NAKO ILISO

ENVIRONMENTAL IMPACT ASSESSMENT
FOR ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT

IPHIVA SUBSTATION

REFERENCE NUMBER 14/12/16/3/3/2/1037

DRAFT ENVIRONMENTAL IMPACT ASSESMENT REPORT - APRIL 2018

Eskom

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ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT: IPHIVA SUBSTATION

ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Title:	Environmental Impact Assessment Report for Eskom's Northern KwaZulu-Natal Strengthening Project: Iphiva Substation
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Project name:	Eskom's Northern KwaZulu-Natal Strengthening Project: Environmental Impact Assessment
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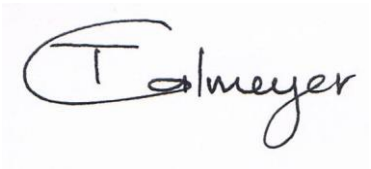
NAKO ILISO

Approved for NAKO ILISO by:



Clint Koopman

Chief Executive Officer

ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT: IPHIVA SUBSTATION

ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PURPOSE OF THE DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

ESKOM Holdings SOC Ltd (Eskom) has commissioned an Environmental Impact Assessment (EIA) of the proposed project to strengthen the supply of electricity in northern KwaZulu-Natal (KZN). The proposed project consists of the new Iphiva 400/132 kV Substation (Iphiva Substation) near the town of Mkhuze in KZN, which will be integrated into the 400 kV Transmission network by two 400 kV Transmission powerlines, namely the approximately 127 km Normandie-Iphiva, and the approximately 107 km Iphiva-Duma 400 kV Transmission powerlines. Approximately 165 km of 132 kV Distribution powerlines will also link into the Iphiva Substation. The EIA is being undertaken by NAKO ILISO as an independent Environmental Assessment Practitioner (EAP), and is being done in terms of the National Environmental Management Act (No 107 of 1998) (NEMA), in particular Regulations GN. R982, R983, R984 and R985 promulgated in December 2014, as amended.

This EIA Report deals with the proposed new Iphiva Substation. Separate applications and reports have been prepared for the substation and other new powerlines. The environmental studies are required to provide an assessment of the project in terms of the biophysical, social and economic environments to assisted both the Environmental Authorities (in this case the Department of Environmental Affairs (DEA)) and Eskom in making decisions regarding the future of the project.

The EIA Report presents a summary of the findings of the specialists studies and provides recommendations on the mitigation measures that should be implemented in order to minimise the negative and maximise the positive impacts.

In keeping with environmental legislations, it is the responsibility of the EAP to ensure that the public is provided the opportunity to participate meaningfully in the environmental assessment process. Accordingly, Interested and Affected Parties (I&APs) are invited to review the Draft EIA Report from 26 April to 29 May 2018 and submit their comments to the public participation officer.

The comments received during this period will be incorporated into the Final EIA Report, and submitted to the DEA who will decide whether the project should go ahead and if so under which conditions. I&APs will be notified of DEA's decisions once it has been made.

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT DISTRIBUTION

Pdf versions of the documents will be uploaded to the NAKO ILISO website. Provision has been made to cut 10 CDs of each of the sets of draft reports. These will be available at key stakeholder and authorities and focus group meetings, or posted to I&APs on request. Hard copies have been placed in the libraries listed below.

Placing of draft documents at public venues

Area	Venue	Address	Contact Details
Piet Retief	Piet Retief Public Library	Piet Retief, 2380	Tel: 017 826 8153
Pongola	Pongola Public Library	61 Martin St, Pongola, 3170	Tel: 034 413 1540
Mkhuze	Ghost Mountain Inn	Fish Eagle Street, Mkuze	Tel: 035 573 1025
Hluhluwe	Hluhluwe Public Library	163 Zebra Street, Hluhluwe	Tel: 035 562 0040

All comments received will be recorded in the Comments and Responses Report (CRR).

INTERESTED AND AFFECTED PARTIES MEETINGS

The Draft EIA Report will also be presented at Key Stakeholders and Authorities meetings as listed in the table below.

Key Stakeholder and Authorities Meetings

Date and Time	Area	Address
Wednesday 09 May 2018 **10h00 – 12h30**	Pongola	Pongola Country Lodge 14 Jan Mielie Street, Pongola
Thursday 10 May 2018 **10h00 – 12h30**	Mkhuze	Ghost Mountain Inn Fish Eagle Road, Mkhuze

Minutes of the meetings that have taken place since the compilation of the Final Scoping Report have been prepared and distributed to all attendees with the opportunity to provide corrections within 14 days. Final minutes are included in **Appendix C**.

Focus Group Meetings

Focus group meetings will be held as follows:

Meeting Type and Target Audience	Day, Date and Time	Area	Venue & Physical Address
Public Meeting: Commondale Farmers Association	Monday 07 May 2018 **15h00 – 17h30**	Between Paulpietersburg and Piet Retief	Commondale Farmers Association

Meeting Type and Target Audience	Day, Date and Time	Area	Venue & Physical Address
Public Meeting: Moolman Farmers Association	Tuesday 08 May 2018 **10h00 – 12h30**	Piet Retief	TWK Agri 11 De Wet Street Piet Retief

Meetings with traditional councils

Meetings with each of the Traditional Councils took place during the Scoping Phase. Follow up meetings are planned for the public comment period for the Draft EIA report. All Traditional Council meetings will be conducted in Zulu. All comments received at these meetings will be incorporated into the CRR.

ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT: IPHIVA SUBSTATION

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EXECUTIVE SUMMARY

Background

ESKOM Holdings SOC Ltd (Eskom) has commissioned a project to strengthen the supply of electricity in northern KwaZulu-Natal (KZN). NAKO ILISO has been appointed to undertake an Environmental Impact Assessment (EIA) to support applications for Environmental Authorisation (EA).

The project has been divided into the following four components, each of which has an application:

- *Iphiva Substation;*
- *Normandie-Iphiva 400 kV Transmission Powerline;*
- *Iphiva-Duma 400 kV Transmission Powerline; and*
- *132 kV Distribution Powerlines.*

This report documents the process and findings of the assessment of the Iphiva Substation. This report will be subject to a public comment period after which it will be finalised and submitted to the competent authority for review.

Need for the project

The northern KZN network is currently fed at 132 kV by the Normandie and Impala Main Transmission Substations. The major load centres are Pongola and the Makhathini Flats. The Normandie Substation is situated approximately 80 km north-west of Pongola and the Impala Substation is situated approximately 180 km south of Makhathini Flats. High voltage drops are experienced in the 132 kV network and the voltages are approaching unacceptable low voltage levels as the demand increases. Contingencies on the main 132 kV supplies also lead to thermal overloading of the remaining network.

Project Description

In order to strengthen and alleviate current and future network constraints in northern KZN, it is proposed that the Iphiva 400/132 kV Substation be introduced in the area, which will de-load the main sub-transmission network and improve the voltage regulation in the area. The Iphiva Substation will be integrated with the existing electricity network by 400 kV Transmission powerlines to the Normandie and Duma Substations, and approximately 165 km of 132 kV Distribution powerlines.

A total footprint of 400 x 400 m (i.e. 16 ha) will be required for the development, within a site-specific study area of 1 x 1 km. The 16 ha development footprint area includes provisions for an 80 m high microwave radio communication mast, oil and fuel storage facilities, and an oil bund to contain any accidental transformer oil spills. The proposed substation will comprise standard electrical equipment, including transformers, reactors, busbars, and isolators.

Listed Activities

The proposed project triggers several activities listed in the National Environmental Management Act (No 107 of 1998) (NEMA), as amended, as requiring environmental authorisation before they can commence. The purpose of this study is to undertake an EIA process, with associated Public Participation Process (PPP) and specialist studies, to enable the competent authority to decide whether the project should go ahead or not, and if so, then on what conditions.

Receiving Environment

The project is located in the KZN Province. The area has warm to hot summers, high evaporation, dry warm winters and a mean annual rainfall between 495 and 1 560 mm. Average rainfall is higher in the west and decreases gradually to the east. The dominant landscape features are valley slopes to undulating hills and flat plains with a network of rivers and smaller streams. The northern and central parts of the study area are more mountainous and have extreme topographical features.

The region is well known for its large wetlands, river systems, grassland hills, bushveld and diverse micro-habitats. The study area falls within the Maputaland-Pondoland-Albany hotspot, which is rich in floral diversity and is part of the Maputaland Centre of Plant Endemism. 58 of Southern Africa's endemic and near endemic avifaunal species are found within the project area.

Mkuze and Pongola are the large towns in the area. The rest of the area consist of settlements in areas under traditional leadership, commercial farms and game reserves. The land under traditional management belongs to the Ingonyama Trust. Settlement patterns are scattered. Dwellings consist mostly of brick structures or traditional structures. Most people have isiZulu as their home language.

In terms of commercial farming, sugar cane and forestry are concerns when it comes to the presence of powerlines. Sugar cane needs to be burnt, and as such cannot always be planted below powerlines. Although there are other methods to harvest sugar cane under powerlines, these are more expensive and labour intensive. Fire is a risk for forestry, and a spark or a snapped powerline could cause extensive damage.

Alternatives

Eskom and the EAP, in consultation with specialists and I&APs identified thirteen (13) technically feasible approximately 1 km^2 sites on which Eskom could construct the substation. A technical screening and comparative assessment were undertaken in the Scoping Phase of the project, and the two sites that are the best practical environmental option, referred to as Iphiva 3 and Iphiva 6, were recommended for further assessment.

Public Participation in the Scoping Phase

Public participation is an important aspect of any EIA, with the objective to assist stakeholders to table issues of concern, suggestions for enhanced benefits and to comment on the findings of the EIA. The PPP is designed to provide sufficient and accessible information to Interested and Affected Parties (I&APs) in an objective manner.

An I&AP database has been established to record the details of stakeholders that wish to register for the project. Key stakeholders have been identified and notified of the project and their opportunities to participate. A Background Information Document was compiled and distributed to all registered I&APs and at meetings. Newspaper advertisements were placed in four newspapers in English and isiZulu. Onsite notices were erected at 23 locations in the study area. Meetings were held with Key Stakeholders and Authorities at four venues in the study area, in order to present the proposed project to them, and give them an opportunity to raise any concerns that they might have. Similar meetings, in isiZulu, took place with each of the 31 Traditional Councils in the study area. Focus Group Meetings with Ezemvelo KZN Wildlife (Ezemvelo), organisations concerned about impacts on birds, Farmers Organisations and the landowners of the substation site alternatives also took place.

The draft Scoping Report was available for public comment. All comments made at meetings or submitted by other means were captured in a Comments and Responses Report, and incorporated into a Final Scoping Report that was submitted to the competent authority for review. The competent authority has accepted the Final Scoping Report and this EIA phase of the project has been undertaken according to the Plan of Study in the Scoping Report.
This draft EIA Report is now available for a 30-day public comment period. All comments received will be considered and the EIA Report will be finalised for submission to the competent authority.

Key Issues

The following key issues have been identified:

- *Impacts on areas protected by National and Provincial legislation resulting in loss of plants and animals of conservation value and a loss in the income from and value of the facilities, primarily due to visual impacts;*
- *Impacts on the rich and diverse fauna and flora (specifically large birds);*
- *Impacts on land use, particularly for sugar cane farmers and forestry;*
- *Impacts on heritage resources;*
- *Social impacts;*
- *Economic,*
- *Impacts on the biophysical environment resulting from access roads;*
- *Construction impacts; and*
- *Cumulative impacts.*

Specialist Studies

This EIA Report uses input from specialists to assess the key impacts, determine their significance, and recommend appropriate measures to mitigate negative impacts and enhance benefits. The specialist studies that have been undertaken are summarised below. Mitigation measures recommended have been included in the Draft Environmental Management Programme (EMPr).

*A preliminary **geotechnical** investigation was undertaken to confirm that the sites being assessed are suitable for the construction of a substation.*

*An assessment of the local **flora and fauna** communities associated with the proposed powerlines was undertaken. This study predicted that:*

- *The direct loss of floral species/vegetation types and biodiversity will have a moderate significance after mitigations;*
- *The loss of species of special concern (protected species) would have a negligible impact after mitigation; and*
- *The impact of alien vegetation establishment will be negligible after mitigation.*

The fauna and flora specialist recommended that the project is authorised. Iphiva 3 has a suitable and relatively undisturbed vegetation cover and is not disturbed by anthropogenic activities such as agricultural fields, rural housing, bush clearing or informal roads. The site is available for livestock to graze. Iphiva 6 is disturbed by rural housing, bush clearing or informal roads, with little natural habitat remaining. There is scattered natural vegetation such as Aloe marlothii (Mountain Aloe) and various Acacia species. Based on the amount of natural habitat that is relatively undisturbed that will be disturbed by the placement of the substation the fauna and flora specialist recommended Iphiva 6 as the preferred alternative.

*With the clearing of vegetation for the construction of the substation, **avi-fauna** habitat will be removed. Indigenous vegetation will be replaced by fast growing alien and weed vegetation, degrading the general habitat quality. The construction of infrastructure especially at height, which includes distribution lines emanating from the substation will pose a risk to avifaunal species in the form of collision and electrocution risk.*

The consideration of alternative substation sites from an avifaunal perspective, was primarily determined by the ecological sensitivity present based on:

- *Presence or absence of Red Data or protected bird species;*
- *Presence or absence of exceptional Avifaunal species diversity;*
- *Extent of intact habitat in good ecological condition in the absence of disturbance; and*
- *Presence or absence of important ecosystems protected areas, such as Important Bird Areas, Protected Areas, areas demarcated for future protected area status (National Protected Areas Expansion Strategy) and wetlands.*

The habitat present at Iphiva 6 is impacted by the presence of the local community, with Iphiva 3 being undisturbed and more natural. No Species of Special Concern were encountered on either of the substation sites during the field work. A Brown Snake Eagle was recorded close to Iphiva 3. The significance of the direct loss of habitat types and biodiversity during

construction after mitigation is therefore moderate for Iphiva 3 and minor for Iphiva 6. Loss of species of special concern during construction after mitigation is minor for Iphiva 3 and negligible for Iphiva 6. The avi-fauna specialist recommended Iphiva 6 as the preferred site for the substation.

*The aim of the **wetland** assessment process was to provide specialist opinion on the viability of the proposed strengthening project in terms of wetland ecology. Wetland areas were identified and preliminary wetland boundaries were delineated at the desktop level using detailed aerial imagery (Southern Mapping, 2015) along with 1 m contours for the two Iphiva Substation sites under consideration.*

Baseline and background information was researched and used to understand the area on a desktop level prior to fieldwork; this included but was not limited to:

- *The Ramsar Convention;*
- *National Freshwater Ecosystem Priority Areas (Nel et al., 2011);*
- *Water Management Areas and Quaternary Catchments; and*
- *The KZN 2012 Critical Biodiversity Areas Map.*

The ecologist recommended that the project be authorised. Existing anthropogenic disturbance is by far considered the largest driver of transformation of wetland habitats and Iphiva 6 is therefore the preferred site for development.

*The investigation of **agricultural potential** involved the collation of climate, geology, topography information and determining the broad soil groups of the area as background for further interpretation. Properties of the soil groups, soil depth, clay content, soil restrictions as well as land capability classes were considered. The soil investigation was based on a field investigation and additional available information from the Land Type Survey of the Institute of Soil Climate and Water, as well as other relevant information.*

The soils in the project area were then classed in four land capability/potential classes, namely:

- *Soils of intermediate suitability for arable agriculture;*
- *Soils not suitable for arable agriculture, but suitable for forestry or grazing;*
- *Soils of poor suitability for arable agriculture; and*
- *No dominant class.*

Properties like clay content and susceptibility to erosion is highly dependent on the parent material. The mudstone underlying this area can give rise to soils severely susceptible to erosion when exposed. Exposed surfaces should therefore be limited or prevented. It should be covered with any vegetation even for short periods.

Arable crop production is not restricted by the climate of the area but may become risky in the areas with lower and irregular rainfall patterns.

At the Iphiva 3 and 6 Substations the soils are not suitable for arable agriculture, but rather suitable for grazing from an agricultural viewpoint. When not covered with vegetation the soils have a high risk for erosion. The specialist has no objections to the project from the agricultural and soil potential standpoint and recommends that Iphiva 6 is implemented.

*The **Heritage** Impact Assessment complies in part with the KZN Heritage Act, (No 4 of 2008) (KZNHA) and National Heritage Resources Act, (No 25 of 1999). The greater cultural landscape is expected to contain heritage resources spanning from palaeontological through to contemporary living heritage resources. Various resource types are anticipated to occur. These include but are not limited to archaeological resources from various time periods; and burial grounds and graves.*

Earth moving activities, such as vegetation and surface clearing, or excavation for the relevant infrastructures, construction and/or upgrading of access roads and stringing of conductors have the greatest likelihood of direct impacts on heritage resources.

*The **visual** specialist study is based on the Oberholzer (2005) guideline that draws on best practice in EIA and provides guidance applicable to visual specialist assessments. Projects-specific receptor (viewer) sensitivity is based on accepted international practice, previous experience of the visual specialists, social specialist and the economic specialist.*

Guest houses, game lodges and nature-based tourism in protected areas dependent upon a pristine visual resource for tourism value are considered to have a High viewer sensitivity; rural (commercial farming) homesteads a Moderate viewer sensitivity; and National / provincial road users where other infrastructure is present and transformation has already taken place, Formal settlements (such as Pongola / Mkuze / Ulundi) and informal settlements/ villages (likely considers transmission lines as a sign of progress) a Low viewer sensitivity.

The greatest factor that influenced visual impact for this project was the presence of conservation areas, due to their dependence upon the landscape as visual resource as income generator for tourism-related activities. The avoidance and minimisation of the visual impact was mostly focused around reducing impact on these areas.

Impacts were identified for each of the viewer groups against each of the infrastructure components. Visibility and visual exposure were combined in the GIS viewsheds generated. These aspects and visual intrusion were combined to calculate the intensity / magnitude of each impact. The visual intensity was then combined with pre-defined impact assessment aspects such as the nature, duration, extent to determine the significance of each impact before and after mitigation.

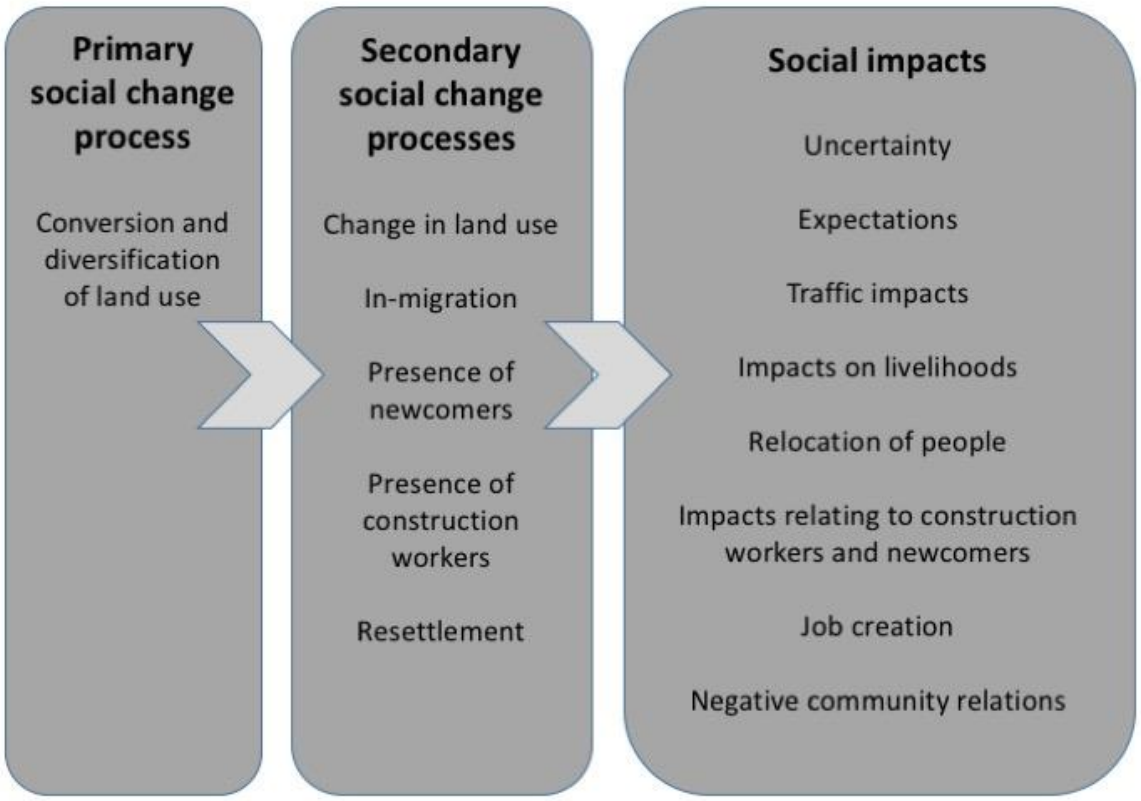
Iphiva 6 is preferred, based on numerous visibility analyses, taking into account scenic points, existing/known lookout points and game drive routes in Manyoni Private Game Reserve, which is the closest game reserve to the two sites.

*Demographic, economic, geographic, institutional, legal, emancipatory, empowerment, and socio-cultural processes were investigated in the **Social** Impact Assessment: The social specialist identified the following key stakeholder groups potentially impacted by the project:*

- *Communities under traditional authority;*
- *Commercial farming;*
- *Tourism establishments; and*
- *Surrounding urban areas.*

The proposed project activities set into motion certain social change processes, and these change processes can lead to the experience of social impacts. Social impacts are context specific and may be experienced differently by different groups in the area. The social environment is very dynamic and is constantly changing.

The following change processes and impacts have been identified for the proposed project:



The social specialist concluded that the project will make an important contribution to the supply of electricity in northern KZN and will be of service to many previously disadvantaged communities. She therefore recommends that the project as a whole should proceed, but in the process attempt to minimise negative social impacts to the immediate environment, keeping in mind the current economic climate and broader societal picture in terms of expenditure. Iphiva 6 is recommended.

One of the key issues that landowners affected by the proposed project have raised is the impact on the eco-tourism activities and knock-on effects including decline in property values, loss of jobs, and reduced budgets for conservation of animals. The socio-economic specialist study only allowed for this to be assessed on a qualitative level. Interaction with the landowners has highlighted that the project could be opposed should this aspect not be adequately addressed. The inclusion of a more detailed ***economic*** *assessment was therefore commissioned.*

Tourism is not an economic sector in its own right but is a complex and composite sector comprising mainly of accommodation, transportation, food and beverages, cultural and recreational activities. The activities undertaken by the tourist relate with the travel, destination, and entertainment activities and expenditure that tourists make. The tourism sector contributes

approximately 6% to the value of economic activity for all goods and services produced within the area. This is slightly higher than the national average. The total number of people employed in tourism amounts to approximately 4.6% of all employment within the regional economy. The tourism value of the region is estimated at R 1.9 billion for the geographical area for 2016, and employment amounts to approximately 9 831 for the corresponding year.

The development of the substation will be a significant investment for and have a positive impact on the economy. This is related to the construction and maintenance of the infrastructure as well as positive spin-off impact due to increased electricity supply. Investment costs for the new substation is estimated to be in the order of R 1.25 billion.

The economic specialist found that the agglomeration of eco- and nature-based tourism is high within this region and a large share of these establishments cater for the international tourism market and even state their tariffs in Euro and Dollar instead of South African Rand. The intensity of the economic impact for tourism activity will be different for each property/activity and depends on inter alia the:

- *Land use type – property with tourism activity, such as game farming, lodges, protected areas and nature reserves should, as far possible, be eliminated from the preferred alignment.*
- *Powerline route – The route should be on the boundary of farms and not transcend properties diagonally or through the middle.*
- *Size of the property – A powerline that transcend properties diagonally or through the middle, for property smaller than 200 ha – tips an argument for expropriation*
- *Existing infrastructure – Do not place powerlines over or in close proximity to tourism infrastructure.*
- *Visibility of the new structure - Place the powerlines / pylons and the substation in areas where it is not visible from tourism areas/hides/etc.*
- *Market related compensation for the affected property should be provided where the powerline is developed.*
- *Landowners should be consulted about their preferred configuration if their property is affected.*

The impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value for game reserves/lodges/private game reserves within the regional economy is estimated to be

approximately R 6 303 per hectare for final sales. The alternatives where the negative economic impact is lowest is preferred.

