already existing overhead power lines and a substation located within the vicinity of the proposed project site. Local variations in topography and man-made structures could cause local obstruction of views in certain parts of the view shed. Given the topography of the study area the impact can be considered definite, long term, local in extent but low in significance.</p>
Fauna	Negative	<p>Considering the insignificant extent of the substation campus and the relatively narrow and linear servitude it is not expected that any endangered species of conservation will be put at risk.</p> <p>No sensitive species or sensitive areas are flagged. The project will not substantially change the reigning ecological character of the general area. Further, the proposed project will not significantly impact</p>

Issue	Rating	Description
		negatively on the assemblages and conservation of the general area.
Flora	Negative	<p>Potential ecological impacts resulting from the development of the Shongweni substation and grid strengthening would stem from a variety of different activities and risk factors associated with the pre-construction, construction and operational phases of the project potentially including the following:</p> <p>Construction Phase</p> <ul style="list-style-type: none"> • Vegetation clearing for access roads, laydown areas and the substation site may impact on vegetation. • Increased erosion risk would occur due to the loss of plant cover and soil disturbance during the construction phase. The terrain is undulating; therefore the risk of erosion would be relatively high. This may impact downstream riparian and wetland habitats if a lot of silt enters the drainage systems. • Increased human presence can lead to illegal plant harvesting and other forms of disturbance such as fire. <p>Operational Phase</p> <ul style="list-style-type: none"> • The presence of the facility may disrupt the connectivity of the landscape for some species which may impact their ability to disperse or maintain gene flow between subpopulations. • The facility will require management and if this is not done appropriately, it could impact adjacent intact areas through impacts such as erosion, alien plant invasion and contamination from pollutants, herbicides or pesticides.

Issue	Rating	Description
		<p>Cumulatively, the development would contribute to the cumulative fragmentation of the landscape and would potentially disrupt the connectivity of the landscape for fauna and flora and impair their ability to respond to environmental fluctuations.</p>
Noise	Negative	<p>In South Africa, the assessment of noise levels in the environment is governed by the South African Bureau of Standards (SABS) noise standard 0103 – ‘The measurement and rating of environmental noise with respect to annoyance and to speech communication’ (SABS 1994). Additional SABS standards cover the measurement of noise over different distances from the source (SABS 0357 – ‘The calculation of sound propagation by the Concave method’), and standards for different sectors (e.g. industry).</p> <p>An increase in noise is expected to emanate from construction activities, which might have an impact especially on the surrounding farms. Noise associated with the construction activities can be mitigated by limiting the construction operation to business hours, during which noise will not be of such a big concern to surrounding residents. According to the SABS 0103 acceptable noise levels at day time is 45dBA. A noise intrusion is disturbing if it exceeds 7dBA or more. Given the nature of the project, it is highly unlikely that the stipulated noise levels will be exceeded at any given time. During the operational phase the impact of noise will also be reduced to almost insignificant levels, given the nature of the proposed project.</p> <p>Noise has been identified as potentially low due to the proposed development being in a remote area, far</p>

Issue	Rating	Description
		<p>removed from communities in most cases. The noise impact may be local during construction and site specific during operations.</p>
<p>Soil and Agricultural potential</p>	<p>Negative</p>	<p>The predominant land use within the study area is commercial agriculture (i.e. mainly sugarcane). Any development activity in a natural system will have an impact on the surrounding environment, usually in a negative way. The construction of the substation will not have a significant impact on the agricultural activities at any of the proposed sites.</p> <p>The overall impacts of the proposed substation on the soil and agricultural capability of any of the target sites and their immediate surrounds will be low due to the shallow soils present, the relatively small size of the substation study area (800m x 800m) and the continued use of the land adjacent to the substation for agricultural activities.</p>
<p>Bird Population</p>	<p>Negative</p>	<p>Due to its size and prominence, electrical infrastructure constitutes an important interface between wildlife and man. Negative interactions between wildlife and electricity structures take many forms, but two common problems in southern Africa are electrocution of birds (and other animals) and collision of birds with power lines. With proper mitigation measures implemented, these potential impacts can be reduced.</p> <p>For the proposed development, major risks to birds that may be caused by the proposed facilities are disturbance by construction activities (temporary), on-going disturbance during operation phase, collision with and electrocution on the power line.</p> <p>The proposed construction of the new Shongweni substation and associated power lines will pose a</p>

Issue	Rating	Description
		<p>limited threat to the birds occurring in the vicinity of the new infrastructure. The power line poses a low collision risk and a low electrocution risk. The impact of displacement due to habitat transformation will have a low impact on avifauna due the largely transformed nature of the proposed site.</p> <p>The construction and maintenance activities associated with the proposed development will have an impact on avifaunal species through disturbance. Species will be particularly sensitive to this disturbance during the breeding season. The proposed site alternatives are located within an agricultural habitat close to National and Domestic roads. Therefore, species within this landscape often experience disturbance and as a result disturbance of birds by the proposed substation is anticipated to be of low significance. The impact assessment phase will undertake a comprehensive assessment of the extent of the impact at all alternative sites.</p>
Waste	Negative	<p>Naturally, the inhabitation of the land will result in the accumulation of various forms of waste in the area. The aesthetic value of the area would decrease if such waste is not collected and disposed of appropriately. Waste material will be generated during the construction phase. Such waste may accumulate from the workers campsite or from litter left around the work area by the construction staff. Other waste substances may accumulate from cement bags amongst other construction material.</p> <p>The impact of waste is definite and will last for the duration of the construction phase as well as the operational phase, although reduced.</p>

Issue	Rating	Description
Soil Erosion	Negative	Movement of heavy machinery across the land as well as vegetation clearance may cause destabilisation of soils which then become susceptible to erosion. Continuous movement of vehicles over the land during the construction phase may leave it susceptible to erosion.
Heritage	Negative	<p>The heritage significance of each alternative site has been assessed in terms of the National Heritage Resources Act, 1999 (No 25 of 1999). A Phase 1 Archaeological Impact Assessment was conducted and the results are incorporated in this Scoping Report. (Also refer to Appendix C4).</p> <p>No significant impacts on heritage are anticipated.</p>
Surface and Groundwater Pollution	Neutral	<p>The proposed alternatives are in close proximity to watercourses. The impact on water quality, if any, could be sedimentation, decrease in quality and possible contamination of surface water and groundwater. This could result from fuel spillages, sewer systems, liquid waste, etc.</p> <p>An increased volume of storm water runoff, peak discharges, and frequency and severity of flooding is therefore often characteristic of transformed catchment. The impact on water is site specific but can be local or regional if proper measures are not put in place.</p> <p>There may be a need to apply for a Water Use Licence with DWS considering the proximity of the study area to surface water bodies.</p>

Issue	Rating	Description
Social Environment	Negative/Positive	<p>The construction phase may have a negative impact on the surrounding landowners if not properly managed. It could result to disturbance of residents as a result of construction related activities. Other social related issues may include theft and risk of fire.</p> <p>Conversely, a positive impact can emanate from the proposed development through employment of local residents. Also, a micro-economic environment could be created through vending/trade between contract workers and the locals. This impact will be local.</p>
Climate	Neutral	<p>Local climate conditions do not appear to be of a significant concern to the proposed project. In a broader scale the project will have no impact on the local and/or global climate change.</p>
Topography	Negative	<p>The topography of the study area is undulating; this may pose design challenges particularly in the steeper area. The substation sites are located fairly low lying terrain.</p>
Tourism	Neutral	<p>The positioning of the substation and the power line must take into consideration the potential impact on tourism in the area.</p>
Traffic	Negative	<p>A significant amount of material and equipment will be delivered to the site during the construction phase of the development. It is therefore expected that there will be a considerable impact considering that the N3 considering that it forms part of the national road. This will have an indirect impact on tourism.</p>

10.1.2 ASSESSMENT OF CUMULATIVE IMPACTS PER SITE

Cumulative impacts in relation to an activity, means the past, current and reasonably foreseeable future impacts of an activity, considered together with the impacts of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities (DEA, 2014 EIA Regulations).