Impacts (table below) are measured in terms of:

- *Production: refers to the value of output generated in the economy as a result of the existing tourism activity.*
- *Employment: reflects the number of jobs created by the tourism activity.*
- *Household Income: refers to the income by households as a result of their involvement in the activity and downstream beneficiation production.*

Summary of economy wide economic impact

Project Component	***Total hectare within reserve/ lodge/ game farm***	***Economy-Wide Economic Value***	***Employment***	***Household Income***
Iphiva 3	*106 ha*	*R 1.2 million*	*5 jobs*	*R 0.6 million*
Iphiva 6	*0 ha*	*0*	*0*	*0*

The economic specialist found that the construction and operation of the Iphiva 3 Substation will have a high negative significant impact after mitigation on property value of the site while it will be low for Iphiva 6. The significance of the impact on adjacent properties is Medium-High for both sites. The reduction in the economic value of the regional economy as a result of a reduction in tourism activities and future expansion/investment in tourism activity may also be impacted due to the loss in productive land and is expected to be High for Iphiva 3 and Low for Iphiva 6.

The economic specialist recommended that Iphiva 6 be implemented, and in order to achieve the lowest possible negative economic impact a suitable location for the substation on Iphiva 6 should be found where the visual impact is as low as possible for the surrounding areas.

Conclusion and Recommendation

The EAP recommends that the construction and operation of the Iphiva Substation be authorised. Iphiva 6 is the best practical environmental option available.

The substation should be placed in the northern section of Site 6 (with the lowest visibility). The southern slopes of the hill on Site 6 should be avoided. This will reduce the visual and

associated economic impacts on tourism. High structures, such as the radio tower pose a risk of collision for birds, and suitable measures must be applied to make the mast visible to birds.

A site investigation of the proposed substation site layout should be conducted by a suitable qualified avifauna and fauna and flora specialists in order to determine the presence of any threatened, protected, endemic bird, animal or plant species of special concern within or in close proximity to the area to be impacted by construction areas.

Areas with a high ecological sensitivity, wetlands and watercourses should be designated as "No-Go" areas and be off limits to all unauthorised vehicles and personnel.

The footprint area must be limited to what is essential in order to minimise impacts as a result of vegetation clearing and compaction of soils. Protected trees on the footprint of the substation site will require permits before these trees are damaged or removed. Physical damage to natural vegetation on the periphery of the footprint, in all riparian areas and areas with steep slopes must be avoided. No hunting is permitted by Eskom employees or contractors. No incision and canalisation of the wetland features should take place. No material may be dumped or stockpiled in any "No-Go" areas. All vehicles must remain on demarcated roads and within the project area footprint. All land disturbed by Eskom should be vegetated and left in the condition it was before the construction and no disturbed areas should be left uncovered during construction to prevent erosion.

Exemption from further palaeontological assessment is recommended. A Fossil Chance Find Procedure must be included in the EMPr.

The social mitigation and management measures include appointing a Community Liaison Officer; compiling and implementing policies for employment, conduct of employees and contractors, road use, access control specifically for protected and game reserve areas, a relocation and compensation in accordance with international best practice, strategies for community relations, communication, Corporate Social Investment, safety and security, HIV and life skills, and a grievance mechanism. A relocation specialist should be appointed should relocation be required. Construction camps should be established in accordance with international best practice, and Eskom must join local fire protection agencies and have and implement a firefighting strategy.

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ENVIRONMENTAL IMPACT ASSESSMENT

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LIST OF ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
BID	Background Information Document
BPAs	Biodiversity Priority Areas
COGTA	Cooperative Governance and Traditional Affairs
C-Plan	Conservation Plan
CRR	Comments and Responses Report
CSIR	Council for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DPLG	Department of Provincial and Local Government
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EO	Environmental Officer
Eskom	ESKOM Holdings SOC Ltd
GIS	Geographic Information System
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
HIV	Human Immunodeficiency Virus

I&AP	Interested and Affected Party
IBAs	Important Bird Areas
IDP	Integrated Development Plan
IFC	International Finance Corporation
IUCN	International Union for the Conservation of Nature
KZN	KwaZulu-Natal
KZN PSDS	KwaZulu-Natal Provincial Spatial Development Strategy
KZNHA	KwaZulu-Natal Heritage Act
MDG	Millennium Development Goal
MEGDP	Mpumalanga Economic Growth and Development Path
MinMec	Ministers and Members of the Executive Council
N2	National Route 2
NDP	National Development Plan
NEMA	National Environmental Management Act (No 107 of 1998)
NEMPAA	National Environmental Management: Protected Areas Act (No 57 of 2003)
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (No 25 of 1999)
NPAES	National Protected Areas Expansion Strategy
NPC	National Planning Commission
PICC	Presidential Infrastructure Coordinating Committee
PPP	Public Participation Process
SABAP2	South African Bird Atlas Project data
SABS	South African Bureau of Standards
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANS	South African National Standards
SDF	Strategic Development Frameworks
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SIPs	Strategic Integrated Projects
UN	United Nation
UNEP	United Nations Environmental Programme

LIST OF UNITS

km	Kilometre
m	Metre
kV	kilo Volts

GLOSSARY OF TERMS

No-go area:	An area in which the Substation or Powerlines cannot be routed due to resulting significant environmental, technical and social impacts.
Corridor:	A corridor, approximately 2 km wide for 400 kV powerlines and 500 m wide for 132 kV powerlines, that is feasible for the routing of the proposed powerline which will be authorised by DEA. Within this approved corridor a final servitude will be negotiated by Eskom with individual landowners.
Study area:	The area that has been covered by the EIA process within which possible substation and corridors for 132 kV and 400 kV powerlines have been investigated.
Substation:	A collection of equipment for the purpose of raising, lowering and regulating the voltage of electricity.

ESKOM'S NORTHERN KWAZULU-NATAL STRENGTHENING PROJECT: IPHIVA SUBSTATION

ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

1 INTRODUCTION

1.1 BACKGROUND

ESKOM Holdings SOC Ltd (Eskom) has commissioned a project to strengthen the supply of electricity in northern KwaZulu-Natal (KZN). The northern KZN network is currently fed at 132 kV by the Normandie Substation and Impala Substation. The major load centres are Pongola and Makhathini Flats. Normandie Substation is situated approximately 80 km North-West of Pongola and Impala Substation is situated approximately 180 km south of Makhathini Flats. High voltage drops are experienced in the 132 kV network and the voltages are approaching unacceptable levels as the demand increases. Contingencies on the main 132 kV supplies also lead to thermal overloading of the remaining network.

In order to alleviate current and future network constraints in northern KZN, it is proposed that the Iphiva 400/132 kV Substation be introduced in the area, which will de-load the main sub-transmission network and improve the voltage regulation in the area. The Iphiva Substation will be integrated with the existing electricity network by 400 kV Transmission powerlines to Normandie and Duma Substations, and approximately 165 km of 132 kV Distribution powerlines. Each of these four components of the overall scheme will be handled separately as individual projects, requiring separate environmental authorisation. This Draft Environemntal Impact Assessment (EIA) Report is specifically for the Normandie-Iphiva 400 kV Transmission powerline.

1.2 PURPOSE OF THIS STUDY

The proposed project triggers several activities listed in the National Environmental Management Act (Act 107 of 1998) (NEMA) as requiring environmental authorisation before they can commence. The purpose of this study is to undertake an EIA process, with associated Public Participation Process (PPP) and specialist studies, to enable the competent authority to decide whether the project should go ahead or not, and if so, then on what conditions.

This EIA Report supports the application for authorisation of the Iphiva Substation. Separate applications and EIA Reports have been compiled for the associated:

1. The 400 kV powerline from the Iphiva Substation to the Normandie Substation; and
2. The 400 kV powerline from the Iphiva Substation to the Duma Substation.

A Basic Assessment process is required for the application for the authorisation of the 132 kV Distribution powerlines.

1.3 OBJECTIVES OF THIS DOCUMENT

This document serves as the Draft of the EIA Report for the proposed Eskom's Northern KZN Strengthening Project for the Iphiva Substation. According to Government Notice Regulation (GNR) 982 (4 December 2014), the objective of the EIA process is to undertake the following, through a consultative process:

- Determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
- Describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
- Identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
- Determine the--
    - Nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    - Degree to which these impacts-
        - Can be reversed;
        - May cause irreplaceable loss of resources, and
        - Can be avoided, managed or mitigated;
- Identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
- Identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
- Identify suitable measures to avoid, manage or mitigate identified impacts; and

- Identify residual risks that need to be managed and monitored.

The Draft EIA Report will be made available to Interested and Affected Parties (I&APs) for a 30-day review period from **26 April to 29 May 2018**. All comments that are received will be incorporated in the Final EIA Report and will also be noted in the Comments and Response Report. The Final EIA Report will be submitted to national Department of Environmental Affairs (DEA), the Competent Authority in respect to this proposed development.

1.4 DETAILS OF THE APPLICANT

Applicant name:	Eskom Holdings SOC Ltd		
Registration number	2002/015527/30		
Responsible person name	Archibold Mogokonyane		
Applicant/ Responsible person ID number:	7011045082088		
Responsible position	Programme Manager: Land Development		
Physical address:	Megawatt Park, Maxwell Drive, Sunninghill, Johannesburg		
Postal address:	P O Box 1091, Johannesburg,		
Postal code:	2000	Cell:	082 466 6022
Telephone:	011 800 3778	Fax:	011 800 3917
E-mail:	MogokoA@eskom.co.za	BBBEE status	State Owned Company

1.5 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

The Environmental Assessment Practitioner (EAP) undertaking this EIA is **Terry Calmeyer** from MDT Environmental (Pty) Ltd (see Curriculum Vitae in **Appendix A).** Eskom has contracted NAKO ILISO who have sub-contracted MDT Environmental as the EAP.

Terry is certified with the Interim Certification Board as an EAP (No. 0067/05), has a MA (Environment and Society) from the University of Pretoria and over 20 years of EIA experience. She is the Past President of the South African Affiliation of the International Association of Impact Assessment, serves on the Training and Professional Development Committee of IAIA (international) and is a member of the Environmental Law Association. She has been involved in a variety of different types of EIAs including for transmission lines, substations, water supply projects, dams, roads, railways, waste water treatment works and airports, in South Africa, Uganda, Lesotho, Botswana, Namibia and Mozambique. She has led public participation programmes on a number of projects, and has provided strategic environmental input on transportation planning projects. Terry has also been responsible for

compiling and updating Environmental Management Programmes (EMPrs), the management of Environmental Control Officers (ECOs) and Environmental Officers (EOs) and providing environmental project implementation advice. Terry has co-ordinated, lectured for and moderated examinations for several tertiary education courses and presented at external workshops and conferences.

1.6 STRUCTURE OF THIS REPORT

The location of the project is presented in **Chapter 2** of this report. A description of the project in **Chapter 3**. Legislations and guidelines in **Chapter 4** and need and desirability in **Chapter 5**. Alternatives and deviations are presented in **Chapter 6**, and the PPP in **Chapter 7**. The issues raised are presented in **Chapter 8**. The environmental attributes are presented in **Chapter 9**, assessment of impacts in **Chapter 10** and summaries of the specialist studies in **Chapter 11**. **Chapter 12** contains an environmental impact statement, **Chapter 13** conditions to be included in an environmental authorisation, **Chapter 14** assumptions, limitations and gaps. A conclusion and recommendations are presented in **Chapter 15** and reference in **Chapter 16.**

1.7 COMPLIANCE WITH THE EIA REGULATIONS

Section 2 of Appendix 3 of GN R982 specifies the content requirements for an EIA Report. **Table 1.1** indicates how this document complies with these requirements.

Table 1.1: Regulatory content requirements for an EIA Report

Section 2 of Appendix 3 of GN R.982	Section in EIA Report
3.(1) (a) details of- (i) the EAP who prepared the report;	Chapter 1.5
(ii) the expertise of the EAP, including a curriculum vitae;	Chapter 1.5 and **Appendix A**
(b) the **location** of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including: (i) the 21-digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; and (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Chapter 2 **Appendix B**
(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	**Figure 2.1** **Appendix L**
(d) a description of the scope of the proposed activity, including- (i) all **listed** and specified activities triggered and being applied for and; (ii) a description of the associated structures and infrastructure related to the development;	Chapter 3

Section 2 of Appendix 3 of GN R.982	Section in EIA Report
(e) a description of the **policy and legislative** context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;	Chapter 4
(f) 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 development footprint within the approved site as contemplated in the accepted scoping report;	Chapter 5
(h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including: (i) details of the development footprint **alternatives** considered;	Chapter 6
(ii) details of the **PPP** undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Chapter 7
(iii) a summary of the **issues raised** by I&APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Chapter 8
(iv) the **environmental attributes** associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 9
(v) the **impacts and risks** identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Chapter 10
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;	Chapter 10
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 10
(ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such; and	Alternative corridors were considered as detailed in Chapter 6
(x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;	Chapter 12
(i) 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 development footprint on the approved site as contemplated in the accepted scoping report through the life of the activity, including— (i) a description of all environmental **issues** and risks that were identified during the EIA process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Chapter 10 Chapter 8 Chapter 10
(j) an assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed;	Chapter 10

Section 2 of Appendix 3 of GN R.982	Section in EIA Report
(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be mitigated;	
(k) where applicable, a summary of the findings and recommendations of any **specialist report** complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;	Chapter 11
(l) an **environmental impact statement** which contains— (i) a summary of the key findings of the EIA: (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	Chapter 12
(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as **conditions** of authorisation;	Chapter 13
(n) the **final proposed alternatives** which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;	Chapter 12
(o) any 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;	Chapter 13
(p) a description of **any assumptions, uncertainties and gaps** in knowledge which relate to the assessment and mitigation measures proposed;	Chapter 14
(q) 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;	Chapter 13
(r) where the proposed activity does not include operational aspects, the period for which the EA is required and the date on which the activity will be concluded and the post construction monitoring requirements finalised;	Not applicable
(s) an undertaking under oath or affirmation by the EAP in relation to**:** (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to I&APs and any responses by the EAP to comments or inputs made by interested or affected parties;	**Appendix A**
(t) where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Not applicable
(u) an indication of any deviation from the approved scoping report, including the plan of study, including— (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	Chapter 10
(v) any specific information that may be required by the competent authority; and	**Section 1.8**

Section 2 of Appendix 3 of GN R.982	Section in EIA Report
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.	None
(2) Where a government notice by the Minister provides for any protocol or minimum information requirement to be applied to an EIA Report the requirements as indicated in such notice will apply.	Not Applicable

1.8 SPECIFIC INFORMATION REQUIRED BY THE COMPETENT AUTHORITY

Specific requirements of the DEA are contained in their letter accepting the Final Scoping Report dated 5 December 2017 as presented in **Table 1.2.**

Table 1.2: Specific Requirements from the DEA's letter accepting the Final Scoping Report

	Requirements from acceptance letter	Comment	Where this is addressed in this report
i.	The total footprint of the proposed development must be indicated. The location of the powerline within the proposed corridor and the associated infrastructure must be mapped at an appropriate scale.	This EIA assesses an approximately 1 km^2 site within which Eskom will construct a new substation with a footprint of approximately 400 m x 400 m. The exact footprint is not known at the time of undertaking the EIA. The exact details of the upgrading of the P234 to access the site are also not known.	Chapter 3
ii.	A clear description of all associated infrastructure must be provided. This description must include, but not limited to the following: • Access roads infrastructure (existing and new); and • All supporting onsite infrastructure.		
iii.	The EIAr must provide an assessment of the impacts and mitigation measures for each of the listed activities applied for. The FSR indicates that a watercourse crossing may need to be upgraded. Please provide information in the EIAr that this will not trigger any of the watercourse related listed activities. Further, please provide information as to the applicability of Activity 27 of GN R. 983, as far as the clearance of indigenous vegetation for the substation is concerned.	Listed activity added to Chapter 10.	Chapter 10
iv.	The listed activities presented in the EIAr and the application form must be the same and correct.	The EIA Report and Application form contain the same activities that are all	Chapter 3

		applicable and relevant to the project.	
v.	The EAP must engage the relevant provincial authority with regards to development in geographic areas triggering GN R. 985: Activities 4 and 12. Please ensure that only relevant sensitive geographic areas are applied for under these listed activities.	Several meetings have taken place with Ezemvelo as recorded in **Chapter 7**). The exact location of access roads has not been determined yet. This EIA assumes that they could be required anywhere in the corridors.	Chapter 3
vi.	The EIAr must provide the bend-point coordinates and the start, middle and end points of all the roads proposed for construction or widening.	This EIA assesses 2 km wide corridors within which Eskom will negotiate a 55 m wide servitude within which the powerline will be constructed. The exact servitude is known at the time of undertaking the EIA. The exact location of access roads to be constructed or upgraded are also not known. The EIA assumes that only access roads in the 2 km wide corridor will be covered by this application. Any additional access roads outside of the 2 km wide corridor will have to be authorised by a separate process during implementation, if required. Access will be negotiated with the directly affected landowners during implementation. Start, bend and end points of the corridors are included in **Appendix L**.	**Appendix L**

vii.	Please ensure that the EIAr correctly indicates only affected provinces, district and local municipalities for this specific application, as far as the location of the activity is concerned.	Provinces, District and Local Municipalities have been identified.	Chapter 9.11
viii.	The EIAr must include the detail inclusive of the PPP in accordance with Regulation 41 of the EIA Regulations.		Chapter 7
ix.	The EIAr must include all items as specified in Appendix 3 of GN R 982, including: • The 21 digits Surveyor General code of each cadastral land parcel; and • Where available, the physical address and farm name of the property or properties;	Requirements of Appendix 3 of GN 982 have been complied with.	Chapter 2 and **Appendix B**
x.	Information on services required on the site, e.g. Sewage, refuse removal and water. Who will supply these services and has an agreement and confirmation of capacity been obtained?	The powerline will not require any permanent sewerage, refuse removal or water during operation. Maintenance workers will provide their own water, remove their waste and use existing sewerage facilities. During construction, the Contractor will provide temporary chemical toilets that will be serviced. Waste will be disposed of at licenced facilities. Water for construction will be negotiated with the service providers or if abstracted directly from resources then only after a Water Use Licence or Registration has been obtained.	EMPr
xi.	Please provide in the EIR an indication of the time period that will be required to complete construction of the applied powerline and associated infrastructure (i.e.	Construction of the powerline is expected to take 36 months.	Chapter 3.4

	number of years or months to required complete development, once construction commences)		
xii.	A construction and operational phase EMPr to include mitigation and monitoring measures. The EMPr to be submitted as part of the EIAr must include the recommendations and mitigation measures recorded in the EIAr and the specialist studies conducted.	An EMPr that addresses construction and operation has been compiled.	EMPr
xiii.	The terms of reference (ToR) for the following specialist studies are accepted to be assessed in the assessment phase: • Fauna and flora impact assessment • Avifauna impact assessment • Wetlands impact assessment • Soil and land capacity impact assessment • Visual impact assessment • Heritage impact assessment (HIA) • Social impact assessment (SIA) Economic impact assessment		Chapter 8
xiv.	Please ensure that the Final EIAr includes at least one A3 regional map of the area that the locality map included in the Final EIR illustrate the different proposed alignments. The maps must be of acceptable quality and as a minimum, have the following attributes: • Maps are relatable to one another • Cardinal points • Co-ordinates • Legible legends • Indicative alternatives • Latest land cover • Vegetation types of the study area; and • A3 size locality map	Locality Map included as **Figure 2.1.** Land cover Map included as **Figure 8.1** Vegetation types map included as **Figure 9.3** Co-ordinates are shown on **Figure 2.1**.	**Figure 2.1, Figure 8.1** and **Figure 9.3**

2 LOCATION OF THE PROJECT

GNR 982 Appendix 3:

3(1) (b) the location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report, including:

(i) the 21-digit Surveyor General code of each cadastral land parcel;
(ii) where available, the physical address and farm name; and
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;

The proposed project consists of the new Iphiva 400/132 kV Substation near the town of Mkuze in KZN, which will be integrated into the 400 kV network by two 400 kV lines, namely the approximately 120 km Normandie-Iphiva, the approximately 130 km Duma-Iphiva 400 kV powerline, and 65 km of 132 kV distribution powerline that will link into the Iphiva Substation **(Figure 2.1).**

The proposed substation sites are located in KZN. The uPhongola Local Municipality (LM) and Nongoma LM in the Zululand District Municipality (DM) and the Jozini LM in the UMkhanyakude DM are potentially affected by the proposed substation sites, with Pongola and Mkuze being the main towns in the study area. The surveyor general codes are presented in **Appendix B**.

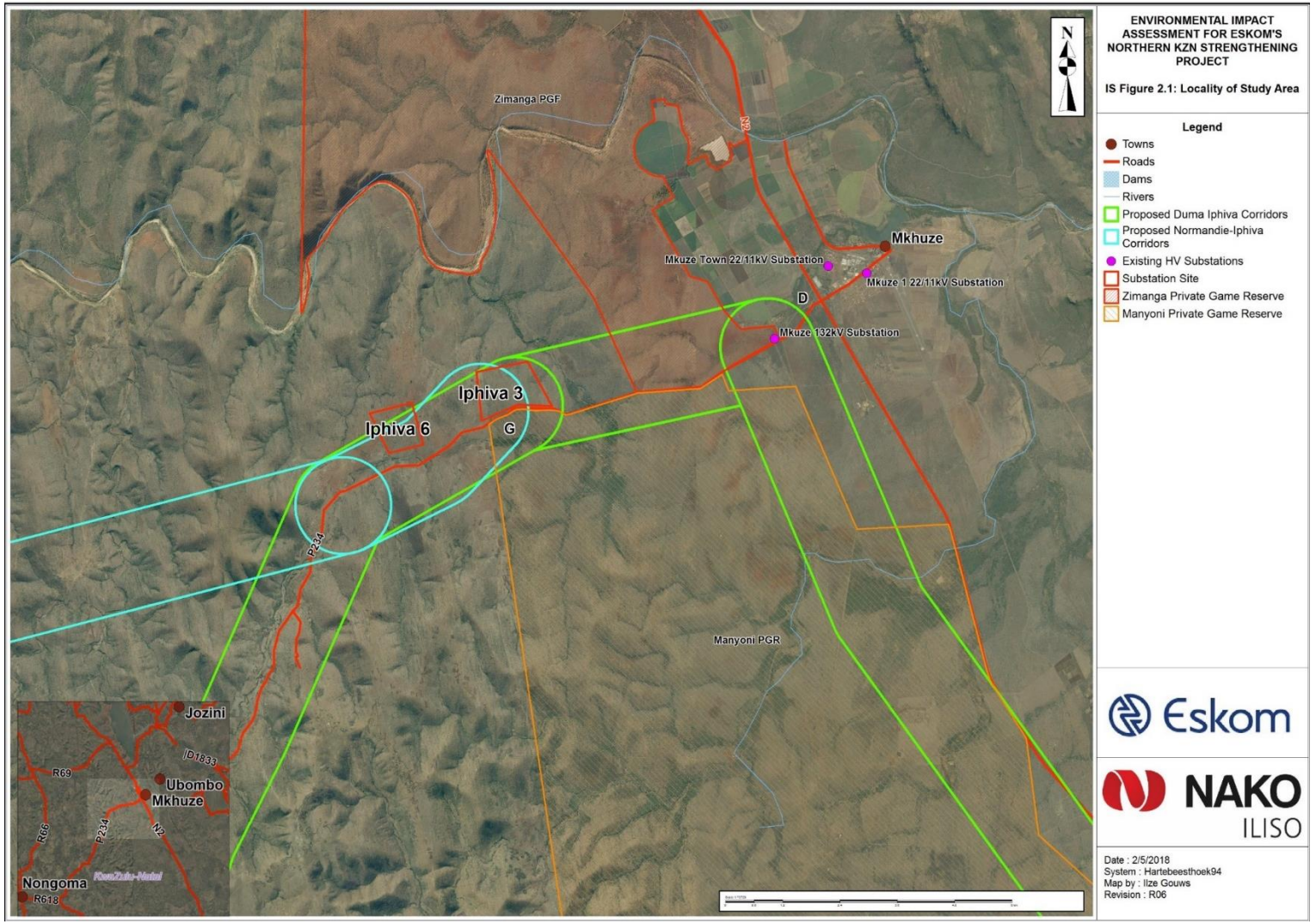

Figure 2.1 Location of the study area

3 PROJECT DESCRIPTION

GNR 982 Appendix 3:

3(1) (d) a description of the scope of the proposed activity, including—

(I) all listed and specified activities triggered and being applied for; and

(ii) a description of the associated structures and infrastructure related to the development;

This section describes the proposed project and activities listed in the EIA Regulations 2014, as amended, that will be triggered by the project. Photographs in this section are curtesy of Bruce Burger (Eskom).

3.1 OVERVIEW OF THE ELECTRICAL NETWORK

The South African electrical power system can be broadly divided into the generators that supply the power, the Transmission system that carries the power from the generating centres to the load centres, and the distribution system that feeds the power to consumers. (**Figure 3.1**).

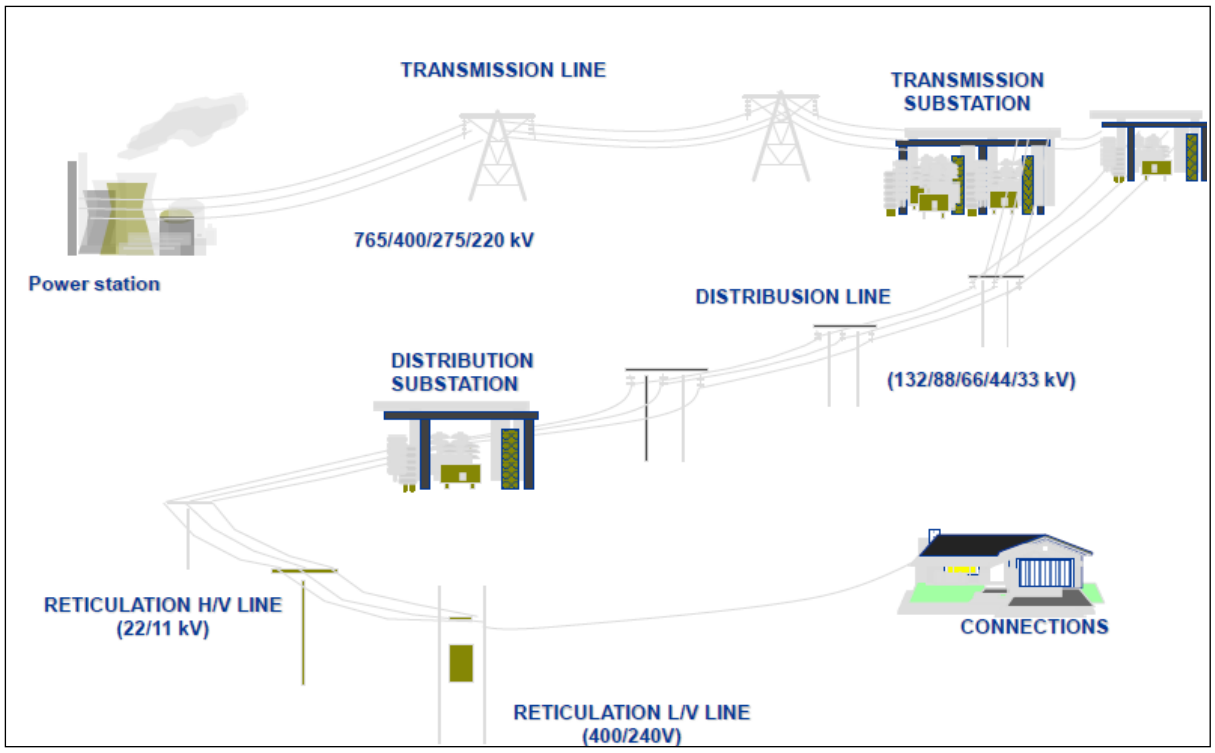

Figure 3.1: Electrical Networks

To reduce the cost of transporting bulk electricity over long distances, the electricity is transmitted at higher voltages typically 765 kV, 400 kV and 275 kV. In South Africa most of the load centres are situated far from the generators, therefore the voltage is stepped-up (increased) at the generation point and stepped-down (decreased) near the load. Substation

transformers are used to step-up or step-down voltages to adjust the voltage along the network (long distance transmission lines to sub-transmission and distribution lines). For safety reasons power is generally distributed to consumers at lower voltages.

The electrical power system must be expanded and strengthened over time to meet the increasing demand for electricity as the new customers get connected. The current electricity requirements in Northern KZN are presently met by 132 kV sub transmission lines. The demand will exceed the transfer capability of the existing 132 kV system going forward. This will lead to thermal overloading of the infrastructure (switchgear and lines) and low network voltages in the affected area.

Thermal overloading is caused by operating the equipment beyond its rated capability. As the power run along the power system increase, the hotter the switchgear and powerlines get. This can lead to equipment failure and drooping of powerlines. The powerline can slump way below the allowable ground-to-line clearance, which could create a short circuit with nearby structures. Low voltage is a result of an inability of the network to supply the required reactive power to meet the demand. Low voltages can cause damage to motors and electrical appliances. Electricity utilities normally cut off the affected part of the network when the network experiences thermal overloading and/or low voltages to avoid cascading network failures.

The proposed new Iphiva Substation will provide the additional capacity to cater for the projected growth in demand and to ensure the system operates within the acceptable limits as stipulated in the South African Grid Code. The bulk electricity to Iphiva substation will be transmitted from Normandie substation near Piet Retief and Duma substation between Empangeni and Ulundi. The electricity will be stepped-down to 132 kV for distribution to the respective load centres via 132 kV sub transmission powerlines.

The intention is to undertake the construction of the proposed new substation in two phases. Construction of the first phase is scheduled to commence in July 2022 and be completed in December 2024, when it will become operational. The second phase is scheduled to commence in March 2024 and be completed in August 2026, when it will become operational.

3.2 LISTED ACTIVITIES TRIGGERED BY THE PROPOSED IPHIVA SUBSTATION

Activities listed in the NEMA 2014 EIA Regulations applicable to the proposed Iphiva Substation that require environmental authorisation are presented in **Table 3.1**.

Table 3.1: Listed Activities triggered by the proposed Iphiva Substation

Detailed description of listed activities associated with the project	
Listed activity as described in GN R 983, 984 and 985, as amended	**Description of project activity that triggers listed activity**
GN R. 983 (11) as amended by GN R. 327 (11): The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kV, or (ii) inside urban areas or industrial complexes with a capacity of 275 kV or more excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c)) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development..	The substation is infrastructure that is part of the system for the distribution of 132 kV of electricity outside of urban areas and industrial complexes.
GN R. 984 (4) as amended : The development and related operation of facilities or infrastructure, for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.	The project entails the construction of a new sub-station, including storage facilities for oil. Based on initial concept designs, storage facilities may have a capacity of > 500 m^3.
GN R. 983 (24): The development of a road (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.	Access roads for the construction and operation of the substation may be required.
GN R. 983 (28) as amended by GN R. 327 (28): Institutional developments wherever such land was used for agriculture, game farming, equestrian purposes or afforestation after 1 April 1998, outside an urban area where the total land is bigger than 1 ha.	The construction of the substation may require the use of some land that is currently being used for agriculture and/or afforestation.
GN R 984 (9) as amended by GN R. 325 (9): The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kV 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 — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	The proposed substation is described in **Section 3.3.** Construction activities are described in **Section 3.4.**

Detailed description of listed activities associated with the project	
Listed activity as described in GN R 983, 984 and 985, as amended	**Description of project activity that triggers listed activity**
GN R. 985 (3): The development of masts or towers of any type used for telecommunication broadcasting or radio transmission purposes where the mast or tower- (a) is to be placed on a site not previously used for this purpose; and (b) will exceed 15 meters in height – but excluding attachments to existing buildings and masts on rooftops. (d) In KZN (ii) Community Conservation Areas; (iii) Biodiversity Stewardship Programme Biodiversity Agreement areas; (iv) A protected area identified in terms of the National Environmental Management: Protected Areas Act (No 57 of 2003) (NEMPAA), excluding conservancies; (vi) Sites or areas identified in terms of an International Convention; (vii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (viii) Core areas in Biosphere Reserves; (ix) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an environmental management framework (EMF) as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (bb) Areas within 10 kilometres from 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 a biosphere reserve.	The substation will have a microwave radio communication mast that could be up to 70 m high. This will be located on a site outside of urban areas on a site not previously used for this purpose, and could be a Community Conservation Area, Biodiversity Stewardship Programme Biodiversity Agreement area, a protected area identified in terms of NEMPAA, a sites or area identified in terms of an International Convention, a Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans, a core areas in a Biosphere Reserves, an areas designated for conservation use in a Spatial Development Framework adopted by a competent authority or zoned for conservation purpose, a sensitive area as identified in an EMF as contemplated in Chapter 5 of the Act and as adopted by the competent authority, within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve. The exact details will be confirmed during the EIA.
GN R. 985 (4) as amended by GN R. 324 (12): Development of a road wider than 4 m with a reserve less than 13,5 metres. (d) In KZN (iii) Community Conservation Areas; (v) Biodiversity Stewardship Programme Biodiversity Agreement areas; (vi) A protected area identified in terms of NEMPAA, excluding conservancies; (vii) Sites or areas identified in terms of an International Convention; (viii) Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans; (ix) Core areas in Biosphere Reserves; (x) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for conservation purpose; (xi) Sensitive areas as identified in an EMF as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (xii) Outside urban areas (i) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified	An access road to the substation may be constructed or upgraded. This will be located on a site outside of urban areas on a site not previously used for this purpose, and could be a Community Conservation Area, Biodiversity Stewardship Programme Biodiversity Agreement area, a protected area identified in terms of NEMPAA, a sites or area identified in terms of an International Convention, a Critical Biodiversity areas as identified in systemic biodiversity plans adopted by the competent authority or bioregional plans, a core areas in a Biosphere Reserves, an areas designated for conservation use in a Spatial Development Framework adopted by a competent authority or zoned for conservation purpose, a sensitive area as identified in an EMF as contemplated in Chapter 5 of the Act and as adopted by the competent authority, within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of

Detailed description of listed activities associated with the project	
Listed activity as described in GN R 983, 984 and 985, as amended	**Description of project activity that triggers listed activity**
in terms of NEMPAA or from the core areas of a biosphere reserve.	NEMPAA or from the core areas of a biosphere reserve. The exact details will be confirmed during the EIA.
GN R. 985 (12) as amended by GN R. 324 (12): Clearance of an area of 300 m2 or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance plan. In (b) KZN: (ii) community conservation areas; (iv) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (v) Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; (vii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; (viii) A protected area identified in terms of NEMPAA, excluding conservancies; (xi) Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; (xii) Sensitive areas as identified in an EMF as contemplated in chapter 5 of the Act and as adopted by the competent authority.	Approximately 12 ha will be cleared at the substation site. Some of these areas are in KZN and in community conservation areas; within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an areas that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; Critical biodiversity areas as identified is systemic biodiversity plans adopted by the competent authority or in bioregional plans; On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; A protected area identified in terms of NEMPAA, excluding conservancies; Areas designated for conservation use in Spatial Development Frameworks adopted by competent authority or zoned for a conservation purpose; or Sensitive areas as identified in an EMF as contemplated in chapter 5 of the Act and as adopted by the competent authority.

3.3 DESCRIPTION OF THE PROPOSED IPHIVA SUBSTATION

In order to alleviate current and future network constraints in northern KZN, it is proposed that the Iphiva 400/132 kV Substation be introduced in the area, which will de-load the main sub-transmission network and improve the voltage regulation in the area. The Iphiva substation will be integrated with the existing electricity network by 400 kV Transmission powerline to Normandie and Duma, and approximately 65 km of 132 kV Distribution powerline.

The proposed 400/132 kV substation will have a 400 m x 400 m footprint, within an approximately 1 km x 1 km site. The substation is composed of standard electrical equipment such as transformers, reactors, busbars and isolators (**Figure 3.2** and **Plate 1**). The substation will have a microwave radio communication mast that could be up to 80 m high. Oil and fuel storage facilities will be bunded and there will be an oil bund to contain any transformer oil spills.

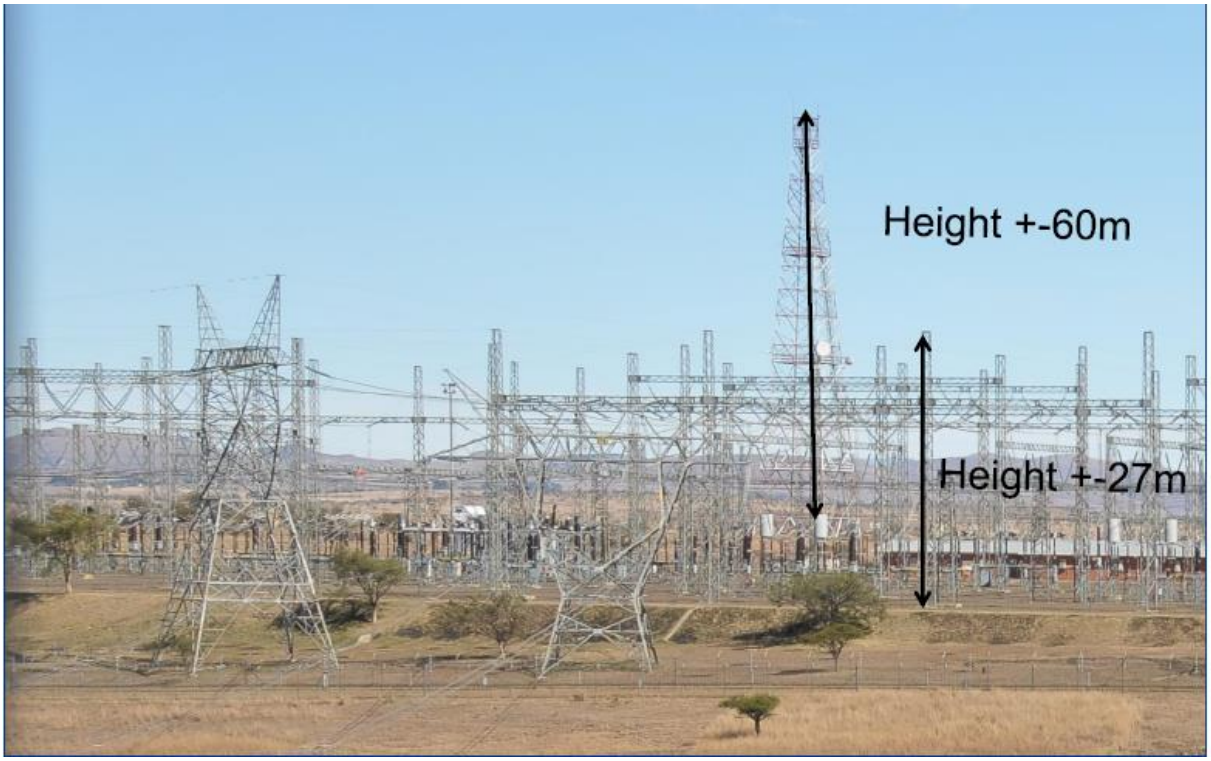

Figure 3.2: Side view of typical substation site

The substation needs to be lit at night for safety and security reasons. The security lighting will be around the substation fence, the luminaire height is 4m, and will be operated with a trigger from the non-lethal fence. Three 400 kV powerline and seven 132 kV powerline will enter/leave the substation in various directions, depending on the final location. The land use on surrounding properties and any barriers to access should therefore also be considered.

The proposed 400/132 kV substation will have a 400 m x 400 m footprint (36 ha), within a 1 km x 1 km study area. The substation is composed of standard electrical equipment such as transformers, reactors, busbars and isolators (**Figure 3.2**). The substation will have a microwave radio communication mast that could be up to 80 m high. Oil and fuel storage facilities will be bunded and there will be an oil bund to contain any transformer oil spills.

Plate 1: Typical substation

3.4 CONSTRUCTION PROCESS

The proposed new Iphiva Substation 400 kV powerline will be constructed first, commencing in 2021 and taking approximately 36 months to complete. No staff will be accommodated on site during the construction or operation of the substation or powerline, but will transported to site each day.

Construction of the substation will consist of the following activities:

- Vegetation clearing, which will result in a loss of flora;
- Upgrade/construction of access roads to accommodate heavy loads;
- Watercourse crossing may need to be upgraded;
- Levelling and terracing of the surface (**Plate 2**);
- Construction of foundations and concrete works, including storm water drainage pipes, slabs, bund walls, a control room and a small building and storage area **Plate 3 and 4**);
- All open areas between the transformer plinths and other switchgear foundations will be covered with about a 100 mm layer of 25 – 38 mm crushed stone. Before laying the crushed stone, the ground surface is intensively treated to strict specification with insecticide and herbicide to prevent insect activity and the growth of weeds and other plants in the high voltage yard;

- Erection of steelworks (**Plate 5**); and
- Delivery and installation of transformers (**Plate 6**)

The establishment of construction camps will take place along the route. The exact position of the construction camps will be negotiated with the relevant landowners. The location and layout of the construction camp, as well as use and management of resources must be approved by the Engineer and will be monitored by the ECO against the requirements set out in the EMPr.

Plate 2: Levelling and terracing of the surface

Plate 3: Construction of foundations and concrete works, including storm water drainage pipes, slabs, bund walls, a control room and a small building and storage area

Plate 4: Foundations

Plate 5: Erection of steelworks

Plate 6: Large transformers being transported to the substation site

3.5 OPERATION AND MAINTENANCE

Ongoing maintenance of the substation will be required throughout its lifespan. The EMPr specifies these operational and maintenance requirements.

4 LEGISLATION AND GUIDELINES CONSIDERED

GN 982 Appendix 3:

3(1) (e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context;

4.1 LEGISLATION APPLICABLE TO THIS EIA

This EIA is being undertaken in terms of NEMA. The following Regulations promulgated in terms of NEMA in 2014 apply:

- GN 982 – specifies the process that must be undertaken to obtain an Environmental Authorisation;
- GN 983 – Listing Notice 1 which identifies activities that would require environmental authorisations prior to commencement of that activity for which a Basic Assessment is required;
- GN 984 – Listing Notice 2 which identifies activities that would require environmental authorisations prior to commencement of that activity for which a Scoping and EIA is required; and
- GN 985 - Listing Notice 3 which identifies activities that would require environmental authorisations prior to commencement of that activity in specific identified geographical areas only.

Table 4.1: Legislation of relevance to the EIA

Legislation	Applicable Legislative Requirements	Implications for the Applicant
Constitution of the Republic of South Africa Act, (No 108 of 1996) Constitution of the Republic of South Africa Amendment (No 35 of 1997)	Section 24 – Environmental Rights	Everyone has the right to –An environment that is not harmful to their health or well-being and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that – • Prevent pollution and ecological degradation, • Promote conservation, • Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development. The Constitution sets in place all laws of the country and the Applicant should note the protection of the environment in the Bill of Rights, especially in relation to justifiable economic and social development.
	Section 33 – Access to Information	Everyone has the right to administrative action that is lawful, reasonable and procedurally fair. Everyone whose rights have been adversely affected by administrative action has the right to be given written reasons. The provisions of NEMA and its Regulations dictate the manner in which environmental authorisation processes are undertaken, decisions made, and the appeal process; all of which are applicable to the current application.
	Section 32 – Administrative Justice	Everyone has the right of access to: • Any information held by the state (unless it is information that is explicitly excluded by the Promotion of Access to Information Act, (No 2 of 2000), • Any information held by another person and that is required for the exercise or protection of any rights. The Applicant will need to make information available to the public if requested.
	Section 38 Enforcement of Rights and Administrative Review	Section 38 of the Constitution guarantees the right to approach a court of law and to seek legal relief in the case where any of the rights that are entrenched in the Bill of Rights are infringed or threatened.

Legislation	Applicable Legislative Requirements	Implications for the Applicant
EMA	Section 2 Chapter 1 Chapter 5 Chapter 6	NEMA states that the State must respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the needs of previously disadvantaged communities. It states further that sustainable development requires the integration of social, economic and environmental factors in the planning, evaluation and implementation of decisions to ensure that development serves present and future generations. Chapter 1 of NEMA contains a list of principles and states clearly that environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests (NEMA, 1998). It states further that negative impacts on the environment and on peoples' environmental rights must be anticipated and prevented, and if they cannot be prevented, they should be minimised and remedied. It elaborates further on the equity of impacts, and the fact that vulnerable communities should be protected from negative environmental impacts. It refers to the principle that everyone should have equal access to environmental resources, benefits and services to meet their basic human needs (NEMA, 1998). Therefore, there is a clear mandate for environmental and restorative justice in the act. Chapter 5 of the NEMA aims to promote the use of appropriate environmental management tools, such as an EIA, in order to ensure the integrated environmental management of activities. The general objective of integrated environmental management, as described in NEMA, is to identify, predict and evaluate the impacts of an activity on the social, economic, bio-physical and cultural components of the environment. This assessment includes the risks associated with activities, consequences of the activities as well as considering alternatives and mitigation measures to avoid, minimise or compensate for negative impacts, maximise benefits, and promote compliance with the principles of environmental management as set out in section 2 of NEMA. This is implemented by requiring environmental authorisation for activities that are "listed" in the EIA Regulations, 2014. The purpose of this EIA is to assess the components of this proposed project that are NEMA listed activities for which Eskom has the mandate and intention to implement. The EIA process will provide the information that the environmental authorities require to decide whether the project should be authorised or not, and if so then with what conditions. In terms of public participation NEMA states that people should be empowered to participate in the environmental governance processes, and that their capacity to do so should be developed if it does not exist. All decisions regarding the environment should take the needs, interest and values of the public into account, including traditional and ordinary knowledge. Chapter 6 of NEMA elaborates on the public participation requirements and is supplemented by the EIA Regulations. GN 982 provides requirements for the public participation, the minimum

		legal requirements for PPP, the generic steps of a PPP, requirements for planning a PPP and a description of the roles and responsibilities of the various role players. The principles in NEMA also state that community wellbeing and empowerment must be promoted through environmental education, the raising of environmental awareness, sharing of environmental knowledge and experience and any other appropriate means. It states that the social, environmental and economic impacts of activities, including disadvantages and benefits, must be considered, assessed and evaluated, and decisions taken must be appropriate given the assessment and evaluation. NEMA recognises that the environment is held in public trust for the people, and therefore the beneficial use of environmental resources must serve the peoples' interest and protect the environment as the peoples' common heritage. NEMA takes a holistic view of the environment, and promotes the consideration of social, economic and biophysical factors to obtain sustainable development and achieve effective management of the biophysical environment.
National Environmental Management: Air Quality Act (No 39 of 2004) (NEM:AQA)	Sections 21 and 37	National Ambient Air Quality Standards GN R1210 dated 24 December 2009. GN 893 in Government Gazette 37054 dated 22 November 2013, listing activities and associated minimum emission standards identified in terms of section 21 of the Air Quality Act. Declaration of temporary Asphalt Plants as controlled emitters and establishment of emission standards, in GN 201 in Government Gazette No 37461 dated 28 March 2014. National Dust Control Regulations, in GN R827 in Government Gazette 36974 dated 1 November 2013. Activities include Macadam preparation (the mixing of aggregate and tar or bitumen to produce road surfacing in permanent facilities and mobile plants). These activities require an Atmospheric Emission Licence in terms of Section 37 of the Act.
National Environmental Management: Biodiversity Act, (No 10 of 2004) (NEMBA)		NEMBA expresses the commitments that South Africa made in approving the Convention on Biological Diversity. The Act aims at resolving the fragmented nature of biodiversity-related legislation that occurred at national and provincial levels by combining different laws and giving effect to the principle of co-operative governance, and at the same time responding to commitments made under the Convention on Biological Diversity. In line with the objectives of the Convention on Biological Diversity, NEMBA provides for: • Management and conservation of South Africa's biodiversity within NEMA's framework; • Usage of indigenous biological resources in a sustainable manner; • Fair and equitable sharing among stakeholders of the benefits arising from bio-prospecting involving indigenous biodiversity; • Protection of species and ecosystems that warrant national protection; and

		• Establishment and functions of the South African National Biodiversity Institute (SANBI). NEMBA restricts activities involving listed threatened or protected species. In addition, the Alien and Invasive Species Regulations (GN 598 of 2014), promulgated in terms of Section 97(1) of NEMBA apply. This Regulation defines Categories of Listed Invasive Species (1a, 1b, 2 and 3), as well as defining restricted activities, and specifying requirements for risk assessments, permits and reporting requirements. The Alien and Invasive Species Lists were published in GN 864 on 26 July 2016. Invasive species are divided into four categories: • Category 1a: Invasive species which must be combatted and eradicated. Any form of trade or planting is strictly prohibited. • Category 1b: Invasive species which must be controlled and wherever possible, removed and destroyed. Any form or trade or planting is strictly prohibited. • Category 2: Invasive species, or species deemed to be potentially invasive, in which a permit is required to carry out a restricted activity. Category 2 species include commercially important species such as pine, wattle and gum trees. • Category 3: Invasive species which may remain in prescribed areas or provinces. Further planting, propagation or trade, is however prohibited.
National Environmental Management Protected Areas Act, (No 57 of 2003) (NEMPAA)	Section 50(5)	No development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority.
National Water Act (No 36 of 1998) (NWA)	Section 21	The construction of the proposed substation and powerlines and associated activities may involve a number of water uses listed in terms of the NWA, and therefore may require a Water Use Licence. The following water uses could apply: s21 (a): taking water from a water resource; s21 (b): storing of water; s21 (c): impeding or diverting the flow of water in a water course; s21 (e): engaging in a controlled activity (i.e. the generation of hydropower); s21 (i): altering the bed, banks, course or characteristics of a water course,

	GN R509 of 2016	s21 (f): discharge of waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit; and s21 (g): disposing of waste in a manner which may detrimentally impact on a water resource. The General Authorisation gazette in GN R. 509 in August 2016 says that 6 (2) "*All State Owned Companies (SOC's), and other institutions specified in Appendix D2 having lawful access to that property or land may on that property use water in terms of section 21 (c) or (i) of the Act as specified under each of the relevant SOC's and other institution (Appendix D2*)". Appendix D2 says that ESKOM may undertake the construction of new Transmission and Distribution powerlines, and minor maintenance of roads, river crossings, towers and substations where the footprint will remain the same. If the construction of the substation triggers a water use, then it is not covered by the GA. Registration of water use and the application for any water use licences are not included in the EIA.
National Heritage Resources Act (No 25 of 1999) (NHRA)	Section 5. General principles for Heritage Resources Management Section 6. Principles for management of heritage resources Section 7. Heritage assessment criteria and grading Section 38. Heritage resources management	The Act requires that Heritage Resources Authorities (HRAs), in this case the South African Heritage Resources Agency (SAHRA), KZN Provincial Heritage Resources Authority, and Amafa aKwaZulu Natali (Amafa), be notified as early as possible of any developments that may exceed certain minimum thresholds in terms of Section 38(1), or when assessments of impacts on heritage resources are required by other legislation in terms of Section 38(8) of the Act. The activities that apply to the proposed project include: 38(1)(a) - The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; 38(1)(c) - Any development or other activity which will change the character of a site exceeding 5 000 m2 in extent; or Involving three or more existing erven or sub-divisions thereof; or involving three or more erven or sub-divisions thereof which have been consolidated within the past five years; and 38(1) (d) - The rezoning of a site exceeding 10 000 m^2 in extent. A Needs and Desirability Application (NDA) and Notification of Intent to Develop (NID) has been submitted, as part of the Heritage Resources Management process, to Amafa, SAHRA and MPRHA. A HIA has been compiled to comply with subsection 3(3) (a) and (b) of the NHRA.