This section presents the assessment anticipated cumulative impacts of the proposed project per site alternative as well as mitigation measures. Cumulative impacts to be considered for this alternative would include:

- Impact on agriculture (i.e. mainly sugarcane cultivation);
- Ecological Fragmentation;
- Bird collision with power lines;
- Heritage;
- Traffic;
- Tourism; and
- Visual.

Table 18: Impact Rating per alternatives

Alternatives	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Agricultural potential							
<p>The impacts of constructing a transmission line will be negative, as the natural environment will be disturbed. However, the isolated nature of the transmission towers means that the impact on the soil resource will be small as most agricultural activities can still be practiced next to or underneath a transmission line; therefore the specific significance on the potential loss of agricultural soil, as well as soil disturbance will be low. Most of the study area is not significantly susceptible to erosion as the area is generally characterised by good natural vegetation cover. Even with the relatively high rainfall, the vegetation cover counter affects the potential impact. These potential impacts will be medium without mitigation measures which can be reduced to low after application of mitigation measures.</p>							
Site E	No	Negative	1	5	8	5	70 = High
	Yes	Negative	1	4	6	4	44 = Medium
Site F	No	Negative	1	5	8	5	70 = High
	Yes	Negative	1	4	6	4	44 = Medium
Site G	No	Negative	1	5	8	5	70 = High
	Yes	Negative	1	4	6	4	44 = Medium
Corridor 1	No	Negative	1	5	6	4	48 =Medium
	Yes	Negative	1	4	4	3	27 = Low
Corridor 2	No	Negative	1	5	6	4	48 =Medium

	Yes	Negative	1	4	4	3	27 = Low
Corridor 3	No	Negative	1	5	6	4	48 =Medium
	Yes	Negative	1	4	<u>4</u>	3	27 = Low

Mitigation Measures

- Roads should avoid steep slopes wherever possible.
- Where steep slopes are used, road stabilization measures (culverts, run-off trenches, banking of bends etc) should be implemented.
- Restrict areas cleared of vegetation to road surfaces only.
- Mitigation measures will include the rehabilitation of any bare soil areas caused by the construction process (including any access roads or tracks) and wherever possible, the siting of pylons away from any cultivated lands, but rather to use servitudes and boundary lines.
- Special care should be given to areas with steeper topography.

Aquatic Ecology

It is anticipated that during the construction phase, moderate to large scale earth moving will be required for civil works. Therefore this will result to compaction which will enhance runoff, leading to an increased risk of erosion down slope. Further vegetation clearing will expose sediments to wind and waters erosive effects. Eroded sediments will be transported down slope and deposited within the aquatic environment thus altering habitat availability as well as species compositions within rivers. Vegetation clearing also poses the risk of allowing invasive plant species to colonise the corridors or substation site if management actions are not put in place during the construction phase.

The potential impacts expected are associated with soil erosion, pollution and alien vegetation that are ranging from moderate to high significance without mitigation and all impacts associated with the proposed substations can be lowered from high (alien invasive plants) or moderate significance to low significance if the correct mitigation is put in place.

Aquatic Ecology (Impacts associated with soil erosion, sedimentation) Construction Phase							
Site E	No	Negative	2	2	6	4	40 = Medium
	Yes	Negative	1	1	4	1	6 = Low
Site F	No	Negative	2	2	6	4	40 = Medium
	Yes	Negative	1	1	4	1	6 = Low
Site G	No	Negative	2	2	8	4	48 = Medium
	Yes	Negative	1	1	6	3	24 = Low
Corridor 1	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 2	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 3	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Aquatic Ecology (Impacts associated with Pollution) Construction Phase							
Site E	No	Negative	2	2	4	3	40 = Medium
	Yes	Negative	1	1	1	1	6 = Low
Site F	No	Negative	2	2	4	3	40 = Medium
	Yes	Negative	1	1	1	1	6 = Low

Site G	No	Negative	2	2	4	3	48 = Medium
	Yes	Negative	1	1	3	1	24 = Low
Corridor 1	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 2	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 3	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Aquatic Ecology (Impacts associated alien vegetation) Construction Phase							
Site E	No	Negative	2	5	6	3	56 = Medium
	Yes	Negative	1	2	4	2	16 = Low
Site F	No	Negative	2	5	6	3	56 = Medium
	Yes	Negative	1	2	4	2	16 = Low
Site G	No	Negative	2	5	6	3	56 = Medium
	Yes	Negative	1	2	4	2	16 = Low
Corridor 1	No	Negative	4	5	6	4	60 = Low
	Yes	Negative	4	5	4	3	39 = Medium

Corridor 2	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 3	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Aquatic Ecology (Impacts associated with soil erosion, sedimentation) Operational Phase							
Alternative E	No	Negative	2	2	4	2	16 = Low
	Yes	Negative	1	1	2	1	4 = Low
Alternative F	No	Negative	2	2	4	2	16 = Low
	Yes	Negative	1	1	2	1	4 = Low
Alternative G	No	Negative	2	2	4	3	24 = Low
	Yes	Negative	1	1	2	2	8 = Low
Corridor 1	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Low
Corridor 2	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Low
Corridor 3	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium

Aquatic Ecology (Impacts associated with Pollution) Operational Phase							
Alternative E	No	Negative	2	2	4	2	16 = Low
	Yes	Negative	1	1	2	1	4 = Low
Alternative F	No	Negative	2	2	4	2	16 = Low
	Yes	Negative	1	1	2	1	4 = Low
Alternative G	No	Negative	2	2	4	2	16 = Low
	Yes	Negative	1	1	2	1	4 = Low
Corridor 1	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 2	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 3	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Aquatic Ecology (Impacts associated alien vegetation) Operational Phase							
Alternative E	No	Negative	2	5	8	4	60 = Medium
	Yes	Negative	1	2	4	2	14 = Low
Alternative F	No	Negative	2	5	8	4	60 = Medium