KZN Heritage Act, (No 4 of 2008) (KZNHA)		The KZNHA provides for the protection and management of heritage resources within KZN. These heritage resources take account of those under general protection and special protection, including: • General protection: • Structures under Section 33; • Graves of victims of conflict under Section 34; • Traditional burial places under Section 35; and • Battlefields, archaeological sites, rock art sites, palaeontological sites, historic fortifications, meteorite or meteorite impact sites under Section 36. • Special Protection: • Heritage Landmark under Section38; • Provincial Landmark under Section39; • Graves of members of the Royal Family under Section 40; • Battlefield sites, public monuments and memorials under Section 41; and • Heritage Objects under Section 43. In terms of the KZNHA, a permit is required to carry out certain listed activities. To accomplish this, a NDA form must be completed for any proposed development. This form is submitted to Amafa for processing after which Amafa will issue comments for further heritage studies, if necessary. A NDA has been submitted, as part of the Heritage Resources Management process, to Amafa, MPRHA and SAHRA. An HIA has been compiled to comply with subsection 3(3)(a) and (b) of the NHRA. The NDA has been compiled to comply with the KZNHA and subsection 38(1) of the NHRA.
National Environmental Management: Waste Act (No 59 of 2008) (NEMWA)	GN 921	GN 921 lists Waste Management Activities in respect of which a Waste Management Licence (WML) is required. These include various activities associated with the storage of waste, reuse, recycling and recovery of waste, treatment of waste (which includes the remediation of contaminated land) and disposal of waste. The Schedule to the Notice distinguishes between two categories of waste management activities which require licensing and for which a basic assessment process (for Category A Waste Management Activities) or an EIA process (for Category B Waste Management Activities) must be conducted. A third category (Category C) refers to activities for which norms and standards have been set. Construction activities usually result in general as well as hazardous waste. WMLs are required for, amongst others: • The storage of general or hazardous waste in lagoons; • The disposal of inert waste to land in excess of 25 tons; • The disposal of any hazardous waste to land; • The disposal of general waste to land covering an area of more than 50 m2; and • The disposal of domestic waste generated on premises in areas not serviced by the municipal service where the waste disposed exceeds 500 kg per month.

		Schedule 3 of the NEMWA, as amended, defines "general waste" as waste that does not pose an immediate hazard or threat to health or to the environment, and includes: (a) domestic waste; (b) building and demolition waste; (c) business waste; and (d) inert waste; or (e) any waste classified as non-hazardous waste in terms of the regulations made under section 69, and includes non-hazardous substances, materials or objects within business, domestic, inert, building and demolition wastes as outlined in Schedule 3 of the Act. Where "building and demolition waste" means waste, excluding hazardous waste, produced during the construction, alteration, repair or demolition of any structure, and includes rubble, earth, rock and wood displaced during that construction, alteration, repair or demolition; and includes discarded concrete, bricks, tiles and ceramics, discarded wood, glass and plastic, discarded metals, discarded soil, stones and dredging spoil and "other" discarded building or demolition wastes. "inert waste" means waste that— (a) does not undergo any significant physical, chemical or biological transformation after disposal; (b) does not burn, react physically or chemically biodegrade or otherwise adversely affect any other matter or environment with which it may come into contact; and (c) does not impact negatively on the environment, because of its pollutant content and because the toxicity of its leachate is insignificant and which include discarded concrete, bricks, tiles and ceramics, discarded glass and discarded soil, stones and dredging spoil, as listed in Schedule 3 of the Act. No WML Applications are included in this EIA process and if applications are required, they will have to be applied for separately.
National Forest Act, (No 84 of 1998)		Trees may have to be disturbed, damaged or destroyed/removed to make way for the new infrastructure. If those trees are protected a licence must be obtained from the Department of Agriculture, Forestry and Fisheries (DAFF).
KZN Nature Conservation Ordinance, (No 15 of 1974)		Certain indigenous plant and animal species in KZN are provided with special protection under the KZN Nature Conservation Ordinance and permits are required from Ezemvelo for their removal, destruction or translocation. The proposed project may affect some indigenous species which are protected. This will only be confirmed for each tower position once the servitude negotiations have been finalised and tower positions determined. This will take place during the walk-down of the powerline route by the fauna and flora specialists.

The Infrastructure Development Act (No 23 of 2014)	Section 15 Section 18	The Infrastructure Development Act provides for the facilitation and co-ordination of public infrastructure development which is of significant economic or social importance to the Republic; to ensure that infrastructure development in the Republic is given priority in planning, approval and implementation; to ensure that the development goals of the State are promoted through infrastructure development; to improve the management of such infrastructure during all life-cycle phases, including planning, approval, implementation and operations. The Act commenced on 10 July 2014. The Presidential Infrastructure Coordinating Commission (PICC) and structures of the Commission are established in terms of this Act. Strategic integrated projects (SIPs), which are projects of significant economic or social importance to the country or a region in the country, or which facilitate regional economic integration on the African continent, are identified and implemented in terms of this Act. Section 15 states that when the Steering Committee of a SIP has identified the approvals, authorisations, licences, permissions and exemptions required to enable the implementation of the SIP, it shall inform, without any delay, the applicant to submit all applications simultaneously to allow for concurrent consideration by the persons authorised by the relevant laws to take the applicable decisions. A member of the Steering Committee must monitor the processing of the application and report to the Steering Committee any undue delays and regulatory concerns emerging for exploration or consideration of solutions thereto. Section 18 concerns environmental assessments specifically and states that whenever an environmental assessment is required in respect of a SIP, such assessment must be done in terms of NEMA, with specific reference to Chapter 5. Time frames are stipulated in Schedule 2 and may not be exceeded without written approval. Schedule 2 refers to "project plans", "applications" and "mitigation plans" that are not defined in the Act. It is not clear how these apply to the EIA process.
KZN Planning and Development Act, (No 6 of 2008) (SPLUMA)		The SPLUMA came into force on 1 July 2015 and replaces the KZN Planning and Development Act, 2008. However, the two will run in parallel until each Local Municipality has set up the structures required by SPLUMA. In terms of the current KZN Planning and Development Act, 2008, Eskom will need to submit a Planning and Development Application (PDA) to the Local Municipalities. This application will need to meet all the requirements of legislation. Important aspects will include planning considerations, and compliance with the municipality's Integrated Development Plan (IDP) and Spatial Development Framework.

		The exact requirements will depend on the timing of Eskom's application to the Municipalities and the status of the legislation and by-laws currently applicable at the time in the local municipality.
Promotion of Administrative Justice Act (No 3 of 2000) (PAJA)		The Bill of Rights in the Constitution of the Republic of South Africa 1996 states that everyone has the right to administrative action that is legally recognised, reasonable and procedurally just. The PAJA gives effect to this right. The PAJA applies to all decisions of all State organisations exercising public power or performing a public function in terms of any legislation that negatively affects the rights of any person. The Act prescribes what procedures an organ of State must follow when it takes decisions. If an organ of State implements a decision that impacts on an individual or community without giving them an opportunity to comment, the final decision will be illegal and may be set aside. PAJA also forces State organisations to explain and give reasons for the manner in which they have arrived at their decisions and, if social issues were involved, how these issues were considered in the decision-making process. PAJA therefore protects the rights of communities and individuals to participate in decision-making processes, especially if these processes affect their daily lives.
Bylaws		All bylaws of the local and district municipalities traversed will apply to the project.

4.2 GUIDELINES CONSIDERED

The following guidelines have been considered in the undertaking of this EIA:

- DEAT Integrated Environmental Management Information Series 1-5 and 12-15.
- NEMA draft Implementation Guideline.
- Western Cape DEA and Development Planning NEMA EIA Regulations Guideline and Information Document Series – Guideline on Alternatives (2007).
- Western Cape DEA and Development Planning NEMA EIA Regulations Guideline and Information Document Series – Draft Guideline for Determining the Scope of Specialist Involvement in EIA Processes (2005).
- IAIA guidelines.
- DEA (2010), Guideline on Need and Desirability, Integrated Environmental Management Series 9, DEA.
- Public Participation Guideline published in 2012 (GN 807 of 10 October 2012) in terms of section J of NEMA (NEMA, 1998).
- According to the guidelines, public participation can be seen as one of the most important aspects of the environmental authorisation process. Public participation is the only requirement of the EIA process for which exemption cannot be given, unless no rights are affected by an application. This stems from the requirement in NEMA that people have a right to be informed about potential decisions that may affect them and that they must be given an opportunity to influence those decisions.
- SAHRA Archaeology, Palaeontology and Meteorites (APM) Guidelines: Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessment Reports (2007). The guidelines provide the minimum standards that must be adhered to for the compilation of a HIA Report. Chapter II Section 7 outlines the minimum requirements for inclusion in the heritage assessment. The Heritage Resource Management process will be completed to adhere to the minimum standards as defined by Chapter II of the SAHRA APM Guidelines (2007).
- Guidelines for Biodiversity Impact Assessments in KZN, 2003 (February 2013, Ezemvelo).
- International Union for the Conservation of Nature (IUCN) Red List (IUCNRedList.org 2016-2).
- Department KZN Biodiversity Conservation Plan (C-Plan) (Updated 2011).

4.3 NATIONAL AND INTERNATIONAL STANDARDS

National and international industry standards aimed at sustainable development and social justice specifically have become abundant in the last decade. Many industries use these standards as indicators for good practice.

4.3.1 ISO 26000:2010/SANS 26000:2010

Performance standards have long been a voluntary tool used by industry to achieve certain outcomes. The first standard on social responsibility, ISO 26000 was published on 1 November 2010 (ISO, 2010). It was developed using a multi-stakeholder approach involving experts from more than 90 countries and 40 international or broadly based regional organisations involved in different aspects of social responsibility (ISO, 2010). The South African Bureau of Standards (SABS), a statutory body that is mandated to develop, promote and maintain South African National Standards (SABS, [sa]) adopted the ISO 26000 Standard as a South African National Standard (SANS) 26000:2010.

4.3.2 International Social Performance Standards/Initiatives

There is a profusion of global initiatives aiming at assisting companies to make their operations more sustainable. The most frequently used in the EIA industry is the International Finance Corporation's (IFC) principles (IFC, 2012). The IFC is a member of the World Bank group, and as a part of their sustainability framework they created performance standards on environmental and social sustainability (IFC, 2012).

The standards relevant to the social environment are the following:

1. Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts
2. Performance Standard 2: Labour and Working Conditions
3. Performance Standard 4: Community Health, Safety, and Security
4. Performance Standard 5: Land Acquisition and Involuntary Resettlement
5. Performance Standard 7: Indigenous Peoples
6. Performance Standard 8: Cultural Heritage (IFC, 2012).

Issues such as gender, climate change, water and human rights are addressed across the standards. A guidance note accompanies each standard (IFC, 2012:4). Environmental and social risks and impacts must be managed by using an Environmental and Social Management System. The standard applies to all the activities funded by the IFC for the duration of the loan period. A number of private banks adopted most of the IFC standards in an initiative known as the Equator Principles (Esteves, Franks & Vanclay, 2012).

4.4 ESKOM POLICY DOUCMENTS

4.4.1 Control Plans for Alien Invasive Species (AIS)

GNR 598 of 2014, Alien and Invasive Species Regulations requires that Eskom as a landowner is legally obliged to clear its properties of alien invasive species. As such, Eskom is required by law to firstly determine if Alien Invasive Species (AIS) are present on its property and if so, as per the listed category, control them so as to prevent them invading outside that property. AIS are one of the initiatives set out on the Eskom's Biodiversity Implementation Plan (Eskom Biodiversity Implementation Plan, 2017).

Alien invasive plant species on land under linear infrastructure is addressed by the National Vegetation Management Commodity Strategy. The updated AIS list as per the most recent legislation is incorporated into the vegetation maintenance schedule going forward.

As a priority, Eskom Real Estate, Generation Peaking and Nuclear have in place AIS Control Plans for all conservation sites. Some Power Stations do possess site specific Vegetation Assessments which need to be aligned to the Control Plan requirements (Eskom Biodiversity Implementation Plan, 2017).

Eskom 5-year Alien Invasive Control Plan is compiled for submission to DEA as an overarching framework to implement AIS regulations in accordance with Eskom's operational risk and supporting finances, capacity and resources. The plan includes:

- Implementation of AIS Control Plan as per priority land specified;
- Training – Engaging with DEA's preferred suppliers and providing Eskom environmental practitioners with the relevant training of identification, effective control methodologies per species etc;
- On the ground implementation – Setting up a national Memorandum of Understanding with Working for Water to initiate provincial collaborations;
- Spatial Support – ensuring Eskom practitioners have access to the most updated spatial data layers to inform their planning of AIS control on their sites; and
- Collaboration with DEA /other parastatals on large scale projects (Eskom Biodiversity Implementation Plan, 2017).

5 NEED AND DESIRABILITY

GNR 982: Appendix 3

3(1) (f) 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 development footprint within the approved site as contemplated in the accepted scoping report;

5.1 GENERAL PURPOSE AND REQUIREMENT FOR THE PROJECT

Various Distribution substations being fed from Normandie Main Transmission Substation are experiencing low voltages on the 132 kV busbars which are well below acceptable limits (0.95 p.u). These Distribution substations include: Candover, Makhathini, Nondabuya, Ndumo and Mkuze. With the current electrification load growth in the areas around the listed substations and Gezisa Substation establishment, the busbar voltages will further drop below minimal acceptable limits until the system collapses. The Normandie Substation is not completely backfeedable. A loss of either the Normandie-Vergenoeg 132 kV powerline or the Normandie-Pongola 132 kV powerline will result in load being shed.

Currently the Impala-Nseleni 132 kV Line is loaded to beyond 90% of its capacity with Mtubatuba and Hluhluwe experiencing low HV Busbar voltages in the year 2019 and beyond due to an increase in both electrification and industrial load. The Impala Substation is not backfeedable. A loss of the Impala-Nseleni powerline will result in load being shed (approximately 44 000 customers).

With the establishment of Iphiva 400-132 kV Substation together with the seven 132 kV Distribution powerlines evacuating power from the substation the following benefits will be experienced:

- Increases in all SS HV Busbar Voltage Levels to above 1 p.u.
- Transformer Taps Reduce throughout the system (Fewer Lockouts)
- Accommodates Load Growth for both electrification and industrial loads.
- 100% Back-feeding possible during the loss of Normandie-Pongola, Normandie-Vergenoeg and Impala-Nseleni 132 kV Lines.

5.2 STRATEGIC AND STATUTORY CONTEXT FOR THE CONSIDERATION OF NEED AND DESIRABILITY

DEA (2017), Guideline on Need and Desirability, says that when evaluating project specific applications, the strategic context of such applications and the broader societal needs and the public interest should be considered. The contents of Municipal IDPs, Strategic Development

Frameworks (SDF), EMFs and other relevant plans, frameworks and strategies must be taken into account. “Whether a proposed activity will be in line with or deviate from the plan, framework or strategy per se is not the issue, but rather the ecological, social and economic impacts that will result because of the alignment or deviation”. Where an application deviates from a plan, framework or strategy the EIA must show why the deviation might be justifiable.

Considering the merits of a specific application in terms of the need and desirability consideration, it must be decided which alternative represents “the most practicable environmental option”, which in terms of the definition in NEMA and the purpose of the EIA Regulations are “that option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long-term as well as the short-term”. This is the ultimate goal of the EIA process.

The DEA 2017 Guideline on Need and Desirability says that during Scoping the questions presented in the guideline document should be used to identify issues to be addressed in the EIA process and alternatives that should be considered. In the EIA Report, the questions must again be considered, but for those questions that were fully addressed in Scoping, it can simply be reported that the questions were dealt with. The remaining questions should be considered in terms of the additional information generated during the impact assessment stage. Most of the questions were addressed in the Scoping Report and are not repeated here. **Table 5.1** presents the questions where responses emanate from additional information that has been generated during the assessment stage.

Table 5.1: Questions from DEA 2017 Need and Desirability Guideline Document

	Question in guideline document	**Response**
1.	How will this development (and its separate elements/aspects) impact on the **ecological integrity** of the area?	This has been addressed in the Fauna and Flora and Wetlands Specialists studies **(Appendix G** and **I** and **Section 10.4.1** and **10.4.3)**
2.7	How will the socio-economic impacts resulting from this development impact on people’s environmental right in terms following: 2.7.1. Negative impacts: e.g. **health** (e.g. HIV-AIDS), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts? 2.7.2. Positive impacts. What measures were taken to **enhance positive impacts**?	Has been addressed in the **Social Specialist Study (Appendix D** and **Section 10.4.6).**
2.8	Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services,	This has been addressed in the **Social Specialist Study**

	Question in guideline document	Response
	describe the linkages and dependencies applicable to the area in question and **how the development's socio-economic impacts will result in ecological impacts** (e.g. over utilisation of natural resources, etc.)?	**(Appendix D** and **Section 10.4.6).**
2.9	What **measures** were taken to pursue the selection of the "**best practicable environmental option**" in terms of socio-economic considerations?	This has been addressed in the **Social Specialist Study (Appendix D** and **Section 10.4.6).**
2.16	Describe how the development will impact on job creation.	This has been addressed in the **Social Specialist Study (Appendix D** and **Section 10.4.6).**
2.19	Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?	Yes, the EAP believes that the mitigation measures proposed are realistic. This is a long terms project (50 years plus). When/if the project is decommissioned at a later stage, then the land that has been affected will have to be rehabilitated to acceptable levels. That will be subject to a separate authorisation process.
2.11	Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?	Alternatives are discussed in **Chapter 6**.
2.12	Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?	This has been addressed in the **Social Specialist Study (Appendix D** and **Section 10.4.6).**

5.2.1 National Development Plan

On 11 November 2011 the National Planning Commission (NPC) released the National Development Plan: Vision for 2030 (NPC, 2012) for South Africa and it was adopted as government policy in August 2012. The National Development Plan (NDP) was undertaken to vision what South Africa should look like in 2030 and what action steps should be taken to achieve this (RSA, 2013). The aim of the NDP is to eliminate poverty and reduce inequality by 2030.

5.2.2 Sustainable Development Goals

All 189 Members States of the United Nations (UN), including South Africa, adopted the UN Millennium Declaration in September 2000 (UN, 2000). The commitments made by the Millennium Declaration are known as the Millennium Development Goals (MDGs), and 2015

was targeted as the year to achieve these goals. The UN Open Working Group of the General Assembly identified seventeen sustainable development goals, built on the foundation of the MDGs as the next global development target (UN, 2014).

The sustainable development goals include aspects such as ending poverty, addressing food security, promoting health, wellbeing and education, gender equality, water and sanitation, economic growth and employment creation, sustainable infrastructure, reducing inequality, creating sustainable cities and human settlements, and addressing challenges in the physical environment such as climate change and environmental resources (UN, 2014). These aspects are included in the NDP, and it can therefore be assumed that South Africa's development path is aligned with the international development agenda.

5.2.3 Strategic Environmental Assessment for Electricity Grid Infrastructure

In order to facilitate the efficient roll out of SIPs lead by the PICC and detailed in the National Infrastructure Plan, DEA, mandated by Ministers and Members of the Executive Council (MinMec), commissioned the Council for Scientific and Industrial Research (CSIR) in January 2014 to undertake a Strategic Environmental Assessment (SEA) linked to SIP 10: Electricity Transmission and Distribution for all. The CSIR has partnered with Eskom and the SANBI to deliver on project outputs (https://egi.csir.co.za/ accessed on 6 January 2017). The corridors being assessed in this EIA do not fall in any of the identified suitable routing corridors that will enable the efficient and effective expansion of key strategic transmission infrastructure designed to satisfy national transmission requirements up to the 2040 planning horizon, in this SEA **(Figure 5.1).** This is, however, not a problem as the SEA did not prioritise the load centre served by this project on the national level. The need for the project, on a regional level, is still justified.