	Yes	Negative	1	2	4	2	14 = Low
Alternative G	No	Negative	2	5	8	4	60 = Medium
	Yes	Negative	1	2	4	2	14 = Low
Corridor 1	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 2	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium
Corridor 3	No	Negative	4	5	6	4	60 = Medium
	Yes	Negative	4	5	4	3	39 = Medium

Mitigation measures

- Maintenance vehicles are to be prohibited from driving within the riparian zone and must be constrained to established support roads at all times;
- No vehicles should be allowed within any river system;
- If significant work needs to be carried out within an aquatic ecosystem a risk assessment should be conducted with input from an aquatic ecologist;
- Erosion monitoring at the bases of the pylons and at the substations must be carried out in order to identify issues early and implement remedial measures to reduce environmental degradation;
- Storm water controls within the substation facility are essential; therefore, a storm water management plan must be compiled to prevent the threat of high rainfall events leading to erosion and the deposition of sediments within aquatic ecosystems;
- Water must not be abstracted from any river for any irrigation, construction or rehabilitation purposes unless a water use license has been granted allowing the specific activity

- Rehabilitation of the disturbed sediments needs to be conducted in a timely manner and the indigenous vegetation planted should be monitored and maintained to prevent die off and alien invasive plant encroachment;
- Construction activity should be restricted to the immediate footprint of the infrastructure; and
- The selection of corridor 2 will reduce the collision of the red list with the earth wire of the proposed powerline.

Avifauna

The development of the proposed project will result in various impacts of low to medium significance to the birds occurring in the vicinity of the new infrastructure which can be reduced through the application of mitigation measures. Given the presence of existing habitat degradation and disturbance, it is anticipated that the proposed project can be undertaken within the study area with acceptable levels of impact on the resident avifauna.

Displacement as a result of habitat transformation

Site E	No	Negative	Local (2)	Permanent (5)	Low (4)	Probable (3)	33 = Medium
	Yes	Negative	Local (2)	Permanent (5)	Low (4)	Improbable (2)	22 = Low
Site F	No	Negative	Site (1)	Permanent (5)	Low (4)	Improbable (2)	20 = Low
	Yes	Negative	Site (1)	Permanent (5)	Minor (2)	Very Improbable (1)	8 = Low
Site G	No	Negative	Site (1)	Permanent (5)	Minor (2)	Improbable (2)	16 = Low
	Yes	Negative	Site (1)	Permanent (5)	Small (0)	Very Improbable (1)	16 = Low
Corridor 1	No	Negative	Local (2)	Long (4)	Moderate (6)	Highly Probable (4)	48 = Medium
	Yes	Negative	Local (2)	Long (4)	Low (4)	Probable (3)	30 = Medium
Corridor 2	No	Negative	Local (2)	Long (4)	Low (4)	Probable (3)	30 = Medium

	Yes	Negative	Local (2)	Long (4)	Minor (2)	Improbable (2)	16 = Low
Corridor 3	No	Negative	Site (1)	Long (4)	Minor (2)	Improbable (2)	14 = Low
	Yes	Negative	Site (1)	Long (4)	Small (0)	Improbable (2)	10 = Low
Displacement as a result of disturbance							
Site E	No	Negative	Local (2)	Short (2)	Low (4)	Probable (3)	24 = Low
	Yes	Negative	Local (2)	Short (2)	Low (4)	Improbable (2)	16 = Low
Site F	No	Negative	Site (1)	Short (2)	Low (4)	Improbable (2)	14 = Low
	Yes	Negative	Site (1)	Short (2)	Minor (2)	Very Improbable (1)	5 = Low
Site G	No	Negative	Site (1)	Short (2)	Minor (2)	Improbable (2)	10 = Low
	Yes	Negative	Site (1)	Short (2)	Small (0)	Very Improbable (1)	3 = Low
Corridor 1	No	Negative	Local (2)	Short (2)	Moderate (6)	Probable (3)	30 = Medium
	Yes	Negative	Local (2)	Short (2)	Low (4)	Improbable (2)	16 = Low
Corridor 2	No	Negative	Local (2)	Short (2)	Low (4)	Probable (3)	24 = Low
	Yes	Negative	Local (2)	Short (2)	Minor (2)	Improbable (2)	12 = Low
Corridor 3	No	Negative	Site (1)	Short (2)	Low (4)	Probable (3)	21 = Low
	Yes	Negative	Site (1)	Short (2)	Minor (2)	Improbable (2)	10 = Low
Collision							
Corridor 1	No	Negative	Local (2)	Long (4)	High (8)	Probable (3)	42 = Medium

	Yes	Negative	Local (2)	Long (4)	Moderate (6)	Improbable (2)	24 = Low
Corridor 2	No	Negative	Local (2)	Long (4)	Moderate (6)	Probable (3)	36 = Medium
	Yes	Negative	Local (2)	Long (4)	Low (4)	Improbable (2)	20 = Low
Corridor 3	No	Negative	Local (2)	Long (4)	Low (4)	Improbable (2)	20 = Low
	Yes	Negative	Local (2)	Long (4)	Minor (2)	Very Improbable (1)	8 = Low

Mitigation

- Construction activity should be restricted to the immediate footprint of the infrastructure.
- Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of avifaunal species.
- Maximum use of existing access roads and the construction of new roads should be kept to a minimum.
- Bird flight diverters must be installed on according to Eskom guidelines.

Biodiversity

The impact assessment of the proposed project identified the following potential negative impacts associated with biodiversity:

- Impacts on vegetation and protected plant species;
- Faunal Impacts During Construction;
- Increased Erosion Risk during operational phase;
- Impact on Critical Biodiversity Areas; and
- Cumulative impacts on broad-scale ecological processes.

The Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching.

Operational phase disturbance may result in large amounts of erosion and silt movement into drainage lines with negative consequences for fauna and flora in these areas. Disturbance along the power line route is likely to increase the vulnerability of the disturbed areas to erosion. Impacts associated with the biodiversity were found to be medium without mitigation measures which can be reduced to low after the appropriate mitigation measures.

Impacts on Vegetation and Plant Species of Conservation Concern

Site E	No	Negative	Local	Long Term	Low	Probable	Low
	Yes	Negative	Local	Long Term	Low	Improbable	Negligible
Site F	No	Negative	Local	Long Term	Low	Probable	Low
	Yes	Negative	Local	Long Term	Low	Improbable	Negligible
Alternative G	No	Negative	Local	Long Term	Low	Probable	Low
	Yes	Negative	Local	Long Term	Low	Improbable	Negligible
Corridor 1	No	Negative	Regional	Long Term	Moderate	Certain	Moderate
	Yes	Negative	Local	Long Term	Low	Probable	Low
Corridor 2	No	Negative	Regional	Long Term	Moderate	Highly Probable	Moderate

	Yes	Negative	Local	Long Term	Low	Probable	Low
Corridor 3	No	Negative	Regional	Long Term	Moderate	Highly Probable	Moderate
	Yes	Negative	Local	Long Term	Low	Probable	Low
Impacts on Fauna During Construction							
Alternative E	No	Negative	Local	Short Term	Low	Probable	Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Alternative F	No	Negative	Local	Short Term	Low	Probable	Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Site G	No	Negative	Local	Short Term	Low	Probable	Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Corridor 1	No	Negative	Local	Short Term	Moderate	Highly Probable	Moderate
	Yes	Negative	Local	Short Term	Low	Probable	Low
Corridor 2	No	Negative	Local	Short Term	Moderate	Highly Probable	Moderate
	Yes	Negative	Local	Short Term	Low	Probable	Low
Corridor 3	No	Negative	Local	Short Term	Moderate	Highly Probable	Moderate
	Yes	Negative	Local	Short Term	Low	Probable	Low
Increased Erosion Risk during Operation							
Site E	No	Negative	Local	Short Term	Low	Probable	Low

	Yes	Negative	Local	Short Term	Low	Improbable	Low
Site F	No	Negative	Local	Short Term	Low	Highly Probable	Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Site G	No	Negative	Local	Short Term	Low	Probable	Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Corridor 1	No	Negative	Local	Medium Term	Moderate	Probable	Moderate
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Corridor 2	No	Negative	Local	Medium Term	Moderate	Probable	Moderate
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Corridor 3	No	Negative	Local	Medium Term	Moderate	Highly Probable	Moderate to High
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Impact on Critical Biodiversity Areas and Listed Vegetation Types							
Alternative E	No	Negative	Local	Long Term	Low	Probable	Low
	Yes	Negative	Local	Long Term	Low	Improbable	Low
Alternative F	No	Negative	Local	Long Term	Low	Highly Probable	Medium-Low
	Yes	Negative	Local	Long Term	Low	Improbable	Low
Alternative G	No	Negative	Local	Long Term	Low	Probable	Low

	Yes	Negative	Local	Long Term	Low	Improbable	Low
Corridor 1	No	Negative	Regional	Long Term	Moderate	Highly Probable	Moderate
	Yes	Negative	Local	Long Term	Low	Probable	Low
Corridor 2	No	Negative	Regional	Long Term	Moderate	Highly Probable	Moderate
	Yes	Negative	Local	Long Term	Low	Probable	Low
Corridor 3	No	Negative	Regional	Long Term	Moderate	Highly Probable	Moderate
	Yes	Negative	Local	Long Term	Low	Probable	Low
Cumulative Impacts							
Site E	No	Negative	Local	Short Term	Low	Probable	Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Site F	No	Negative	Local	Short Term	Medium	Highly Probable	Medium-Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Site G	No	Negative	Local	Short Term	Low	Probable	Low
	Yes	Negative	Local	Short Term	Low	Improbable	Low
Corridor 1	No	Negative	Regional	Long Term	Moderate	Highly Probable	Moderate to High
	Yes	Negative	Local	Long Term	Moderate	Probable	Moderate
Corridor 2	No	Negative	Regional	Long Term	Moderate	Probable	Moderate

	Yes	Negative	Local	Long Term	Low	Probable	Low
Corridor 3	No	Negative	Regional	Long Term	Moderate	Probable	Moderate
	Yes	Negative	Local	Long Term	Low	Probable	Low

Mitigation measures

- There should be a preconstruction walk-through of the power line route and substation site to identify species of conservation concern that should be avoided;
- Existing roads and access routes should be used wherever possible;
- Avoid development within the High sensitivity parts of the site;
- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas;
- Avoid impact to potential corridors such as the riparian corridors associated with the larger drainage lines within the area;
- Any fauna threatened by construction activities should be removed to safety by the ECO or other suitably qualified person;
- During construction all vehicles should adhere to demarcated tracks or roads and the speed limit should not exceed 40km/h on larger roads and should be 20-30km/h o All construction staff should undergo environmental induction before construction commences in order to raise awareness and reduce potential faunal impacts;
- To avoid impacts on amphibians, all spills of hazardous material should be cleared in the appropriate manner according to the nature and identity of the spill and all contaminated soil removed from the site;
- Avoid sensitive faunal habitats such as drainage lines and wetlands;
- No pylons should be located within drainage lines or the adjacent floodplains.

- CBAs should be avoided by the final power line route as much as possible, especially where these related to sensitive habitats such as forest or wetlands;
- The options containing the least sensitive vegetation types should be selected;
- Disturbance within or near the drainage lines should be kept to a minimum;
- Any roads along slopes should have water diversion structures placed at regular intervals to ensure that they do not capture overland flow and become eroded; and
- Any erosion problems observed along the power line servitude should be rectified as soon as possible using the appropriate re-vegetation and erosion control works.

Ecotourism

The impacts of electricity transmission infrastructure on eco-tourism are closely related to the impacts on the surrounding natural environment, upon which ecotourism products rely. The impact assessment of the proposed project identified the potential negative impacts on the environment that will in turn affect the tourism product as follows:

- Clearing of vegetation;
- Disturbance of topographic features of the land;
- Degradation as a result of erosion/loss of top soil; and
- Fauna mortality resulting from powerline strikes.

Ecotourism specialist indicated that construction of a powerline along a freeway or alongside existing powerlines has a much lower relative visual impact than a powerline running through a pristine area without existing “eyesores”. In addition, powerline corridor proposed alongside an existing servitude (or where an existing line falls closer to a tourism product than the proposed line) the direct and visual impacts were deemed negligible. The specialist emphasised that Shongweni corridor 3 is considered to have a low impact as it is closer to the route of existing powerline (Existing_Tx_lines_275kV). The impact significance of the project will be low to medium.

Alternative E	No	Negative	2	4	6	2	24 = Low
	Yes	Negative	2	3	6	2	22 = Low

Alternative F	No	Negative	2	4	4	2	20 = Low
	Yes	Negative	2	3	4	2	18 = Low
Alternative G	No	Negative	2	4	2	2	16 = Low
	Yes	Negative	2	3	2	2	14 = Low
Corridor 1	No	Negative	2	4	2	2	16 = Low
	Yes	Negative	2	3	2	2	14 = Low
Corridor 2	No	Negative	2	4	6	2	24 = Low
	Yes	Negative	2	3	6	2	22 = Low
Corridor 3	No	Negative	2	4	4	2	20 = Low
	Yes	Negative	2	3	<u>4</u>	2	18 = Low

Mitigation measures

- The seasonality of the domestic and international tourism markets needs to be taken into account during the construction phase for the proposed projects.
- It is imperative that construction phase/s is strategically selected outside of the peak holiday's season in KwaZulu-Natal, at least around the main tourism nodes identified in this report.
- Make use of existing access roads where possible. Where new access roads are required, disturbance should be minimized by keeping roads narrow and using two-track dirt roads wherever possible.
- Suitable screening should be made available to reduce the visibility of these activities.

Heritage

The heritage impact assessment was conducted within the proposed study area and there no archaeological resources were noted in the proposed area. The impacts on heritage were found to range from low to medium, with the alternative E the most preferred site, followed by F and then G. This recommendation is mostly based on the area less likely to yield graves and historical structures.