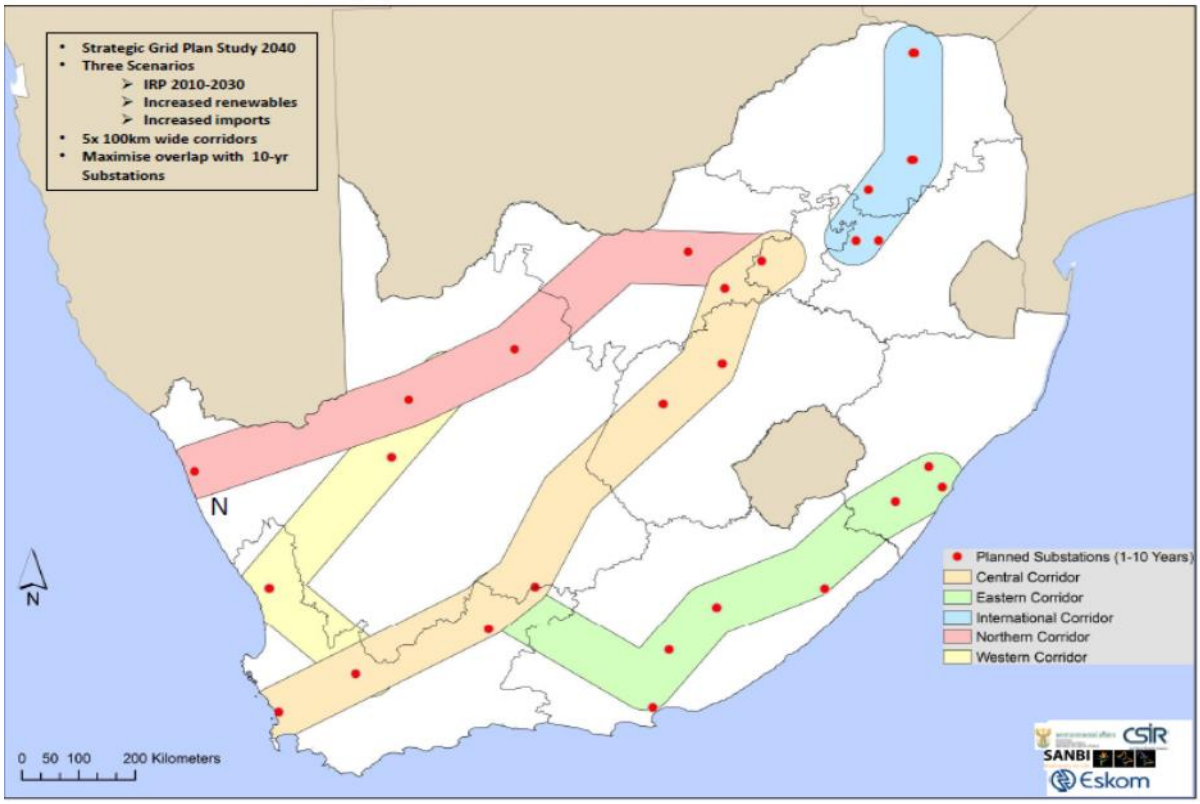

Figure 5.1: SEA suitable electricity routing corridors

Source: (https://egi.csir.co.za/ accessed on 6 January 2017)

Electricity Grid Infrastructure (EGI) Expansion Corridors

5.2.4 Provincial Growth and Development Strategies

Provinces play an important role in contextualising acts and other tools of governance and grounding them within the realities of each province. The provincial governments must guide the local government in the implementation and development of IDPs and other programmes for sustainable development. Provincial Growth and Development Strategies are a critical tool to guide and coordinate the allocation of national, provincial and local resources and private sector investment to achieve sustainable development outcomes. They are not a provincial government plan, but a development framework for the province as a whole (Department Provincial and Local Government [DPLG], 2005).

PGDS are not a legislative requirement, but play an important role in ensuring effectiveness and coordinating delivery of the overall objectives of South Africa as a developmental state. PGDS are based on a long-term view of the provinces' development route. Their primary purpose is to provide a collaborative framework to drive implementation within a province

(DPLG, 2005). The Mpumalanga Economic Growth and Development Path (MEGDP, 2011), and KwaZulu Natal Provincial Spatial Development Strategy (KZN PGDS, 2011) are relevant to this application.

Linking to this, the MEGDP has identified five job drivers:

- Infrastructure;
- Main economic sectors;
- Seizing the potential of new economies;
- Investing in social capital and public services; and
- Spatial development.

The KZN PGDS strategy consists of seven long-term goals and 30 objectives (KZN PGDS, 2011)"

1. Job creation
    1.1. Unleash agricultural potential
    1.2. Enhance industrial development through Trade, Investment & Exports
    1.3. Expand Government-led job creation programmes
    1.4. Promote SMME, entrepreneurial and youth development
    1.5. Enhance the knowledge economy
2. Human resource development
    2.1. Improve early childhood development, primary and secondary education
    2.2. Support skills alignment to economic growth
    2.3. Promote and enhance youth skills development & life-long learning
3. Human and community development
    3.1. Alleviate poverty and improve social welfare
    3.2. Enhance health of communities and citizens
    3.3. Safeguard sustainable livelihoods & food security
    3.4. Sustain human settlements
    3.5. Enhance safety & security
    3.6. Advance social cohesion
    3.7. Promote youth, gender and disability advocacy & the advancement of women
4. Strategic infrastructure
    4.1. Develop ports and harbours
    4.2. Develop road & rail networks
    4.3. Develop Information and Communication Technology infrastructure

4.4. Improve water resource management
4.5. Develop energy production capacity

5. Responses to climate change
   5.1. Increase productive use of land
   5.2. Advance alternative energy generation
   5.3. Manage pressures on biodiversity
   5.4. Manage disaster
6. Governance and policy
   6.1. Strengthen policy, strategy coordination and Inter Governmental Relations
   6.2. Build Government capacity
   6.3. Promote participative, facilitative & accountable governance
7. Spatial equity
   7.1. Promote spatial concentration
   7.2. Facilitate integrated land management & spatial planning

The KZN PGDS has been developed in order to achieve the goals and objectives of the PGDS in a targeted and spatial coordinated manner (KZN PGDS, 2011).

5.2.5 Integrated Development Plans

The South African government operates on three spheres, namely local (municipal), provincial and national. IDPs are compulsory through the Municipal Systems Act 32 of 2000 on municipal level. Integrated Development Planning is a process by which municipalities prepare 5-year strategic development plans. The IDP is the written plan that results from the integrated development planning process. It is the principle strategic planning instrument that guides and informs all planning, management, investment, development and implementation decisions and actions in the local area and supersedes all other plans that guide local development (Coetzee, 2002).

The White Paper on Local Government (RSA, 1998) has contextualised the IDP as a tool for developmental local government with the intention of enabling municipalities to:

- Help align scarce resources behind agreed policy objectives and programmes;
- Make sure that actions are prioritised around urgent needs;
- Ensure the necessary integration with other spheres of government, serving as a tool for communication and interaction with them, and

- Serve as a basis for engagement between local government and communities/residents.

"Although the following municipalities have IDP documents that have been obtained, the following municipalities were considered".

KwaZulu-Natal Province

- Zululand District Municipality
    - Uphongolo Local Municipality
    - Nongoma Local Municipality
- Umkhanyakude District Municipality
    - Jozini Local Municipality.

6 ALTERNATIVES

GNR 982 Appendix 3:

3(1) (h) a full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping report, including:

(i) details of the development footprint alternatives considered;

(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(ix) if no alternative development footprints for the activity were investigated, the motivation for not considering such; and

(x) a concluding statement indicating the location of the preferred alternative development footprint within the approved site as contemplated in the accepted scoping report;

6.1 NO PROJECT ALTERNATIVES

The major load centres in northern KZN, specifically Pongola and the Makhathini Flats, currently experience high voltage drops in the 132 kV network that services them, and the voltages are approaching unacceptable levels as the demand increases. Contingencies on the main 132 kV supplies also lead to thermal overloading of the remaining network. The objective of the applications for this project are to alleviate current and future network constraints in the area. The Iphiva 400/132 kV Substation will also de-load the main sub-transmission network and improve the voltage regulation in the area.

If the projects do not go ahead, then the existing electricity supply to the area as well as future economic development will be limited and compromised. Eskom will then not be fulfilling its mandate, making it an unacceptable scenario.

In the Final Scoping Report. That was accepted by DEA, the EAP therefore recommended that the no-go alternative be rejected and not assessment of the no project alternative in the Impact Assessment Phase of the project.

6.2 SITE ALTERNATIVES

Eskom and the EAP undertook a desktop assessment followed by site visits to identify possible sites for the construction of the proposed Iphiva Substation. Thirteen (13) sites were considered in the Scoping Phase of the project and the two most preferred sites, Iphiva 3 and Iphiva 6 have been further assessed in the specialist studies and this EIA Report.

6.2.1 Iphiva Site 3

Iphiva 3 is located approximately 7 km west of the N2/P234 intersection, immediately north of the P234 (**Figure 6.1**). The P234 and particularly watercourse crossings may require upgrading for the large vehicles with the substation equipment to gain access. Iphiva 3 relatively undisturbed vegetation cover and is not disturbed by anthropogenic activities such as agricultural fields, rural housing, bush clearing or informal roads. The site is available for livestock to graze.

The soils at this site are not suitable for arable agriculture, but rather suitable for grazing. When not covered with vegetation the soils have a high risk for erosion.

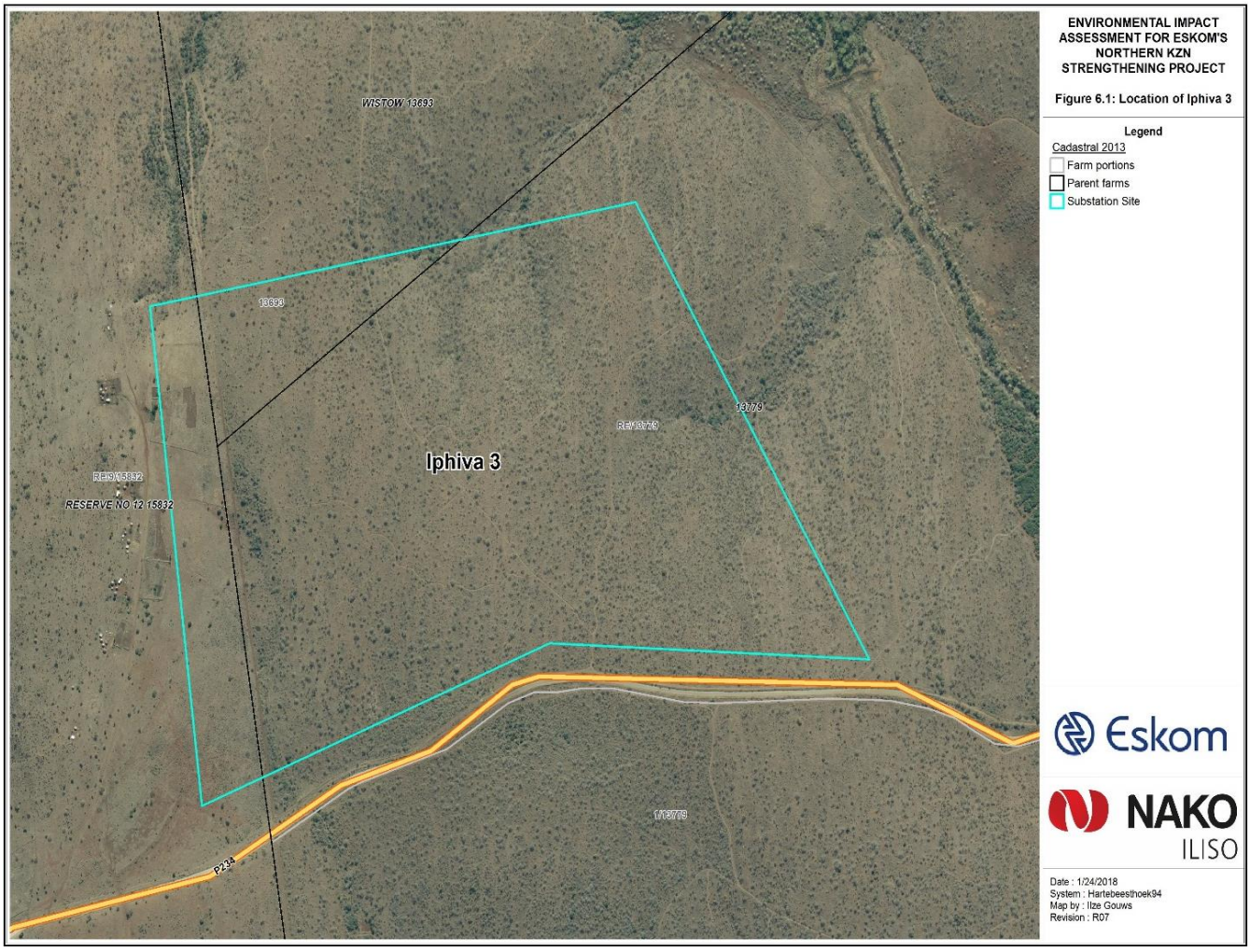

Figure 6.1: Location of Iphiva 3

6.2.2 Iphiva Site 6

Although Iphiva 6 (**Figure 6.2**) is on a mountainous terrace, initial assessments found that acceptable quantities of cut and fill will be required to prepare the site. Accessibility to this site is slightly more difficult to Iphiva 3. Iphiva 6 is disturbed by rural housing, bush clearing or informal roads, with little natural habitat remaining. There is scattered natural vegetation such as Aloe marlothii (Mountain Aloe) and various Acacia species.

The soils at this site are not suitable for arable agriculture, but rather suitable for grazing. When not covered with vegetation the soils have a high risk for erosion.

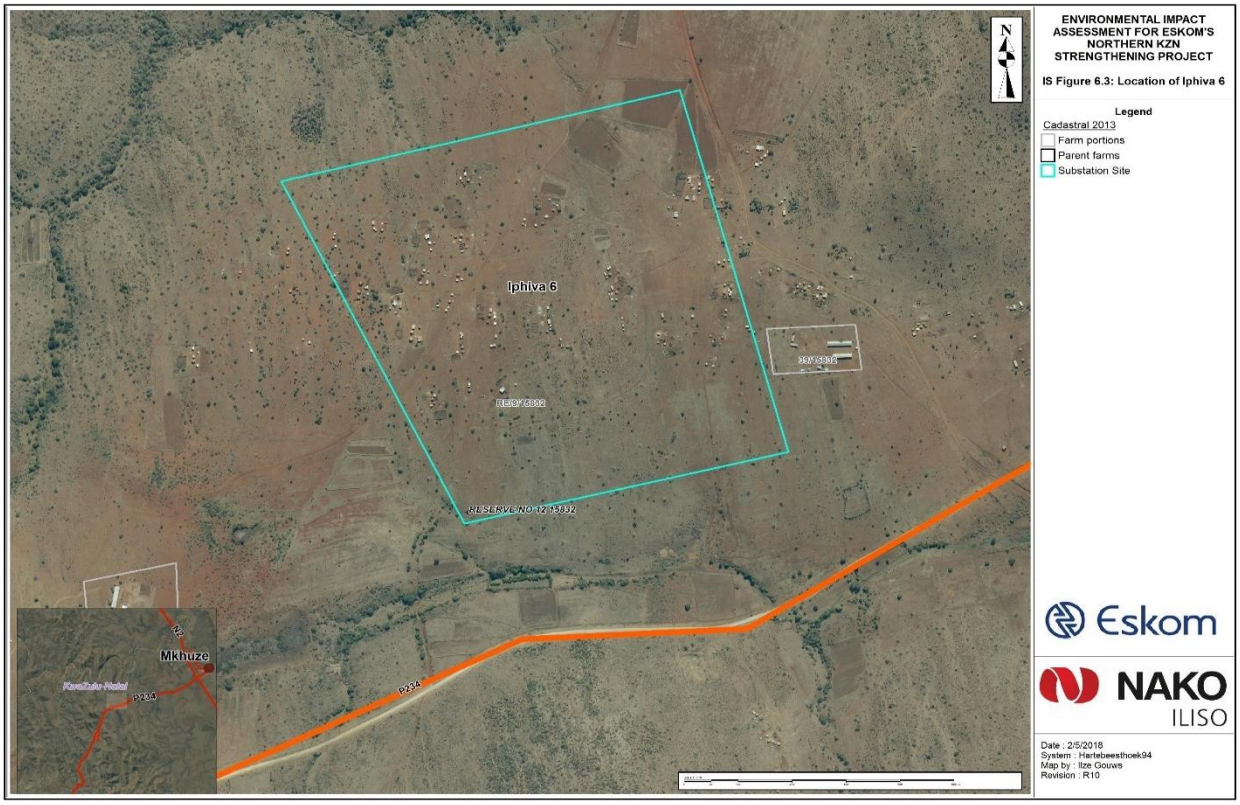

Figure 6.2: Location of Iphiva 6

7 PUBLIC PARTICIPATION PROCESS

GNR 982 Appendix 3:

3(h)(1) (ii) details of the PPP undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;

Due to the cumulative and interrelated nature of the four components of the Northern KZN Strengthening Project (the substation, two 400 kV powerlines and 165 km of 132 kV powerlines) a combined PPP is being undertaken. The PPP therefore cover the greater study area.

7.1 LEGAL REQUIREMENTS

Public participation is a legal requirement for an application for environmental authorisation and is defined in the NEMA, No. 107 of 1998 (as amended) as the "process by which potential I&APs are given opportunity to comment on, or raise issues relevant to the application". Section 24(4)(a)(v) of NEMA requires that such public information and participation procedures "provide all I&APs, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures".

The PPP required is prescribed in Chapter 6 of GN R982 of December 2014, as amended and is also guided by relevant principles contained in Chapter 2 of NEMA. The PPP for the EIA of this project is designed to satisfy the requirements laid down in the above legislation. The International Association for Impact Assessment (IAIA) Fast Tips have also been taken into account as a guideline.

The following are the minimum legal requirements of GN R982:

- Regulation 39 (1) Obtaining written consent of the landowner or person in control of the land to undertake the activity on that land, except for linear activities (the Powerlines are linear activities, but the Substations require written consent);
- Give notice to all I&APs by:
    - Fixing a notice board to the boundary of the proposed and all alternative sites and/or along the corridors
    - Giving written notice in accordance with Section 47D of NEMA (as below) to the owners, occupiers or persons in control of the proposed site and alternatives, adjacent land, municipal ward councillors, any organisation of ratepayers, the

municipality, any organ of state having jurisdiction in respect of any aspect of the activity, and any other party as required by the competent authority
    - Placing an advertisement in one local newspaper or Gazette
    - Placing an advertisement in at least one provincial or national newspaper,
- Maintain a register of I&APs, and
- Comments and responses must be recorded in reports and plans submitted to the authorities.

Section 47D of NEMA says that *"A notice or other document in terms of NEMA or*

1) a specific environmental management Act may be issued to a person—

(a) by delivering it by hand;

(b) by sending it by registered mail—

(i) to that person's business or residential address; or

(ii) in the case of a juristic person, to its registered address or principal place of business;

bA) by faxing a copy of the notice or other document to the person, if the person has a fax number;

bB) by e-mailing a copy of the notice or other document to the person, if the person has an e-mail address; or

bC) by posting a copy of the notice or other document to the person by ordinary mail, if the person has a postal address;

(c) where an address is unknown despite reasonable enquiry, by publishing it once in the Gazette and once in a local newspaper circulating the area of that person's last known residential or business address.

[Subsection 1 amended by section 23(a) of Act No. 30 of 2013]

(2) A notice or other document issued in terms of subsection (1)(b), (bA), (bB), (bC) or (c) must be regarded as having come to the notice of the person, unless the contrary is proved.

[Subsection 2 amended by section 23(b) of Act No. 30 of 2013]. "

The PPP will give all registered I&APs a period of at least 30 days to submit comment on each of the documents that form part of the EIA as they are completed, i.e. the scoping report, the EIA Report and EMPr, and all information that reasonably has or may have the potential to influence the decision with regard to the application.

7.2 PUBLIC PARTICIPATION TASK LEADER

The PPP Task Leader, **Bongi Shinga,** has 15 years of experience in communications management, stakeholder engagement and PPP, in support of environmental management and development processes. She has extensive experience in running complex yet successful communication programmes, particularly in the bulk water and energy sectors. She has been involved in various water resources development assignments for the Department of Water and Sanitation (DWS) and infrastructural development projects for Eskom. She also has actively managed PPP for the review of policies and management plans in the conservation sector. Her ability to communicate and interact with all levels of stakeholders (local, provincial and national), in both rural and urban settings has contributed to effective approaches for monitoring and maintaining stakeholder relationships. She is well-versed in the requirements of public participation as applied in environmental assessments in South Africa. Her role includes facilitation of the public, focus group and key stakeholder meetings.

7.3 THE EIA PROCESS AND LINKS TO THE PUBLIC PARTICIPATION PROCESS

An EIA is a planning and decision-making tool. It identifies the potential negative and positive consequences of a proposed project or development at an early stage, and recommends ways to enhance positive impacts and to avoid, reduce or minimize negative impacts. The EIA findings will also inform further technical and financial investigations and decisions. The EIA is undertaken in terms of section 24C of the NEMA.

Public participation is an important aspect of any EIA, with the objective to assist stakeholders to table issues of concern, suggestions for enhanced benefits and to comment on the findings of the EIA. The PPP is designed to provide sufficient and accessible information to I&APs in an objective manner.

Public Participation can be divided into the following phase:

1. **Announcement Phase** – I&APs are identified and notified of the proposed project. They are given an opportunity to raise any concerns that they have and suggest any alternatives not considered.
2. **Scoping Phase** – During the Scoping Phase I&APs will have an opportunity to provide written comment on the Draft Scoping Report. During this phase they should check that the issues they have raised have been accurately captured and will be addressed by the specialist studies.

3. **Impact Assessment Phase** – The findings and recommendations of the specialist studies and impact assessment will be presented to I&APs in this phase, primarily by an opportunity to comment on the Draft Impact Assessment Report.
4. **Decision making phase** – I&APs will be notified of DEA's decision regarding the project and of their opportunity to appeal.

One of the approaches of the PPP in this EIA is to limit the amount of printing as much as possible, without compromising the effectiveness of the process. Digital methods of making information available (e-mail, webpages and CDs) are therefore used wherever possible.

7.4 PUBLIC PARTICIPATION ACTIVITIES IN THE ANNOUNCEMENT SCOPING PHASES

7.4.1 Stakeholder Identification

The legal requirements set out in Regulations 39 – 44, were taken into account when identifying, notifying and registering I&APs.

Through newspaper advertisements, networking, referral to existing databases of projects undertaken in the study area, stakeholder and/or public meetings, there are currently 1 017 I&APs registered on the database for the Eskom Northern KZN Strengthening Project.

An effort was made to ensure that individuals and/or organisations were identified from an institutional and geographic point of view. The KZN Department of Cooperative Governance and Traditional Affairs (COGTA) assisted the Public Participation Team in identifying stakeholders within the uMkhanyakude and Zululand Districts.

I&APs identified and notified included the following:

- National and Provincial government departments:
    - DWS,
    - DAFF,
    - Department of Local Government and Traditional Affairs,
    - AMAFA/Heritage KZN,
    - Ezemvelo,
    - Department of Agriculture and Rural Development,
    - KZN Department of Economic Development, Tourism and Environmental Affairs,
    - KZN Department of COGTA,

- Organs of state which have jurisdiction in respect of the activity to which the application relates:
    - Eskom Holdings SOC Limited
- District Municipalities:
    - uMkhanyakude District Municipality – Mkuze (Iphiva Substation)
    - uMkhanyakude District Municipality (Iphiva – Duma 400 kV line)
    - Zululand District Municipality – Ulundi (Duma Substation)
    - Gert Sibande District Municipality – Piet Retief (Normandie Substation)
    - Zululand District Municipality (Normandie – Iphiva 400 kV line)
- The Local Municipalities:
    - Ulundi Local Municipality – Ulundi - (Duma Substation)
    - Mkhondo Local Municipality – Piet Retief - (Normandie Substation)
    - Hlabisa Local Municipality (Iphiva – Duma 400 kV line)
    - uPhongolo Local Municipality (Normandie – Iphiva 400 kV line)
    - The Big 5 False Bay Local Municipality (Iphiva – Duma 400 kV line)
    - Jozini Local Municipality (Normandie – Iphiva 400 kV line)
    - Abaqulusi Local Municipality (Normandie – Iphiva 400 kV line)
    - Nongoma Local Municipality (Iphiva – Duma 400 kV line)
    - eDumbe Local Municipality (Normandie – Iphiva 400 kV line)
- Landowners/Land Occupiers.
    - Private Landowners
    - Game Reserves and Tourism Establishment Operators
    - Community Trusts
- Traditional Councils within uMkhanyakude District
    - Qwabe/Makhasa Traditional Council
    - Nibela Traditional Council
    - AbakwaHlabisa Traditional Council
    - Mdletshe Traditional Council
    - Mpembeni Traditional Council
    - Myeni/Ntsinde Traditional Council
    - Myeni/Ngwenya Traditional Council
- Traditional Councils within Zululand District
    - Ndlangamandla Traditional Council
    - Sibiya Traditional Council
    - Msibi Traditional Council

- Simelane Traditional Council
- Gumbi Traditional Council
- Emgazini Traditional Council
- Ntshangase Traditional Council
- Mavuso Traditional Council
- Klwana Traditional Council
- Msiyane Traditional Council
- Empangisweni Traditional Council
- Khambi Traditional Council
- Emathongeni Traditional Council
- Hlahlindlela Traditional Council
- Othaka Traditional Council
- Mandlakazi Traditional Council
- Usuthu Traditional Council
- Dlamini Traditional Council
- Ndlela Traditional Council
- Mthethwa Traditional Council

A GIS map of the study area (**Appendix C1**) has been developed with all properties shown and where landowners/traditional authorities have been notified or registered on the database shaded in. This gives a visual representation of the extent of landowner consultation.