Alternative E	No	Negative	1	4	2	3	Low = 21
	Yes	Negative	1	4	2	2	Low = 14
Alternative F	No	Negative	1	4	4	4	Medium = 36
	Yes	Negative	1	4	2	3	Low = 21
Alternative G	No	Negative	1	4	4	4	Medium =36
	Yes	Negative	1	4	2	3	Low =21
Corridor 1	No	Negative	2	4	2	2	16 = Low
	Yes	Negative	2	3	2	2	14 = Low
Corridor 2	No	Negative	2	4	6	2	24 = Low
	Yes	Negative	2	3	6	2	22 = Low
Corridor 3	No	Negative	2	4	4	2	20 = Low
	Yes	Negative	2	3	<u>4</u>	2	18 = Low

Mitigation measures

- Should any heritage or archaeological artefacts be discovered during construction or operational phase, all works must be stopped at the affected area and SAHRA must be contacted.

Wetland: Soil erosion, sedimentation and degradation within water resource systems

The impact assessment of the proposed project identified the potential negative impacts on the wetland systems as follows:

- Soil compaction leading to erosion, sedimentation and degradation of wetland systems;
- Pollution of wetlands and soil as a result of the construction phase of the project; and
- Disturbance within the wetland systems thereby increasing the encroachment of alien invasive species and the loss of natural habitat for fauna and flora.

The impacts associated with the wetland system would be moderate which can be reduced to low through the application of appropriate mitigation measures.

Alternative E	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	6	3	27 = Low
Alternative F	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	6	3	27 = Low
Alternative G	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	6	4	36 = Moderate
Corridor 1	No	Negative	2	2	8	4	48 = Moderate
	Yes	Negative	1	2	6	3	27 = Low
Corridor 2	No	Negative	2	2	8	4	48 = Moderate
	Yes	Negative	1	2	6	3	27 = Low

Corridor 3	No	Negative	2	2	8	4	48 = Moderate
	Yes	Negative	1	2	6	3	27 = Low
Wetland: Pollution of water resources and soil							
Alternative E	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	4	3	21 = Low
Alternative F	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	4	3	21 = Low
Alternative G	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	6	4	36 = Moderate
Corridor 1	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	4	4	28 = Low
Corridor 2	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	4	4	28 = Low
Corridor 3	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	4	4	28 = Low
Wetland: Alien invasive species							

Site E	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	6	4	36 = Moderate
Site F	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	6	4	36 = Moderate
Site G	No	Negative	2	2	8	5	60 = High
	Yes	Negative	1	2	6	4	36 = Moderate
Corridor 1	Yes	Negative	2	2	8	5	60 = High
	No	Negative	1	2	6	4	36 = Moderate
Corridor 2	Yes	Negative	2	2	8	5	60 = High
	No	Negative	1	2	6	4	36 = Moderate
Corridor 3	Yes	Negative	2	2	8	5	60 = High
	No	Negative	1	2	6	4	36 = Moderate
Mitigation measures							

- The enforcement of the buffer and the placement of towers outside wetland systems will significantly reduce the impact on the wetlands;
- Areas which have been disturbed will be quickly colonised by invasive alien plant species;
- All waste generated during construction is to be disposed of at an appropriate facility and no washing of paint brushes, containers, wheelbarrows, spades, picks or any other equipment adjacent to the watercourses is permitted;
- The creation of access roads must take all wetlands and watercourses into consideration and these systems must be avoided;
- All disturbed areas must be rehabilitated as soon as construction in an area is complete or near complete and not left until the end of the project to be rehabilitated;
- Do not locate the construction camp or any depot for any substance which causes or is likely to cause pollution within a distance of 100m of the delineated water resources;
- No release of any substance i.e. cement, oil, that could be toxic to fauna or faunal habitats within the watercourses; and
- Spillages of fuels, oils and other potentially harmful chemicals must be cleaned up immediately; and disposed at solid/hazardous waste facilities (not to be disposed of within the natural environment); and
- Any contaminated soil must be removed and the affected area rehabilitated immediately.

10.1.3 GENERAL CUMULATIVE IMPACTS

This section outlines the general cumulative impacts that might result from the proposed substation, powerline and associated infrastructures as follows:

10.1.3.1 WASTE GENERATION

During the construction phase there will be a variety of waste material produced.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Waste	No	Negative	2	2	4	5	40 =Medium
	Yes	Negative	1	2	4	2	14 = Low
Mitigation Measures	<ul style="list-style-type: none"> No waste will be buried on site or incorporated into the foundation trenches. The work force must be encouraged to sort waste into recyclable and non-recyclable waste. No burning of waste will be allowed on site. Waste must be regularly removed from site and disposed of at a registered waste disposal facility. 						

10.1.3.2 SOCIO-ECONOMIC IMPACT

The proposed development will result in a positive socio-economic impact as the demand for equipment, building material and labour will increase. Secondary service provision such as food supply, toilet hire, equipment maintenance etc. would also stimulate the local economy especially during the construction phase.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Socio-economic	No	Positive	3	2	8	5	65 Medium
	Yes	Negative	1	2	4	2	14 Low

Mitigation Measures	<ul style="list-style-type: none"> Contractors must by all means practice the localisation matrix while seeking for construction equipment or building materials. For minimal jobs, the appointed contractor should by all means consider the local residents for jobs that do not need any skill transfer. Property owners or occupiers must be treated with respect and courtesy at all times; The culture and lifestyles of the communities living in close proximity to the proposed development must be respected; A register must be maintained of all complaints or queries received as well as action taken.
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10.1.3.3 VISUAL IMPACT

The proposed activity will change the visual character of the area particularly considering that the proposed site is located next to major roads (i.e. N3). Given the undulating topography on some other areas of the site and the proximity to these routes, the impact can be considered definite and long term. Cumulatively, the impact may be lower than anticipated due to existing power lines and substation. A visual impact study will be conducted during the EIA phase.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Visual impacts	No	Negative	2	4	8	5	70 High
	Yes	Negative	2	4	6	3	36 Medium
Mitigation Measures	<ul style="list-style-type: none"> Keep disturbed areas to a minimum. No clearing of land to take place outside the demarcated footprints. The contractor should maintain good housekeeping on site to avoid litter. New road construction must be kept to a minimum. Utilise existing roads and tracks to the extent possible. All contractors to adhere to a construction phase Environmental Management Programme 						

10.1.3.4 TRAFFIC IMPACT

During the construction phase increased heavy vehicle traffic should be expected. Without management, such increased traffic loads may negatively impact existing traffic flow. Further unmanaged construction vehicles may decrease road safety for other road users and uncontrolled movement of construction vehicles may result in unnecessary impacts to the environment through vegetation and habitat destruction.

Aspect	Corrective measures	Impact rating criteria					Significance
		Nature	Extent	Duration	Magnitude	Probability	
Traffic impact	No	Negative	3	2	8	3	39 Medium
	Yes	Negative	2	2	6	2	20 Low
Mitigation Measures	<ul style="list-style-type: none"> The delivery of construction material and equipment should be limited to hours outside peak traffic times (including weekends) prevailing on the surrounding roads. Access roads must be clearly marked. Delivery vehicles must comply with all traffic laws and bylaws. 						

10.2 PLAN OF STUDY FOR EIA

The Scoping phase of the Environmental Impact Assessment (EIA) process is fundamental as it allows for the identification of potential impacts on the environment, as well as facilitation of the process of compiling the EIA and Environmental Management Programme (EMPr). The draft Scoping Report attached hereto has been compiled from information from the client, specialist studies, site visits, literature reviews as well as previous environmental studies conducted in the area; it therefore, provides a comprehensive baseline of the environment at the proposed site.

This Scoping Process has followed the appropriate standards and procedure for the EIA application, as set out in the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, and the EIA Regulations of 2014. The Scoping Study includes a description of the various alternatives and indicates those alternatives, which should be pursued as part of the detailed assessment of the EIA process. Impact significance of the proposed activity on the environment will be assessed in the EIA phase with the assistance of the various specialist studies.

The purpose of this section is to outline how the EIA for the proposed development of Shongweni 2 x 500MVA 400/132kV substation, 400KV powerline and associated infrastructures will proceed during EIA phase. The detailed assessment phase of the EIA process entails the integration of the specialist studies for those potential impacts evaluated to be of significance. Relevant mitigation measures will be used to compile an EMP. This section provides specific terms of reference and impact assessment methodology for utilisation by the specialist team and EAP. The Plan of study for EIA also outlines the remainder of the PPP as well as the process in terms of the NEMA EIA Regulations.

The Plan of Study for EIA is intended to provide a summary of the key findings of the Scoping Phase and to describe the activities to be undertaken in the Impact Assessment Phase of the EIA process. According to the amended EIA regulations and other legislation, the document is required to provide the following:

- A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;
- A description of the aspects to be assessed as part of the environmental impact assessment process;
- Aspects to be assessed by specialists;
- A description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;
- A description of the proposed method of assessing duration and significance;
- An indication of the stages at which the competent authority will be consulted;
- Particulars of the public participation process that will be conducted during the EIA process;
- A description of the tasks that will be undertaken as part of the environmental impact assessment process; and
- Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.

The EAP will ensure that the entire process is undertaken as dictated by the Regulations.

10.2.1 A DESCRIPTION OF THE ALTERNATIVES TO BE CONSIDERED AND ASSESSED WITHIN THE PREFERRED SITE, INCLUDING THE OPTION OF NOT PROCEEDING WITH THE ACTIVITY

The scoping phase of the project assessed technical, site and structural alternatives. These alternatives will be assessed further during the EIA. The preferred site will be the site with the relatively shorter loop in and loop out power lines, least sensitivity, easy to access, relatively flat terrain and least contested by the I&AP as well as stakeholder.

10.2.1.1 SITE ALTERNATIVES

The substation sites to be assessed further during the EIA include alternative Sites E, F, G and the associated powerline corridors as well as the No-Go Alternative.

10.2.1.2 TECHNICAL ALTERNATIVES

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

Table 19: Alternative Analysis

	Advantages	Disadvantages
Underground 400 kV power line	<ul style="list-style-type: none"> Minimal Visual Impact 	<ul style="list-style-type: none"> Increased ground disturbance, therefore increased impact on sensitive environments. High maintenance cost High construction costs; underground costs 4 times more than the above ground cables
Above Ground 400kV power line	<ul style="list-style-type: none"> Minimal ground disturbance therefore reduced impact on sensitive environments. 	<ul style="list-style-type: none"> Considerable Visual Impact

	<ul style="list-style-type: none">• Economically feasible as it offers a cost saving• Easy maintenance and reduced maintenance cost	
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It is therefore evident that the merits of the underground option are minimal, given the nature of the terrain as well as other technical requirements the underground option is not feasible. The underground alternative will not be assessed any further during the EIA. The aboveground (overhead option) is the remaining option which will be assessed further during the EIA process

10.2.1.3 STRUCTURAL ALTERNATIVES

The following three structural alternatives are under consideration:

- Cross-Rope suspension type;
- Self-supporting type; and
- Guyed V towers.

Given the comments received from stakeholders regarding the visual impacts of the proposed project, the selection of the pylons to be used for the proposed powerline will take the potential impacts into consideration. None of the above options have been dismissed and they remain alternatives depending on the terrain and topography.

10.2.2 A DESCRIPTION OF THE ASPECTS TO BE ASSESSED AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT

During the draft scoping phase, seven specialist studies were undertaken and these include Agricultural Potential, Eco-Tourism, Wetland, Aquatic ecology, Biodiversity, Heritage and Avifauna Studies and the reports are attached herein. The studies undertaken during the scoping phase assessed all the seven alternative sites and will continue with the three alternative sites as well as the No-go option during the EIA phase. The following are aspects to be assessed as part of the EIA:

- Agriculture;
- Biodiversity (flora and fauna);
- Avifauna;

- Water resources;
- Heritage and archaeology;
- Aesthetics;
- Noise;
- Tourism;
- Access;
- Waste management;
- Traffic; and
- Socio-economics.

Aspects to be assessed by the specialist are included in Table 20:

Table 20: Specialist and Aspects

Specialist Study	Specialist	Aspects
Biodiversity	Simon Todd	Flora and fauna
Heritage	Munyadziwa Magoma of Vhubvo Archaeo-Heritage Consultants	Heritage and Palaeontology
Avifauna	Megan Diamond of Feathers Environmental	Avifauna
Agriculture	Garry Peterson of ARC	Soils and Agricultural potential
Wetland Delineation and Aquatic	Rowena Harrison of Malachite	Hydrology and Wetland
Eco Tourism	Edward Rice of ETC	Tourism

10.2.3 A DESCRIPTION OF THE PROPOSED METHOD OF ASSESSING THE ENVIRONMENTAL IMPACTS

The description of the proposed method of assessing the duration and significance is included on Table 16 above.

10.2.4 AN INDICATION OF THE STAGES AT WHICH THE COMPETENT AUTHORITY WILL BE CONSULTED

Figure 25 below indicates the different stages at which the Competent Authority will be consulted.