7.4.2 I&AP Database

A Microsoft Access database that has been used which allows for stakeholders to be registered, categorised into sectors and for a full record of their participation in the project to be recorded (**Appendix C2**).

7.4.3 Newspaper Adverts

Advertisements were drafted, translated into Zulu and placed in the newspapers listed in **Table 7.1** Copies are included in the Scoping Report.

Table 7.1: Newspapers where advertisements have been published

Newspaper	Language	Geographic area covered	Date of publication
Mercury Regional newspaper	English	Mkhuze, Pongola, Paulpietersburg, Duma and Vryheid	11 August 2016
Excelsior News	English	Piet Retief	11 August 2016
Isolezwe	Zulu	Mkhuze, Pongola, Paulpietersburg, Duma and Vryheid	11 August 2016

A second round of newspaper advertisements were placed in the same newspapers to announce the availability of the Draft Scoping Report for comment, and to invite I&APs to the second round of Key Stakeholder and Authorities Meetings, that took place from 21 to 25 August 2017.

7.4.4 Onsite Notices

Twenty-three on-site notices were erected at the locations indicated on **Figure 7.1**. Notices have complied with GN 982 Regulation 41 (2), (3) and (4). Additional notices were erected at Iphiva sites 8 to 13 during the public comment period.

Plate 7: Examples of onsite notice

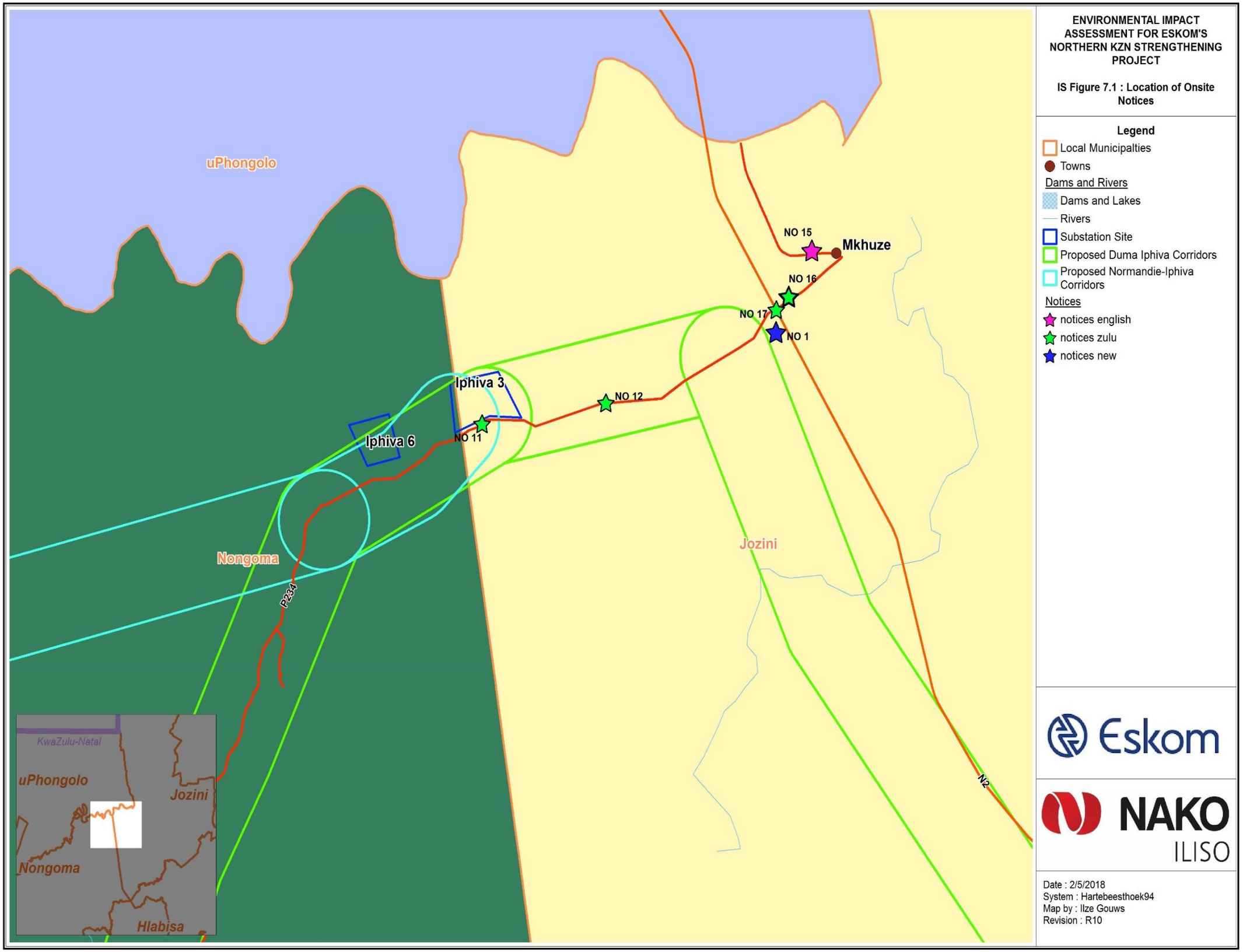

Figure 7.1: Location of onsite notices

7.4.5 Written Notice

Notification letters (copies included in the Scoping Report) were given to the municipal councillors of the wards affected by the project, the district and local municipalities and organs of state indicated in **Section 7.4.1**. Notices were e-mailed with a copy of the Background Information Document (BID) (copy included in the Scoping Report) and I&AP registration form.

7.4.6 Background Information Document

A 6-page x A4 BID was compiled in English, translated into isiZulu and distributed with the notification letters. Additional copies were made available at the first round of key stakeholder and authorities' meetings, focus group meetings and traditional council meetings (copy was included in the Scoping Report).

7.4.7 Draft Report Comment Periods

The 2014 EIA Regulations require a 30-day comment period for all draft reports prior to submission to the competent authority. The first comment period was for the DSR. Registered I&APs were notified by e-mail (or fax, post or phone if they do not have an e-mail address), of the availability of the draft documents for comment, and were invited to attend public meetings.

The availability of the draft Scoping Report and details of public meetings was also advertised in newspapers as detailed in **Table 7.2**.

Table 7.2: Newspapers where availability of the Draft Scoping Report was advertised

Newspaper	Geographic	Language	Areas covered	Insertion Date
The Mercury	Regional	English	Mkhuze, Pongola, Paulpietersburg, Duma and Vryheid	04 September 2017
Excelsior News	Local	English	Piet Retief	01 September 2017
Isolezwe	Regional	Zulu	Northern KZN	04 September 2017
Ilanga	Regional	Zulu	Northern KZN	05 September 2017

Hard copies of the draft documents were made available at four (4) public places in the study area, as indicated in **Table 7.3.** Pdf versions of the documents were uploaded to the NAKO ILISO website. 20 CDs of each of the sets of the draft reports were prepared and made available to I&APs at the meetings and as requested.

Table 7.3: Placing of draft documents at public venues

Area	Venue	Address	Contact Details
Piet Retief	Piet Retief Public Library	Piet Retief, 2380	Tel: 017 826 8153
Pongola	Pongola Public Library	61 Martin St, Pongola, 3170	Tel: 034 413 1540
Mkhuze	Ghost Mountain Inn	Fish Eagle Street, Mkuze	Tel: 035 573 1025
Hluhluwe	Hluhluwe Public Library	163 Zebra Street, Hluhluwe	Tel: 035 562 0040

All comments received have been recorded in the Comments and Responses Report (CRR) for the DSR review period (**Appendix C**).

Minutes of meetings that have taken place since the Final Scoping Report have been prepared and distributed to all attendees with the opportunity to provide corrections within 14 days. Final minutes are included in (**Appendix C)**.

7.4.8 Key Stakeholder and Authorities Meetings

The first round of Key Stakeholder and Authorities' Meetings took place in September 2016 (**Table 7.4)**.

Table 7.4: Venues for Key Stakeholder Meetings

Area	Date	Venues	Time	Attendance
Piet Retief	**Monday, 05 Sept 2016**	Piet Retief Country Club West End Street, Piet Retief	**10H00 – 12H30**	9
Pongola	**Tuesday, 06 Sept 2016**	Pongola Country Lodge 14 Jan Mielie Street Pongola	**10H00 – 12H30**	13
Mkhuze	**Wednesday, 07 Sept 2016**	Ghost Mountain Inn Fish Eagle Road, Mkhuze	**10H00 – 12H30**	14
Hluhluwe	**Thursday, 08 Sept 2016**	Protea Hotel 104 Main Road, Hluhluwe	**10H00 – 12H30**	9

Invitations (copies were included in the Scoping Report) were sent to all registered I&APs. Minutes were prepared and distributed to all attendees with the opportunity to provide corrections within 14 days. Final minutes are included in the Final Scoping Report.

A second round of Key Stakeholder and Authorities meetings will take place in September 2017. Due to the poor turnout at the first round of meetings, the second round of meetings will only be arranged for Pongola and Mkhuze.

The public and focus group meeting that took place during September 2017 to present the draft Scoping Reports and project description for the Distribution powerlines are listed in **Table 7.5**.

Table 7.5: Public and Focus Group Meetings during the Draft Scoping Report Comment Period

Area	Date	Venues	Time	Attendance
Paulpietersburg Farmers	Monday, 18 September 2017	Mr Eckard Hiestermann's farm	14:00 – 15:00	8
Pongola	Tuesday, 19 Sept 2017	Pongola Country Lodge	10H00 – 12H30	15
Mkhuze	Wednesday, 20 Sept 2017	Ghost Mountain Inn	10H00 – 12H30	22

7.4.9 Focus Group Meetings

Two (2) focus group meetings were held during announcement phase and one during the Draft Scoping Report Comment Period as follows:

Table 7.6: Focus group meetings

No	Date	Group/Target Audience	Venue	Time
1	09 September 2016	Ezemvelo	Queen Elizabeth Park, 1 Peter Brown Drive; Pietermaritzburg	10h00 – 11h30
2	25 October 2016	Landowners potentially affected by Iphiva Substation Sites	Ghost Mountain Inn	09h00 – 11h30
2	18 September 2017	Farmers in the Paulpietersburg area	Mr Hiestermann's Farm	14h00-15h00

Minutes of focus group meetings were compiled and distributed to attendees (copies were included in the Scoping Report). Focus Group Meetings will also be arranged during the Draft Scoping Report Comment Period, if required.

7.4.10 Meetings with traditional councils

32 Traditional Councils within the study area that could be affected by the project have been identified. Meetings have taken place with each of these councils as shown in **Table 7.7**. Minutes are presented in the Scoping Report.

Table 7.7: Focus Group Meetings with Traditional Councils that have taken place

No	Meeting With	Venue	Date
1	Makhasa Traditional Council	Makhasa Tribal Court (Hluhluwe)	12 Sept 2016
2	Nibela Traditional Council	Nibela Tribal Court (Hluhluwe)	13 Sept 2016
3	AbakwaHlabisa Traditional Council	AbakwaHlabisa Tribal Court (Hlabisa)	14 Sept 2016
4	Mdletshe Traditional Council	Mdletshe Tribal Court (Hlabisa)	14 Sept 2016
5	Mpembeni Traditional Council	Mpembeni Tribal Court (Hlabisa)	15 Sept 2016
6	Myeni/Ntsinde Traditional Council	Myeni Tribal Court (Obonjeni)	20 Sept 2016
7	Ngwenya/Ntsinde Traditional Council	Ngwenya Tribal Court (Mkuze)	20 Sept 2016
8	Ndlangamandla Traditional Council	Ndlangamandla Tribal Court (Pongola)	21 Sept 2016
9	Sibiya Traditional Council	Sibiya Tribal Court (Pongola)	22 Sept 2016
10	Msibi Traditional Council	Msibi Tribal Court (Emgulatshani)	23 Sept 2016
11	Simelane Traditional Council	Simelane Tribal Court (Pongola)	26 Sept 2016
12	Gumbi Traditional Council	Gumbi Tribal Court (Pongola)	27 Sept 2016
13	Emgazini Traditional Council	Emgazini Tribal Court (Pongola)	28 Sept 2016
14	Ntshangase Traditional Council	Ntshangase Tribal Court (Pongola)	29 Sept 2016
15	Mavuso Traditional Council	Mavuso Tribal Court (Pongola)	03 Oct 2016
16	Klwana Traditional Council	Klwana Tribal Court (Piet Retief)	03 Oct 2016
17	Msiyane Traditional Council	Msiyane Tribal Court (Louwsberg)	04 Oct 2016
18	Empangisweni Traditional Council	Empangisweni Tribal Court (Langkraans)	05 Oct 2016
19	Khambi Traditional Council	Khambi Tribal Court (Gluckstadt)	06 Oct 2016
20	Emathongeni Traditional Council	Emathongeni Tribal Court (Vryheid)	07 Oct 2016
21	Hlahlindlela Traditional Council	Hlahlindlela Tribal Court (Swart Umfolozi)	12 Oct 2016
22	Othaka Traditional Council	Othaka Tribal Court (Nqutu)	12 Oct 2016
23	Mandlakazi Traditional Council	Mandlakazi Tribal Court (Emondlo)	13 Oct 2016
24	Usuthu Traditional Council	Usuthu Tribal Court (Nongoma)	13 Oct 2016
25	Dlamini Traditional Council	Dlamini Tribal Court (Nongoma)	18 Oct 2016
26	Ndlela Traditional Council	Ndlela Tribal Court (Paulpietersburg)	18 Oct 2016
27	Bhovungane Traditional Council	Bhovungane Tribal Court (Paulpietersburg)	19 Oct 2016
28	Mthethwa Traditional Council	Mthethwa Tribal Court (Paulpietersburg)	20 Oct 2016
29	Mpukunyoni Traditional Council	Mpukunyoni Tribal Court (Paulpietersburg)	21 Oct 2016
30	Usuthu Traditional Council	Usuthu Tribal Court (Mtubatuba)	25 Oct 2016
31	Gumbi Traditional Council	Gumbi Tribal Court (Nongoma)	26 Oct 2016
32	Mandlakazi Traditional Council	Mandlakazi Tribal Court (Pongola)	28 Oct 2016

All Traditional Council meetings were conducted in Zulu. Zulu BIDs were also distributed at these meetings. Additional copies were also provided to the Councillors, Izinduna and AmaKhosi. All comments received at these meetings have been incorporated into the CRR.

7.5. PUBLIC PARTICIPATION IN THE IMPACT ASSESSMENT PHASE

The following Focus Group Meetings have taken place after the completion of the Final Scoping Report (minutes included in **Appendix C**):

- Birds Focus Group Meeting on 13 December 2018 in Johannesburg;
- Moolman Farmers Focus Group Meeting on 22 November 2017 in Piet Retief;
- Moolman Farmers site visit to the Normandie Substation on 23 November 2017;
- EKZNW Meetings on 09 September 2016 in Queen Elizabeth Park.

This Draft EIA Report will be available for public comment from 26 April to 29 May 2018.

Availability of the draft reports for public comment have been advertised in the following newspapers:

No	Publication	Insertion Date	Language
1	Excelsior News	27-Apr-18	English
2	Ilanga	26-Apr-18	Zulu
3	Mercury	26-Apr-18	English
4	Isolezwe	26 Apr-18	Zulu

The comments received during this period will be incorporated into the Final EIA Report, and submitted to the DEA who will decide whether the project should go ahead and if so under which conditions. I&APs will be notified of DEA's decisions once it has been made.

Pdf versions of the documents will be uploaded to the NAKO ILISO website. Provision has been made to cut 10 CDs of each of the sets of draft reports. These will be available at key stakeholder and authorities and focus group meetings, or posted to I&APs on request.

Table 7.8: Placing of draft documents at public venues

Area	Venue	Address	Contact Details
Piet Retief	Piet Retief Public Library	Piet Retief, 2380	Tel: 017 826 8153
Pongola	Pongola Public Library	61 Martin St, Pongola, 3170	Tel: 034 413 1540
Mkhuze	Ghost Mountain Inn	Fish Eagle Street, Mkuze	Tel: 035 573 1025
Hluhluwe	Hluhluwe Public Library	163 Zebra Street, Hluhluwe	Tel: 035 562 0040

All comments received will be recorded in the CRR.

The Draft EIA Report will also be presented at Key Stakeholder and Authorities meetings as listed in **Table 7.9**.

Table 7.9: Key Stakeholder and Authorities Meetings

AREA	DATE	VENUES	DATE & TIME
Pongola	Wednesday, 09 May 2018	Pongola Country Club	10:00 – 12:30
Mkuze	Thursday, 10 May 2018	Ghost Mountain Inn	10:00 – 12:30

7.5.1. Focus Group Meetings

Focus group meetings scheduled for the Draft EIA Report comment period are presented in **Table 7.10.** Additional meetings will be scheduled as requested.

Table 7.10: Focus Group meetings scheduled for the Draft EIA Report comment period

Meeting Type and Target Audience	Day, Date and Time	Area	Venue & Physical Address
Public Meeting: Commondale Farmers Association	Monday 07 May 2018 **15h00 – 17h30**	Between Paulpietersburg and Piet Retief	Commondale Farmers Association
Public Meeting: Moolman Farmers Association	Tuesday 08 May 2018 **10h00 – 12h30**	Piet Retief	TWK Agri 11 De Wet Street Piet Retief

Meetings with traditional councils

Traditional Councils within the study area that could be affected by the project have been identified. Meetings with each of the Traditional Councils took place during the Scoping Phase. Follow up meetings are planned for the public comment period for the Draft EIA report. All Traditional Council meetings will be conducted in Zulu. All comments received at these meetings have been incorporated into the CRR.

7.6. PUBLIC PARTICIPATION IN THE AUTHORISATION PHASE

Once the competent authority has made a decision on the project I&APs will be informed in writing and advised of their opportunity and the mechanism by which they can appeal**.**

8 ISSUES RAISED

GNR 982 Appendix 3

3(h) (iii) a summary of the issues raised by I&APs, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;

As a combined PPP is being undertaken the Northern KZN Strengthening Project (the Main Transmission Substation, two 400 kV powerlines and 165 km of 132 kV powerlines), the issues discussed below cover the greater study area that include the powerline corridors. An issue is a point of concern around which debate can be held. These have been identified during the Scoping Phase of the project. An impact is how the natural, social or economic environment will be affected by a specific activity. These have been assessed in this Phase (Impact Assessment Phase) of the project.

The following key issues were identified by the EAP in consultation with I&APs, the applicant and specialists:

- Areas protected by National or Provincial conservation legislation;
- Fauna and Flora (including birds);
- Land use;
- Heritage;
- Social;
- Access;
- Construction Impacts;
- Cumulative impacts.

8.1 PROTECTED AREAS

How will the Northern KZN Strengthening Project impact on areas protected by Provincial or National conservation legislation and associated biodiversity, tourism and investment value?

The study area is characterised by large number of protected and conservation areas (varying from provincially proclaimed reserves to private game reserves) (**Figure 9.4**), including (from the South African Protected Areas Database (2016)):

- Bendor Private Nature Reserve;
- Corridor Game Reserve;
- Hluhluwe Game Reserve;

- iSimangaliso Wetland Park;
- Ithala Nature Reserve;
- Mandlakazi Community Nature Reserve;
- Mduna Royal Game Reserve;
- Mkhuze Game Reserve;
- Ntendeka Wilderness Area;
- Obuka Community Nature Reserve;
- Skaapkraal Private Nature Reserve;
- Somkhanda Game Reserve;
- Somopho Community Nature Reserve;
- Thanda Private Game Reserve;
- Ubombo Mountain Nature Reserve;
- Umfolozi Game Reserve;
- Umkoonyan No1 Private Nature Reserve;
- Umkoonyan No2 Private Nature Reserve;
- Welkom Private Nature Reserve;
- Witbad Nature Reserve; and
- Zululand Rhino Reserve.

Private game reserves, such as the Manyoni Private Game Reserve (previously called the Zululand Rhino Reserve), which is owned by a consortium of owners, and the proposed Zimanga Private Game Reserve (owned by Charl Senekal) develop facilities in the reserve for their own and tourist use. These reserves rely on income from tourists that make use of the facilities to fund their operations. The owners are concerned that **visual** impacts from the Iphiva Substation and/or any above-ground powerlines will reduce the number of visitors to lodges in the private game reserve, or the price that visitors are prepared to pay for the experience. This could impact on the **economic viability** of the existing lodges and potential **future developments and investors**.

If this happens, then it will reduce the **job opportunities** provided by the Reserves, as well as additional **income to the region** from tourists visiting the facilities, negatively impacting the **livelihoods of local communities**. Less income to the Reserves will also result in less funds available for looking after (e.g. supplementary feeding) and protecting important **Red Data species** such as rhinos and wild dogs.

If there is any construction inside a protected area, the Reserve management will have to provide additional **security** to protect the construction workers from the wild animals during construction, which will have a **cost**.

Construction will require the **clearing of vegetation** impacting on the biodiversity of the area. Removing some of the vegetation below the lines may have an impact on the **carrying capacity** of the Reserves that could financially impact the Reserve and its shareholders.

Construction workers in the park increases the risk of **poaching**.

The overhead Transmission lines from Iphiva through the Eastern boundary of the Rhino Reserve are expected to have the above-mentioned impacts. Powerlines in the Iphiva-Duma Western corridors could, similarly be visible with similar impacts from the elevated Western boundary of the Rhino Reserve.

Response

The EAP recommends that any new substations or powerlines in existing protected areas should be completely avoided, and believes that this is possible. It will, however, not be possible to completely avoid having sight of the substation and powerlines from all protected areas, although this will be minimised as far as is possible.

The concern from the landowners is based on **sense of place**, and the value the owners and tourists place on the sense of place (which is subjective and will differ from person to person). It can be difficult to prove that any losses are specifically due to powerlines, as there are numerous factors that could impact on tourism, such as economic conditions, tourism trends, environmental aspects such as droughts etc.

The construction phase is specifically vulnerable phase, as it is the phase with most activities.

These impacts have been assessed by a number of specialists.

A viewshed analysis has been undertaken for the lodges that are particularly close to potential impacts to test the impact (Visual Specialist Study in **Appendix J).**

The assessment has been undertaken qualitatively as visual impact is a perception, and by nature, differs from person to person.

The economic specialist has assessed the potential economic impacts on these parties (**Appendix K**)**.**

8.2 FAUNA AND FLORA

What impacts will the construction and operation of the Northern KZN Strengthening Project have on the natural environment (flora and fauna) of the region?

The construction of surface infrastructure will entail the removal/clearing of vegetation, which will affect the current vegetation present in the study areas. Habitat utilised by mammals, amphibians, reptiles and bird species will also be lost. Open areas will facilitate the establishment of alien invasive plant species. Protected plant and animal species could be affected by construction activities.

The potential impacts on Red Data Species and Birds were raised by I&APs. Birds are impacted by Electrocutions, Collisions, Habitat Destruction and Disturbance.

Electrocutions

The electrocution of birds on overhead powerlines can cause unnatural mortality of a number of different bird species in Southern African. The larger terrestrial dwelling species and birds of prey are the most susceptible. The electrocution can occur when a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (Van Rooyen 2004). Electrocution is possible on 400/132 kV powerlines, especially where large raptors and vultures feature prevalently. It is very likely that vultures will occur in the study area as well as large eagles, ibises and buzzards, so the risk of electrocution is high across the proposed powerline routes.