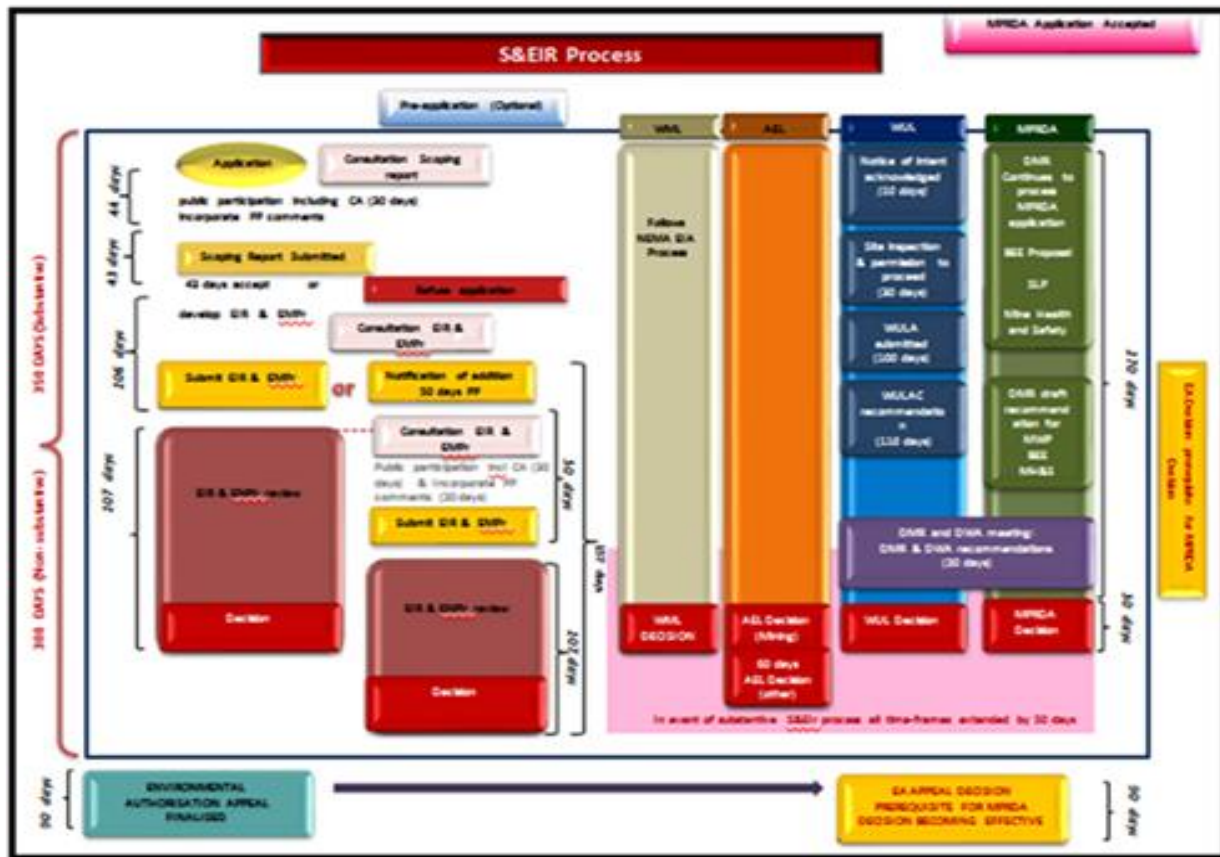


Figure 23: Stages for submitting the reports to the Competent Authority

10.2.4.1 SCOPING PHASE

As part of the Scoping phase, the draft Scoping Report together with the Application Form will be submitted to the DEA for review and comments. Comments will be received by the EAP and respond to the accordingly. Furthermore, the final Scoping Report will be submitted to the DEA for consideration.

10.2.4.2 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The draft Environmental Impact Assessment Report will be prepared and distributed for public review and comments. Further, copies of the draft EIA will be submitted to the DEA and other stakeholders for review and comment. Then the final EIR that incorporate all comments and specialist reports and recommendations will be submitted to DEA for decision making.

10.2.5 PARTICULARS OF THE PUBLIC PARTICIPATION PROCESS THAT WILL BE CONDUCTED DURING THE ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The extensive database of stakeholders developed during the scoping process will be used as a basis to ensure that those stakeholders involved in the Scoping Phase also participate in the EIA phase. The database will also be expanded to include I&APs that wish to be involved in the process. Registered I&APs will be informed of the availability of the Draft EIA Report for review and will be given 30 days to provide their comment.

The comments received during the 30-day review period of the Draft EIA Report will be incorporated into an updated Comments & Response Report. Further public consultation will take place in the form of Public meetings and focus group meetings as appropriate.

The purpose of the public meetings would be to present the findings of the Draft EIA Report as well as the alternatives considered to the relevant stakeholders, registered I&APs and the affected landowners. Nsovo will use this forum to provide more information about the proposed development including the specialist input, and also to provide the stakeholders with the opportunity to further comment on the proposed development.

In the event that the comments and issues raised highlight information that changes or influences the impact evaluation provided in the Draft EIA, the necessary amendments will be made to the report. The Final EIA Report will be submitted to the DEA, subsequent to the second phase of public consultation.

10.2.5.1 ADVERTISING

In line with the EIA Regulations, the commencement of the EIA process i.e. the Scoping Phase of the project was advertised in a local newspapers in English. The proposed project was further announced publicly through the following forms of information sharing:

- Newspaper adverts providing a description of the proposed development and location, as well as contact details of where more information can be obtained and announcing the availability of the Draft Report for review and comment;
- Notices (with descriptions as above) were placed at conspicuous locations around the proposed alternative sites as well as at the eThekweni Metropolitan Municipality offices;

- A5 notices were distributed in the immediate vicinity of the development; and
- Letters were submitted to key stakeholders.

Further advertising will take place during the EIA phase and will relate to the availability of the reports for public review and announcement of public meetings that will be held at strategically located sites, which will allow for maximum attendance.

10.2.5.2 INTERACTION WITH DEA AND PROVINCIAL ENVIRONMENTAL DEPARTMENTS

Interaction with DEA and the other provincial environmental authorities was undertaken during the Scoping Phase and will continue into the EIA Phase of the project. Further interaction will occur in the following manner:

- Submission of the Final Scoping Report to DEA;
- A consultation meeting with various stakeholders and I&APs as appropriate, to discuss the findings of the Draft EIA;
- Submission of the Final EIA report, following a public review period; and
- Notification of registered I&APs of the Environmental Authorization (EA) once it is issued by the DEA.

The draft EIR will be reviewed by I&AP's, authorities and key stakeholders. The Report will be submitted to:

- eThekweni Metropolitan Municipality;
- South African Heritage Resource Agency;
- KwaZulu Natal Department of Transport and Public Works;
- KwaZulu Natal Department of Water and Sanitation;
- Wildlife and Environmental Society of South Africa;
- KwaZulu Natal Department Economic Development, Tourism and Environmental Affairs;
- National Department of Environmental Affairs;
- National Department of Water and Sanitation.
- Registered Interested & Affected Parties; and
- Department of Water and Sanitation.

Further, the Report will be made available on Nsovo website.

10.2.5.3 DEVELOPING A STRATEGY AND RESOLVING KEY ISSUES

A strategy for addressing and resolving key issues is to be developed and will include:

- Details on all assessments and investigations carried out;
- Use of the Public Participation Meetings to present the findings of the reports and test the acceptability of priority issues and mitigations;
- Openly and honestly relating both positive and negative impacts of the proposed development during the Public Meetings; and
- Allowing the public to understand the consequences of the proposed development on the area.

10.2.6 A DESCRIPTION OF THE TASKS THAT WILL BE UNDERTAKEN AS PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT

The section below indicates the tasks that will be undertaken as part of the EIA process.

10.2.6.1 PREPARATION OF THE DRAFT EIA REPORT AND EMPR

The draft EIA Report and the EMPr will be prepared as per Appendices 3 and 4 of the EIA Regulations. The EIA Report and EMPr will include input from the specialist studies as indicated in Section 7.7.3 above.

Contents of the draft EIR (Appendix 3) will include the following:

- Details and expertise of the EAP;
- Location of the Activity;
- A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale;
- A description of the scope of the proposed activity;
- A description of the policy and legislative context within which the proposed development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;
- A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;

- A motivation for the preferred development footprint within the approved site;
- A full description of the process followed to reach the proposed development footprint within the approved site;
- A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity;
- An assessment of each identified potentially significant impact and risk including (i) and (vii) as per the Regulations;
- A summary of the findings and recommendations of specialist reports;
- Environmental Impact Statement inclusive of (i) to (iii) as per the Regulations;
- Recommendations from the specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation;
- The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;
- Aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;
- A description of any assumption, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;
- A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;
- The period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;
- The undertaking under oath by the EAP in relation to (i) and (iv) as per the regulations; and
- An indication of any deviation from the approved Scoping Report, including the Plan of Study including (i) and (ii) as per the Regulations.

Contents of the EMPr (Appendix 4) will include the following:

- An EMPr must comply with Section 24N of the Act and include - details of the EAP who prepared the EMPr; and the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
- A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;

- A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;
- A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including (i) to (v) of the EIA Regulations;
- A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated above will be achieved, and must, where applicable, include actions as indicated on (i) to (iv) of the EIA Regulations.
- The method of monitoring the implementation of the impact management actions contemplated above;
- The frequency of monitoring the implementation of the impact management actions contemplated above;
- An indication of the persons who will be responsible for the implementation of the impact management actions;
- The time periods within which the impact management actions contemplated above must be implemented;
- The mechanism for monitoring compliance with the impact management actions contemplated above;
- A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;
- An environmental awareness plan describing the manner in which-
 - (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and
 - (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and
- Any specific information that may be required by the competent authority.

10.2.6.2 PUBLIC PARTICIPATION PROCESS

The draft EIA Report will be distributed to I&APs as well as the Organs of State for a 30 days review and comments period. Various means of notifying the I&APs of the availability of the draft EIA Report will be used and this include newspaper advert, e-mails, letters etc. The public participation process will be undertaken as indicated on Section 7 above.

10.2.6.3 PREPARATION OF THE FINAL EIA REPORT AND EMPR

The final EIA Report and EMPr will be prepared as per Appendices 3 and 4 of the EIA Regulations, further; it will be submitted to DEA in hard copy and electronic version (CD) and will include the following:

10.2.7 IDENTIFY SUITABLE MEASURES TO AVOID, REVERSE, MITIGATE OR MANAGE IDENTIFIED IMPACTS AND TO DETERMINE THE EXTENT OF THE RESIDUAL RISKS THAT NEED TO BE MANAGED AND MONITORED

The aspects that will be assessed have been identified and their potential impacts and mitigation measures will be indicated. The proposed method of assessing environmental aspects is included on Section 8, Table 16 above.

11. UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP

In undertaking the draft and final Scoping phases of the project the EAP has taken into consideration the requirements stipulated in the EIA Regulation as amended, as well as other relevant Acts and Regulations. The EAP hereby confirm that with the information available at the time of preparing the Scoping Report and the reports prepared by the specialists, the following has been taken into account in preparing this report:

- The correctness of the information provided in the report;
- The inclusion of comments and inputs from stakeholders and interested and affected parties; and
- Any information provided by the EAP to the interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties.

Refer to **Appendix E2** for the Declaration of the EAP.

12. AN UNDERTAKING UNDER OATH OR AFFIRMATION BY THE EAP IN RELATION TO THE LEVEL OF AGREEMENT BETWEEN THE EAP AND INTERESTED AND AFFECTED PARTIES ON THE PLAN OF STUDY FOR UNDERTAKING THE ENVIRONMENTAL IMPACT ASSESSMENT

The draft Plan of Study was part of the draft Scoping Report which was made available to I&APs and Organs of State for a 30 days review and comment period. Comments/issues raised have been addressed and are included in the Issues and Response Report (**Appendix D4**).

No agreement between the EAP and I&APs is in place.

13. WHERE APPLICABLE, ANY SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

The information required by the authority and is currently available, has been included in this draft Scoping Report.

14. ANY OTHER MATTER REQUIRED IN TERMS OF SECTION 24(4) (a) AND (b) OF THE ACT.

This Report has been prepared in terms of NEMA, its respective EIA Regulations as well as other various Acts. Information that is required by the NEMA has been included in the Scoping Report and will also be included in the EIA phase.

15. CONCLUSION

The Scoping study was undertaken as dictated by the NEMA and the EIA Regulations as well as associated Legislations.

The site alternatives have been proposed and the primary objective was to assess the suitability of each site for the intended use as well as to assess the impacts of the proposed development i.e. the Shongweni substation and associated loop in and loop out power lines on the environment. This report has comprehensively addressed the baseline environment which will form the backdrop of the impact assessment. Information provided has been supported by specialist studies that were undertaken and attached hereto.

No fatal flaws or highly significant impacts were identified during the scoping phase that would necessitate substantial redesign or termination of the project. The main impacts are outlined below, and recommended mitigation measures and a summary of site suitability and residual impacts will further be assessed in detail during the EIA phase. Such potential impacts include the following:

- Impacts on agriculture;
- Impacts on flora and fauna;
- Impacts on avifauna;
- Impacts on water resources;
- Impacts on heritage and archaeology;
- Impact on aesthetics;
- Impact on noise;
- Traffic impact; and
- Impact on tourism.

The subsequent EIA phase will provide a detailed assessment of the identified aspect, rate the significance accordingly and propose mitigation measures as applicable.

16. REFERENCES

<http://weatherhq.co.za//swellendam>

DEAT, 1998. A National Strategy for Integrated Environmental Management in South Africa. Compiled by Environomics

DEAT, 1998 Guideline Document: Environmental Impact Assessment Regulations

DWAF (2005). A Practical Field Procedure for Identification and Delineation of Wetlands and Riparian Areas - Edition 1

Eskom, December 2015. Network Planning: KwaZulu-Natal Operating Unit

Harrison, J.A., Allan, D.G., Underhill, L.G., Herremans, M., Tree, A.J., Parker, V & Brown, C.J. (eds). 1997. The atlas of southern African birds. Vol. 1&2. Bird Life South Africa: Johannesburg.

EThekweni Metropolitan Municipality., Integrated Development Plan (IDP) annual report IDP, 2017.

Mucina, L. & Rutherford, M.C. (2006): The vegetation of South Africa, Lesotho and Swaziland. *Strelitzia 19*. South African National Biodiversity Institute, Pretoria.

Raimondo, D., von Staden, L., Foden, W., Victor, J.E., Helme, N.A., Turner, R.C., Kamundi, D.A. & Manyama P.A., (eds) (2009): Red List of South African plants 2009. *Strelitzia 25*, South African National Biodiversity Institute.

Scott-Shaw, R., & Escott, B. (2012). KwaZulu-Natal Provincial Pre-transformation Vegetation Type. Pietermaritzburg: Ezemvelo KZN Wildlife

Overberg district Air quality Management Plan , November 2012