Collisions

Collisions are the biggest single threat posed by over-head powerlines to birds in Southern Africa (Van Rooyen 2004). In general, large lines with earth wires that are not always visible to birds, can have the largest impact in terms of these collisions. Most heavily impacted upon are korhaans, bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with powerlines (Van Rooyen 2004).

Unfortunately, many of the collision sensitive species are considered threatened in Southern Africa.

The Red Data, rare and endemic species vulnerable to powerline collisions are generally long living, slow reproducing species. Some of the larger terrestrial dwelling species like bustards and cranes require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. These species have not evolved to cope with high adult mortality, with the results that consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the long or even medium term. The project area has a number of these species that are susceptible to powerline collisions.

Many of the anthropogenic threats including habitat destruction, disturbance and powerlines all contribute to adult mortality of these larger Species Special Concern and it is not known what the cumulative effect of these impacts could be over the long term. Collisions of certain large flying bird species such as Great White Pelican *(Pelecanus onocrotalus)*, Pink-backed Pelican *(Pelecanus rufescens)*, Saddle-billed Stork *(Ephippiorhynchus senegalensis)*, Yellow-billed Stork *(Mycteria ibis)*, Woolly-necked Stork *(Ciconia episcopus)*, Lesser Flamingo *(Phoenicopterus minor)*, Black-bellied Bustard *(Lissotis melanogaster)*, Secretarybird *(Sagittarius serpentarius)* and the three crane species, are all a possibility within the project area.

A number of new species of special concern are now regarded as being of high collision threat. These include African Pygmy Goose (*Nettapus auritus)*, Southern Ground Hornbill *(Bucorvus leadbeateri)*, Hooded Vulture *(Necrosyrtes monachus)*, Bateleur *(Terathopius ecaudatus)*, African Marsh Harrier *(Circus ranivorus)* and Black Harrier *(Circus maurus).*

Habitat destruction

Habitat clearing and alteration inevitably takes place during the construction of the powerlines. This happens with the construction of access roads, and the clearing of servitudes, as well as clearing vegetation at the substation sites. Servitudes also have to be cleared of excess vegetation at regular intervals during the operational phase. These activities impact on breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat (Van Rooyen, 2004).

Disturbance

Similarly, the above mentioned construction and maintenance activities impact on birds through disturbance, particularly during ground breeding activities within species. Uncontrolled vehicle access results in unnecessary loss of indigenous and riparian vegetation and preferred habitat for breeding bird species such as lark, pipit, lapwing, courser and bustard species.

Response

These impacts have been assessed in the fauna and flora and avifauna specialists studies.

Impacts as a result of powerlines lies in the risk that they present of bird collisions and mortality and to a lesser extent the limitations on flora in the servitude. As such, the impacts are potentially more significant for the substations and roads during **construction**, whereas for powerlines during **operations**.

Alien Invasive plant species can be controlled with the implementation and regular monitoring of Eskom's Invasive Species management plan.

Impacts on Protected Plant and Animal Species must be addressed through a species of special concern management plan (EMPr). Impacts could be addressed through avoidable, mitigation, rehabilitation, compensation and offsets.

8.3 COMMERCIAL FARMING

What impacts will the construction and operation of the Northern KZN Strengthening Project have on commercial farming in the region?

In terms of commercial farming, sugar cane and forestry are concerns when it comes to the presence of powerlines (**Figure 8.1**).

Sugar cane need to be burnt, and as such cannot be planted below powerlines because the smoke provides a conductor and creates arcs to the ground resulting in the risk of powerlines tripping. Although there are other methods to harvest sugar cane, those are more expensive and labour intensive.

Fire is a great risk for the forestry sector, and a spark or a snapped powerline could cause extensive damage.

Farmers in the north west of the study area have voiced their concerns in a series of Focus Group Meetings **(Appendix C7).** Their concerns included:

- Late identification and involvement in the EIA process;
- Impacts on homesteads;
- Loss of forestry, grazing and cultivated lands;
- Noise pollution and health hazards;
- Visual impacts;
- Long terms financial losses;
- Using a local wood fuelled power station as an alternative to Transmission Powerlines from the coal fires power stations;
- Impacts on cell phone communication;
- Safety for small planes and helicopters used for firefighting and crop spraying;
- Risk of fire;
- Maintenance of fire breaks; and
- Impacts on farm workers.

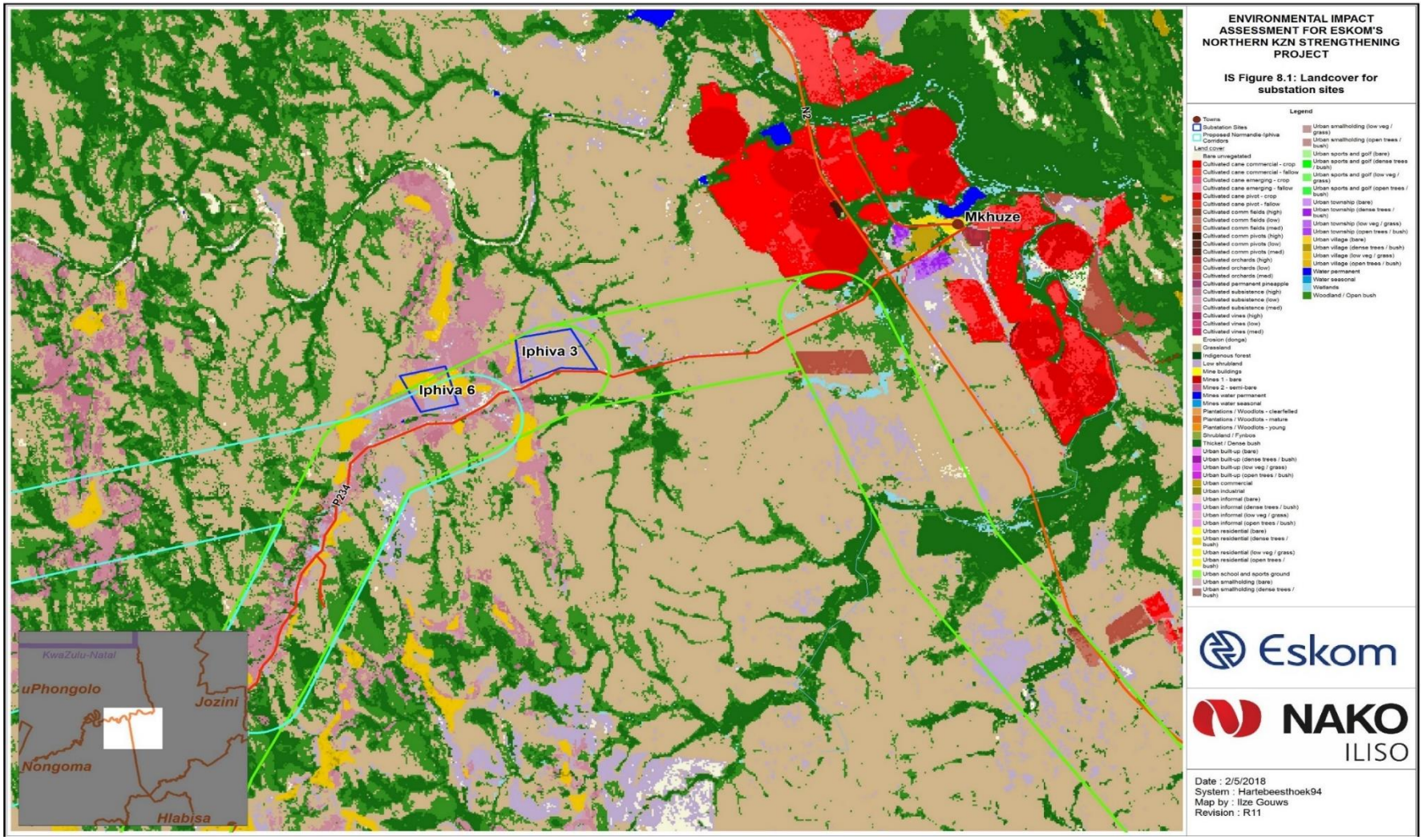

Figure 8.1: Land cover

8.4 HERITAGE

What effects will the construction of the Iphiva Sub-station have on cultural heritage resources?

An impact to a heritage resource from a project related activity may manifest in several ways. These impacts are not always comparable in scale. In addition, project activities can influence the Cultural Significance of heritage resources without any actual physical impact on the resources taking place.

Heritage impacts can therefore generally be placed into three broad categories (adapted from Winter & Bauman 2005: 36):

- **Direct or primary heritage impacts** affect the fabric or physical integrity of the heritage resource, for example, destruction of an archaeological site or historical building. Direct or primary impacts may be the most immediate and noticeable. Such impacts are usually ranked as the most intense, but can often be erroneously assessed as high-ranking; and
- **Indirect, induced or secondary heritage impacts** can occur later in time or at a different place from the causal activity, or as a result of a complex pathway. For example, restricted access to a heritage resource resulting in the gradual erosion of its cultural significance that may be dependent on ritual patterns of access. Although the physical fabric of the resource is not affected through any primary impact, its significance is affected that can ultimately result in the loss of the resource itself.

Responses

The Heritage Specialist Study (**Appendix F**) identifies and assesses the impacts of this project on Heritage Resources.

8.5 SOCIAL

What are the potential social impacts associated with the construction and operation of the proposed sub-station and powerlines?

A social impact is something that is experienced or felt by humans. It can be positive or negative. Social impacts can be experienced in a physical or perceptual sense. Therefore, two types of social impacts can be distinguished:

- Objective social impacts – i.e. impacts that can be quantified and verified by independent observers in the local context, such as changes in employment patterns, in standard of living or in health and safety.

- Subjective social impacts – i.e. impacts that occur “in the heads” or emotions of people, such as negative public attitudes, psychological stress or reduced quality of life.

It is important to include subjective social impacts, as these can have far-reaching consequences in the form of opposition to, and social mobilisation against the project (Du Preez & Perold, 2005).

It is very likely that a number of social change processes will be set in motion by the project. Whether these processes cause social impacts will depend on the successful implementation of mitigation measures. Having said that, it must be considered that the social environment is dynamic and constantly changing, making it difficult to predict exact impacts. External processes not related to the project, like political changes or global economic changes can alter the social environment in a short period of time, and therefore alter the predicted impacts.

Sources of social impacts are often not as clear-cut as those in the biophysical environment. Social impacts are not site-specific, but occur in the communities surrounding the proposed site – where the people are.

Response
A Social Specialist Study has been undertaken **(Section 10.4.6** and **Appendix D)**

8.6 ACCESS

In order to implement the proposed substation and powerline, Eskom and its contractors will require access to substation site, tower positions and servitudes.

Existing roads will be used, and upgraded if necessary, wherever possible. In some cases, new temporary or permanent access roads may need to be constructed within the corridors assessed. Access roads are therefore included in the application, project description, assessment and EMPr.

Initial field work has revealed that some areas of the study area already have significant erosion resulting from other activities.

Response
The comparative assessment of the initial alternatives undertaken in the Scoping phase considered access roads. The soils and agricultural potential specialist study has also considered erosion in **(Section 10.4.5** and **Appendix E).** Mitigation measures and monitoring requirements have been included in the EMPr.

8.7 CONSTRUCTION IMPACTS

What impacts will the common construction activities of the proposed Iphiva Substation and powerlines have?

Construction activities cause a well-known suite of impacts and risks. These include dust, noise, visual intrusion, increased traffic, erosion, pollution, waste generation and social impacts as a result of an influx of construction workers.

A real potential exists for surface and groundwater pollution as well as impacting on the volume and flow patterns of surface and groundwater. Furthermore, surface and groundwater users could be negatively impacted during the construction and operational phases of such a substation.

Response

These impacts have been addressed in the EMPr, which includes mitigation measures recommended by specialists in their studies.

Although no specialist studies on the impacts on surface and groundwater was commissioned associated mitigation plans have been prescribed.

8.8 CUMULATIVE IMPACTS

What cumulative effects will the proposed Iphiva Sub-station and powerlines contribute to?

GN 982 defines a cumulative impact in relation to an activity as "*the past, current or reasonably foreseeable future impact of an activity, considered together with the impact 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*".

The most significant cumulative impacts of the proposed Iphiva Substation will be caused by all of the future powerlines that could loop in to the substation. No other reasonably foreseeable future activities that will result in cumulative impacts have been identified.

Response

The substation sites have not been assessed based on their footprint only, but the number and direction of the powerlines emanating from the substation in the foreseeable future has been taken into account, in both the Scoping comparative assessment (**Chapter 6**) and this phase. This is also the main reason that the four applications are being assessed together in one process. Impacts from past and current activities have also been taken into account in description of the receiving environment (**Chapter 9**).

9 ENVIRONMENTAL ATTRIBUTES

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3h(1) (iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

As components of the Northern KZN Strengthening Project (the substation, two 400 kV powerlines and 165 km of 132 kV powerlines) impact on each other and are being assessed concurrently, the environmental attributes discussed below generally cover the greater study area that include all of these components.

9.1 CLIMATE

The area has warm to hot summers, high evaporation and dry warm winters and a mean annual rainfall between 495 and 1 560 mm. Average rainfall is higher in the west and decreases gradually to the east.

9.2 GEOLOGY

This region of KZN is underlain by lithostratigraphic units associated with the Karoo Supergroup (Main Karoo Basin), ranging in age from Late Carboniferous to Middle Jurassic. The Karoo Supergroup is famously known for its terrestrial vertebrate fossils, distinctive plant assemblages, thick glacial deposits and extensive dolerite dykes and sills.

The parent material in the western parts of both Iphiva 3 and Iphiva 6 Substations is arenite. In the eastern part of the Iphiva 3 Substation the parent material is basalt, but the eastern part of the Iphiva 6 Substation has mudstone and arenite as parent material, which indicates that developing soils may be erosion susceptible.

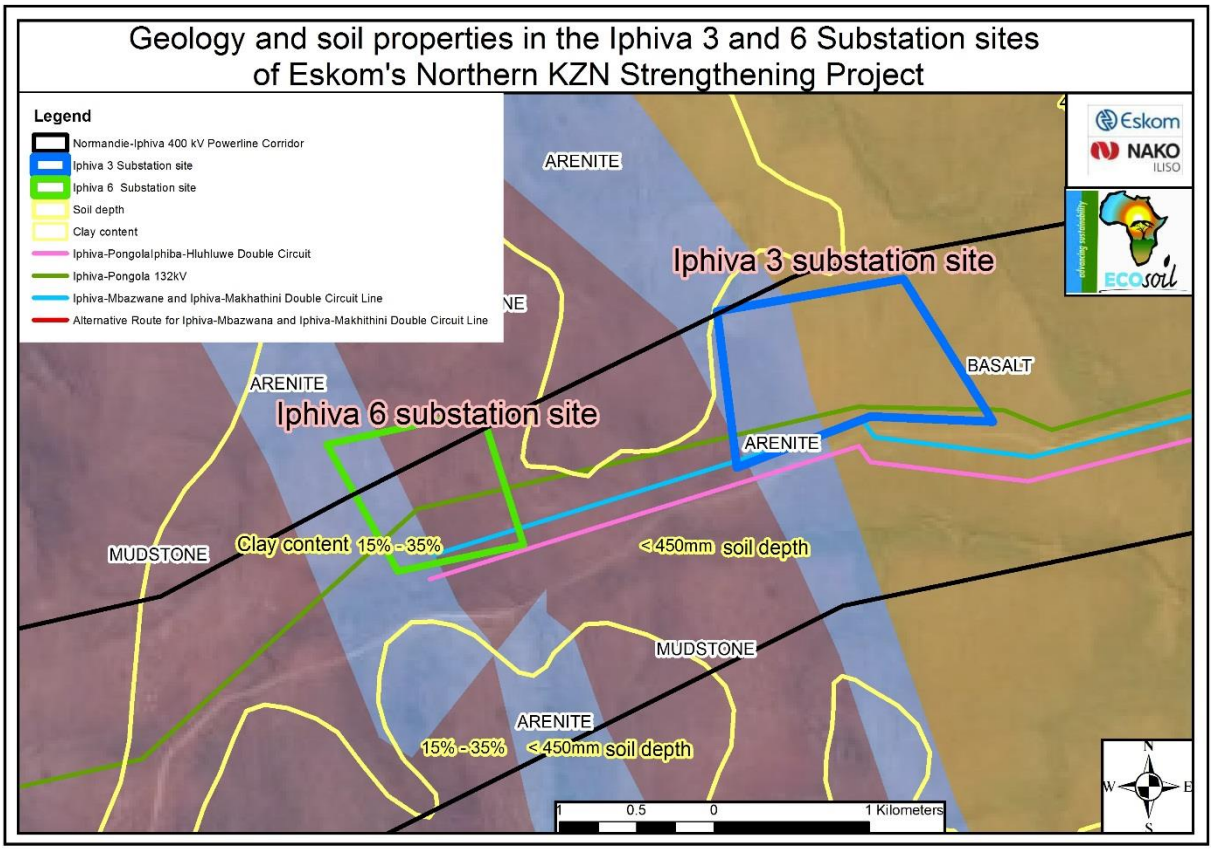


Figure 9.1: Geology and Soil Properties in the Iphiva 3 and 6

9.3 LANDSCAPE AND TOPOGRAPHY

The dominant landscape features are valley slopes to undulating hills and flat plains with a network of trailing rivers and smaller streams. The northern and central parts of the study area are more mountainous and have extreme topographical features. Two extreme areas where topographical features are observed is in the north along the Pongola River and east, close to the N2.

Mean elevation ranges from 0 m above mean sea level (mamsl) to 1 560 mamsl above sea level. The typical height increases as one moves further away from the coast. Eastern areas ranges from 0 – 910 mamsl, while areas in the west ranges from 655 – 1 560 mamsl.

9.4 SOILS

The Fb soil group occupies a large percentage (37.4 %) of land in the Duma-Iphiva Corridors and 42.6 % of land in the Normandie-Iphiva corridors. These Fb group of soils are shallow and of low agricultural potential and have rock or weathered rock as underlying material.

All three of the proposed substations are situated on soil with vertic, melanic or red structured diagnostic horizons. This means that the soil has swelling and shrinking and sticky properties and will have special needs for foundations and planning during construction. These kinds of soils are not high potential agricultural soils.

Small numbers of hectares have deep soils (>750 mm) in both the Corridors and soil depth is more likely to be between 450 to 750 mm. Clay contents is generally between 15 and 35 % in both corridors. Almost 24 % of the soils in the Duma-Iphiva Corridors and 10.2 % of the Normandie-Iphiva Corridors have clay contents more than 35 % and may therefore be susceptible to water erosion. Soils should always be kept covered with plants or crops to prevent erosion. Clay contents higher than 35 % is present at the proposed Iphiva 1 and 2 sites, but the clay content of the Iphiva 2 site is expected to be lower (between 15 and 35 %).

Approximately 30.1% of the soils in the Duma-Iphiva Corridors may have a high swell-shrink potential, plasticity and stickiness, restricted effective soil depth and signs of wetness. The proposed Iphiva 1 and 2 sites are also situated on similar soils. 31.6 % of the soils have a restricted soil depth associated with rockiness. At Iphiva 3 the soil depth may be restricted and excessive drainage, high erodibility and low natural fertility properties may occur.

9.5 AGRICULTURE POTENTIAL

Arable crop production is not restricted by the climate of the area, but may become risky in the areas with lower and irregular rainfall patterns. Soil with a high swell-shrink potential, plasticity and stickiness may cause problems during construction in wet periods of the year. Such soils are mainly found in the eastern parts of the Duma-Iphiva Corridors. The profile (plant) available water content also indicates soils of low potential in the entire Northern KZN Strengthening Project area. Almost 35% of the soils in the Normandie-Iphiva Corridors have favourable soil physical properties and 34% of the soils in the Duma-Iphiva Corridors have a high natural fertility, but is of low value due to the other soil features.

The area can be classed in five land capability classes, namely:

- Soils of intermediate suitability for arable agriculture
- Soils not suitable for arable agriculture, but suitable for forestry or grazing
- Soils of poor suitability for arable agriculture
- No dominant class
- Water bodies

At the Iphiva 3 and 6 Substations the soils are not suitable for arable agriculture, but rather suitable for grazing from an agricultural viewpoint. When not covered with vegetation the soils have a high risk for erosion.

9.6 WATER RESOURCES

9.6.1 Drainage and Quaternary Catchments

The proposed powerline routes will directly traverse a total of 33 quaternary catchments, as listed in **Table 9.1.**

Table 9.1: Quaternary catchments

Quaternary Catchment	Major watercourse	Duma Iphiva Corridors	Normandie Iphiva Corridors
W21K	White Mfolozi River; Nhlungwane[1]; and Mbilane tributary[1].		x
W21L	White Mfolozi River; Munywana tributary[1]; and Mayayeni tributary[1].		x
W22E	Bululwana tributary[2]; Sikwebexi tributary[2]; and Vuna tributary[2].	X	
W22J	Black Mfolozi River.		x
W22K	Wela tributary[2]; and Mvalo tributary[2].		x
W23A	Mfolozi River; Mvamanzi tributary[3]; Nkatha tributary[3]; and Mbukwini tributary[3].		x
W31A	Mkuze River; and Nkongolwana tributary[4].	X	
W31B	Mkuze River.	X	
W31D	Mkuze River; Ntutshe tributary[4]; and Manzimhlope tributary[4].	X	
W31E	Mkuze River.	X	
W31F	Nkunzana tributary[4]; and Mpuphisi tributary[4].	X	X
W31G	Mkuze River; and Mtiki tributary[4].	X	X
W31H	Mkuze River; and Kwasekane tributary[4].	X	X
W31K	Msunduzi tributary[4]; Ntweni tributary[4]; Msebe tributary[4]; and Mduna tributary[4].		X
W32C	Mzinene tributary[5]; Mhlosinga tributary[5]; Ngweni tributary[5]; and		X

Quaternary Catchment	Major watercourse	Duma Iphiva Corridors	Normandie Iphiva Corridors
	Munywana tributary[5].		
W32E	Hluhluwe River[5].		X
W32F	Nzimane tributary[6]; Manyisa tributary[6]; and Manzabomvu tributary[6].		X
W32G	Nyalazi River[5]; Hlazane tributary[5]; Sikhathula tributary[5]; Mnyaba tributary[5]; and Nsane tributary[5].		X
W41E	Bivane tributary[7].	X	
W41F	Manzana tributary[7]; and KwCeba tributary[7].	X	
W42D	Phongolo River.	X	
W42E	Phongolo River.	X	
W42F	Wit River[7].	X	
W42G	Phongolo River.	X	
W42H	iThalu River[7]; and Mbizane River[7].	X	
W42J	Phongolo River; and Mhulumbela River[7].	X	
W42K	Mozana River[7].	X	
W42L	Mozana River[7].	X	
W42M	Phongolo River; Spekboom River[7]; and Mtokotshwala River[7].	X	
W44A	Phongolo River; Voyizana River[7]; and Mdlavenga River[7].	X	
W44B	Phongolo River; and Manzawakho River[7].	X	
W44D	Phongolo River.	X	
W44E	Phongolo River (and dam); Libe River[7]; and Mhlanganisi River[7].	X	

Key: [1] denotes tributaries of the White Mfolozi River; [2] denotes tributaries of the Black Mfolozi River; [3] denotes tributaries of the Mfolozi River; [4] denotes tributaries of the Mkuze River; [5] denotes tributaries of the St Lucia estuary; [6] denotes tributaries of the Hluhluwe River; [7] denotes tributaries of the Phongolo River

The major rivers associated with wetland and riparian habitat along the powerline routes include: the Mfolozi River and its tributaries traversed by the Duma-Iphiva corridors, the Pongola River and its tributaries traversed by the Normandie-Iphiva corridors, as well as the Mkuze and Hluhluwe Rivers.

9.6.2 National Freshwater Ecosystem Priority Areas

The National Freshwater Ecosystem Priority Areas (NFEPA) (Nel *et. al.;* 2011) are strategic spatial priorities for conserving the country's freshwater ecosystems and supporting sustainable use of water resources were considered to evaluate the importance of the wetland areas located within the project area (Nel *et. al.;* 2011). **Figure 9.2** shows the distribution of NFEPA wetlands associated with the study area.

Section A-B of the Normandie-Iphiva route traverses a large valley flat wetland of rank 2 (important for the maintenance of biodiversity), as well as numerous rank 4 (wetlands n good ecological condition) and 5 (wetlands identified for future rehabilitation efforts) wetlands.

A rank 1 wetland has been identified by NFEPA, which is attributable to the presence of a Ramsar wetland associated with the study site (found 2 km from the study area). The St Lucia Ramsar site consists of a complex arrangement of coastal dune forest, marine, estuarine and fresh water wetlands and hygrophilous grassland to the east of the study area. As a consequence, any wetlands linked to the adjacent Ramsar site should be conserved. The Duma – Iphiva route traverses major rivers systems (primarily rank 4) for both the eastern and western routes.

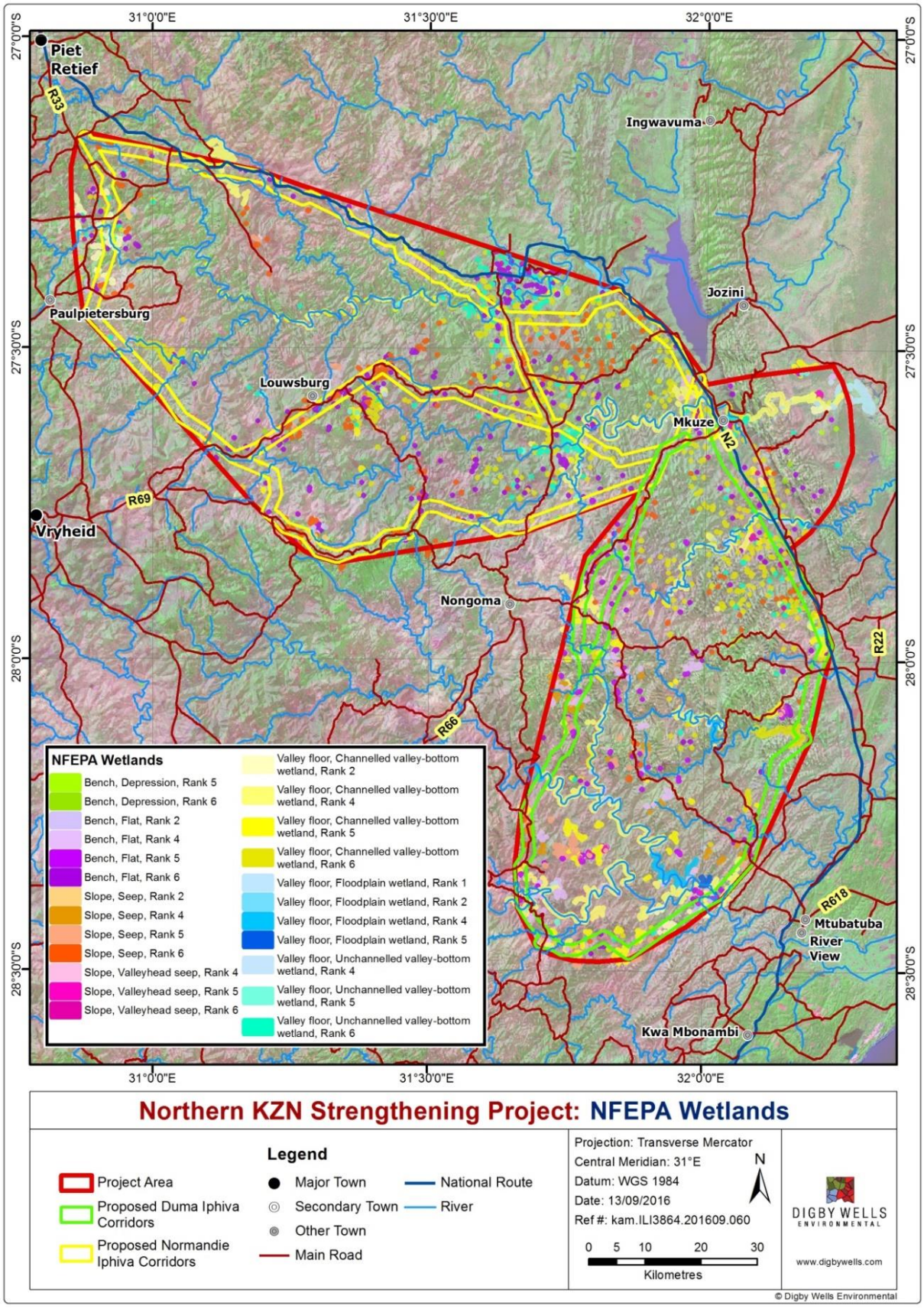


Figure 9.2: National Freshwater Ecosystems Priority Areas

9.7 FAUNA AND FLORA

9.7.1. Regional Vegetation

The KZN Vegetation Type map has undergone several changes since the publication of the Mucina and Rutherford (2006) national Vegetation Types. Ezemvelo has, in collaboration with various government departments, NGOs, Working Groups and Forums e.g. KZN Wetland Forum, IAIA (members of the International Association for Impact Assessment), municipalities and parastatals, refined the KZN Vegetation Types to develop an accurate representation of the pre-transformation extent of the vegetation types present. As a result of the finer scale mapping and classification, KZN vegetation types map has in some cases identified new vegetation types and or subtypes within the vegetation types identified at national level. The sub types in some instances have different red data statuses from the main vegetation type, and are indicated as such (**Appendix G**). The fauna and flora specialist focussed on high conservation status vegetation in his field.

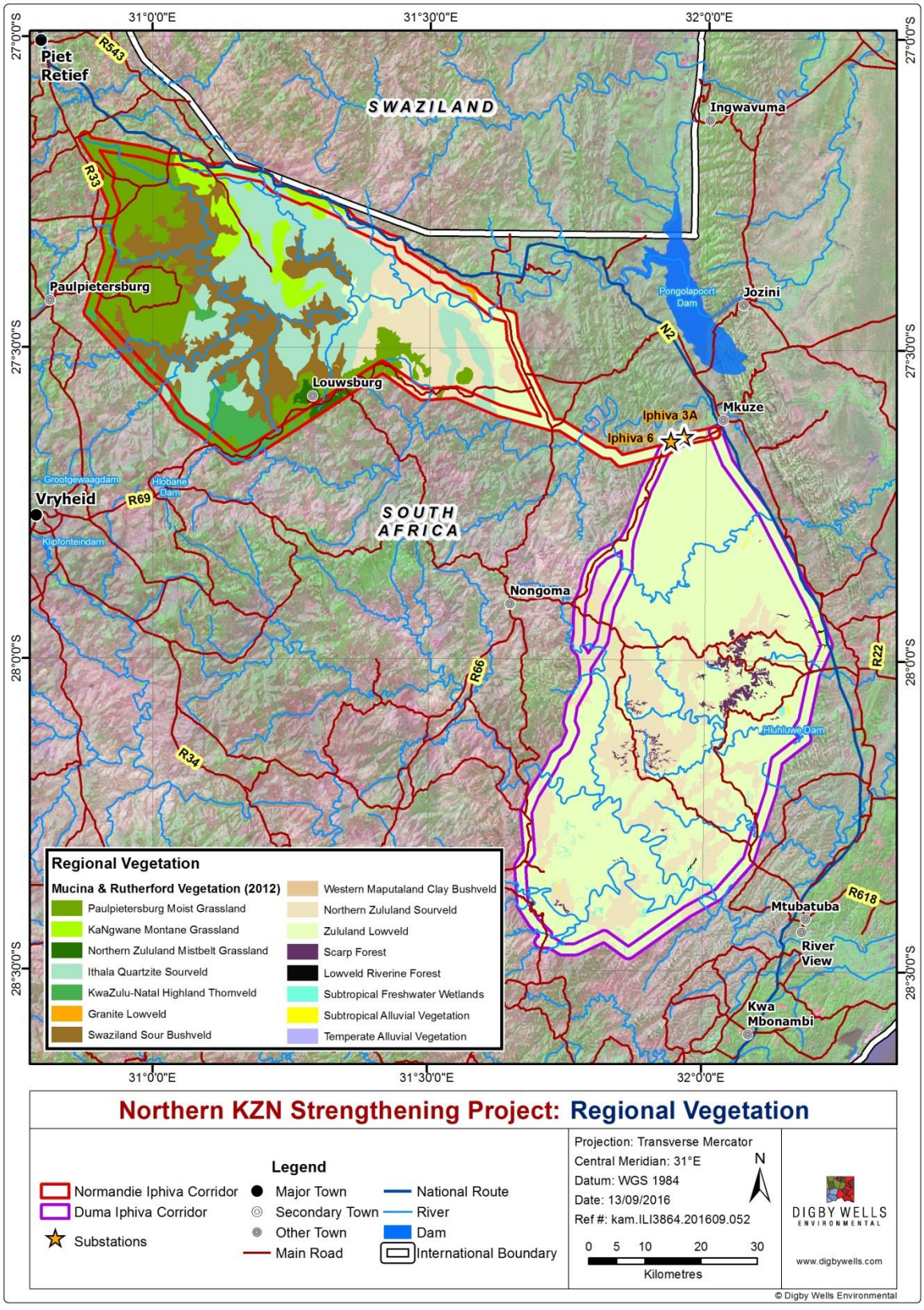


Figure 9.3: Regional Vegetation Types (Mucina and Rutherford 2012)

9.7.2. Flora

Species of Special Concern

The Red Data listed species that have been recorded previously in relevant 26 Quarter Degree Square Grid (QDS grids) are listed in the Fauna and Flora Specialist study (**Appendix G**). This list is supplemented with data received from Ezemvelo in January 2017. Within this list three species are designated as Critically Endangered, 15 species as Declining, ten species as Endangered, 13 species as Near Threatened, five species as Rare, one species as Threatened and 21 species as Vulnerable. No champion trees occur within the route alignments. (DAFF 2012).

9.7.3. Fauna

Mammals

A database search for mammal species that have been recorded in the 26 QDS grids, on the virtual museum of the Animal Demography Unit (http://www.adu.org.za) was performed (**Appendix G**). This database forms part of the Department of Biological Science at the University of Cape Town.

Mammal species expected to occur in the study area include eight Vulnerable species, two Near Threatened, one Critically Endangered species and two Endangered. The variety of vegetation types occurring in the study area ensures an ecologically diverse assemblage of plant species which in turn could support a variety of mammal species, therefore the expected species list could be more extensive than is currently. 21 bat species of conservation concern can possibly be present in the area of interest.

9.7.4. Reptiles

Reptiles are ectothermic (cold-blooded) meaning they are organisms that control body temperature through external means. As a result, reptiles are dependent on environmental heat sources. Due to this many reptiles regulate their body temperature by basking in the sun, or in warmer areas. Substrate is an important factor determining which habitats are suitable for which species of reptile.

According the Animal demography unit's virtual museum a total of 60 species have been recorded in the relevant QDS grids in the past (http://sarca.adu.org.za/). Only three protected species are expected to occur within the Transmission powerline corridors and proposed substation sites.

9.7.5. Amphibians

Amphibians are viewed be good indicators of changes to the whole ecosystem because they are sensitive to changes in the aquatic and terrestrial environments (Waddle, 2006). According to Carruthers (2009), frogs occur throughout southern Africa. No protected amphibian or NEMBA protected species are expected to occur in the study area.

9.7.6. Invertebrates

Butterflies are a good indication of the habitats available in a specific area (Woodhall 2005). Although many species are eurytropes (able to use a wide range of habitats) and are widespread and common, South Africa has many stenotrope (specific habitat requirements with populations concentrated in a small area) species which may be very specialised (Woodhall 2005). Butterflies are useful indicators as they are relatively easy to locate and catch, and to identify.

9.7.7. Birds

The project area falls within the northern section of KZN and the region is well known for its large wetlands, river systems, grassland hills, bushveld and diverse micro-habitats. 58 of Southern Africa's endemic and near endemic avifaunal species are found within the project area, many of them confined to the grassland, riparian and wetland systems. Although the summer months are more productive for the diversity of species due to the arrival of breeding migrants, winter provides large congregations of water birds around some of the nationally important wetlands found within or close to the project area.

The site falls within the Maputaland-Pondoland Centre of Endemism, which is a biodiversity hotspot. There is an Important Bird Area (IBA) within the current proposed project area, namely; the Ithala Game Reserve. There are a further three Important Bird Areas (IBAs) in close proximity, namely the Hluhluwe–Umfolozi National Park, the Pongola Nature Reserve and the Mkuze Game Reserve which forms part of the greater Isimangaliso Wetland Park.

Collectively these IBA's would constitute some of the most avifaunal rich and diverse areas in South Africa. Many of the areas outside these IBAs will have similar habitat and species will therefore not be restricted to the protected areas.

The Ithala Game Reserve is located 15 km from the town of Louwsburg south of the Pongola River. This IBA is known to support more than 300 bird species, a diversity that can be

attributed to its variety of habitat it supports including Ithala Quartzite Sourveld Grassland vegetation (Mucina and Rutherford, 2006). In the higher altitude areas, the vulnerable Southern Bald Ibis *(Geronticus calvus),* Blue Crane (*Anthropoides paradiseus)* and several large bird of prey species including the endangered White-backed Vulture *(Gyps africanus)*, Lappet-faced Vulture *(Torgos tracheliotos)*, Martial Eagle *(Polemaetus bellicosus)*, Bateleur *(Terathopius ecaudatus)* and Tawny Eagle *(Aquila rapax)* occur. African Grass Owl *(Tyto capensis)* occurs in the grassland areas. (Birdlife.org.za).

The Pongola Nature Reserve IBA is located 30 km south-east of Pongola town. The Pongola River flows in from the north-west and only a small section of the river lies inside the reserve. The vegetation predominantly consists of Zululand Lowveld (Mucina and Rutherford, 2006). The associated wetlands are important for wetland-dependent birds such as the Pink-backed Pelican (*Pelecanus rufescens)* which has bred in the past, making this one of only two sites in South Africa where it does so.

Globally threatened species include the endangered vulture species such as Lappet-faced Vulture *(Torgos tracheliotos)*, White-headed Vulture *(Trigonoceps occipitalis)*, White-backed Vulture *(Gyps africanus)* and Martial Eagle *(Polemaetus bellicosus)*. Regionally threatened species are Marabou Stork (*Leptoptilos crumeniferus)*, African Marsh Harrier *(Circus ranivorus)*, African Grass Owl *(Tyto capensis)* and Tawny Eagle *(Aquila rapax)*. Biome-restricted species include White-throated Robin-Chat *(Irania gutturalis),* Gorgeous Bush-Shrike (*Telophorus viridis)* and Rudd's Apalis *(Apalis ruddi)*.

The Mkuze IBA is located on the western edge of the Isimangaliso Wetland Park which is both a Ramsar Site and a World Heritage Site. Here a number of large pan systems exist and therefore the IBA is home to a number of Red Data Listed wetland and aquatic species. There are important water courses and wetlands that are associated with the river systems in the central and southern region of the study area, as well as in the east within the Mkuze Game Reserve. These wetlands may well be seasonal but occasionally inundated with water and associated with the “Subtropical Alluvial Vegetation” vegetation type (Mucina & Rutherford 2006). The larger rivers and associated sandbanks provide habitat for various wading species including, Lapwings, Plovers, Stilts and Sandpipers.

Rivers and drainage lines also represent important flight paths for many species. These areas will be very important for assorted water bird species, and construction of the new powerline in close proximity to these areas should be avoided.

The Hluhluwe–Umfolozi IBA is located 20 km north-west of the town Mtubatuba, at the junction of the coastal plain and the foothills of the KZN interior. The local vegetation is classified as Zululand Lowveld and Northern Zululand Thornveld (Mucina and Rutherford, 2006). This region to the south of the proposed project area is known to support more than 400 bird species, about 46% of the species found in the southern African sub-region (birdlife.org.za). The bird diversity within the region can be attributed to the variety of habitats in this area. This diversity includes a number of important populations of large, widespread Red Data Listed birds of prey that have suffered outside the protected areas.

Large terrestrial species found here and are susceptible to powerline collisions include Black Stork (*Ciconia nigra)*, Woolly-necked Stork *(C. episcopus)*, African Openbill *(Anastomus lamelligerus)* and Saddle-billed Stork (*Ephippiorhynchus senegalensis).* Several endangered vulture species that are rare outside South Africa's large parks are locally common here.
Various sensitivity zones have been identified on a desk top level, associated with protected areas and IBAs, including potentially pristine or secondary grassland, bushveld/thornveld and sand forest, wetlands, pans and rivers. Avifaunal input into the Final EMPr will be compiled via a walk down of the final powerline route when a specialist will identify the areas for marking and areas to install deflectors to mitigate for bird collisions.

The South African Bird Atlas Project data (SABAP2) has recorded a total of 29 Red Data species according to the IIUCN (2016), these comprise 3 Endangered species, 11 Vulnerable species and 13 Near-threatened species and are presented in the Avifauna Specialist Study in **Appendix H**.

9.8 IDENTIFICATION OF ENVIRONMENTAL SENSITIVITIES

In terms of ecological sensitivity, the following features are assessed to determine how sensitive the habitat identified within the transmission line corridors is:

- Presence or absence of Red Data or protected plant and animal species;
- Presence or absence of exceptional species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems such as Protected Areas, areas demarcated for future protected area status (National Protected Areas Expansion Strategy (NPAES)) and wetlands.

Terrestrial conservation priorities highlighted in the Terrestrial Systematic C-Plan for the Province (EKZNW, 2010). According to this plan, the majority of the project site and proposed corridors fall within areas known as Biodiversity areas, all the alternatives cross Critical Biodiversity areas 1 Mandatory, or Critical Biodiversity areas Optimal.

Biodiversity Priority Areas (BPAs) refer to natural areas that are viewed as necessary to ensure protection of biodiversity, environmental sustainability, and human well-being. The importance of the biodiversity features in BPAs and the associated ecosystem services is sufficiently high that, if their existence and condition are confirmed, the likelihood of a fatal flaw for new development projects is high (i.e. development projects are likely to be significantly constrained or may not receive necessary environmental authorizations).

9.8.1 Critical Biodiversity Areas including Centres of Endemism

The Transmission powerline corridors and substations falls within the Maputaland-Pondoland Centre of Endemism, this is a biodiversity hotspot. Stretching along the east coast of southern Africa, from southern Mozambique through KZN and the Eastern Cape in South Africa, the recently recognized Maputaland-Pondoland-Albany Hotspot is an exceptionally diverse area.

The hotspot is the meeting point of six of South Africa's eight major vegetation types. The region boasts an unusually high number of unique species and ecosystems, with one type of forest (sand forest), six types of bushveld and five types of grassland restricted to the hotspot, as well as an entire vegetation type called "subtropical thicket."

The hotspot is a refuge for the critically endangered Black Rhino. It is estimated that only 3 600 Black Rhino remaining in the wild (compared with 65,000 animals recorded in the 1970s), most of which are restricted to this hotspot.

The hotspot is also home to most of South Africa's natural forests, and with nearly 600 tree species it has the highest tree diversity of any temperate forest in the world. The region is home to the 'Big Five' game animals (elephant, lion, rhino, leopard and Cape buffalo).

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan.

9.8.2 Sensitivity and Conservation Planning Tools

There are several assessments for South Africa as a whole, as well as on provincial levels that allow for detailed conservation planning as well as meeting biodiversity targets for the country's variety of ecosystems. These guides are essential to consult for development projects, and have formed an important part of the sensitivity analysis. Areas earmarked for conservation in the future, or that are essential to meet biodiversity and conservation targets should not be developed, and have a high sensitivity as they are necessary for overall functioning. In addition, sensitivity analysis in the field based in much finer scale data can be used to ground truth the larger scale assessments and put it into a more localised context.

Protected areas

Officially protected areas, either Provincially or Nationally that occur close to a project site could have consequences as far as impact on these areas are concerned. Protected areas that occur within the broader study area (South African Protected Areas Database (2016) are presented on **Figure 9.4.**

Nationally Threatened Ecosystems

The list of national Threatened Ecosystems has been gazetted (NEM:BA: National list of ecosystems that are threatened and in need of protection) and result in several implications in terms of development within these areas (**Figure 9.5**).

National Protected Areas Expansion Strategy

The NPAES are areas designated for future incorporation into existing protected areas (both National and informal protected areas). These areas are large, mostly intact areas required to meet biodiversity targets, and suitable for protection. They may not necessarily be proclaimed as protected areas in the future and are a broad scale planning tool allowing for better development and conservation planning (**Figure 9.6**).

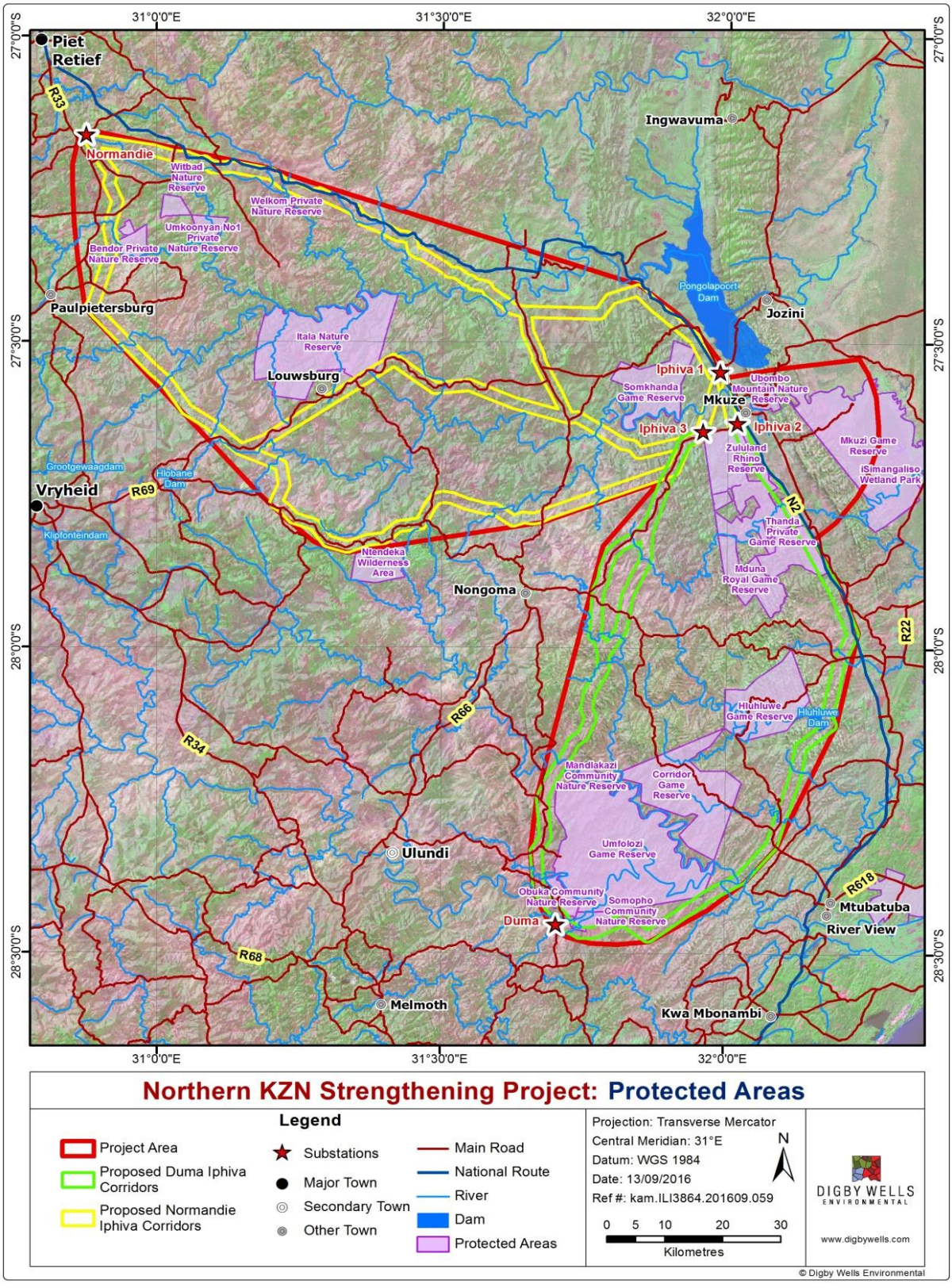


Figure 9.4: Protected area in relation to the study site

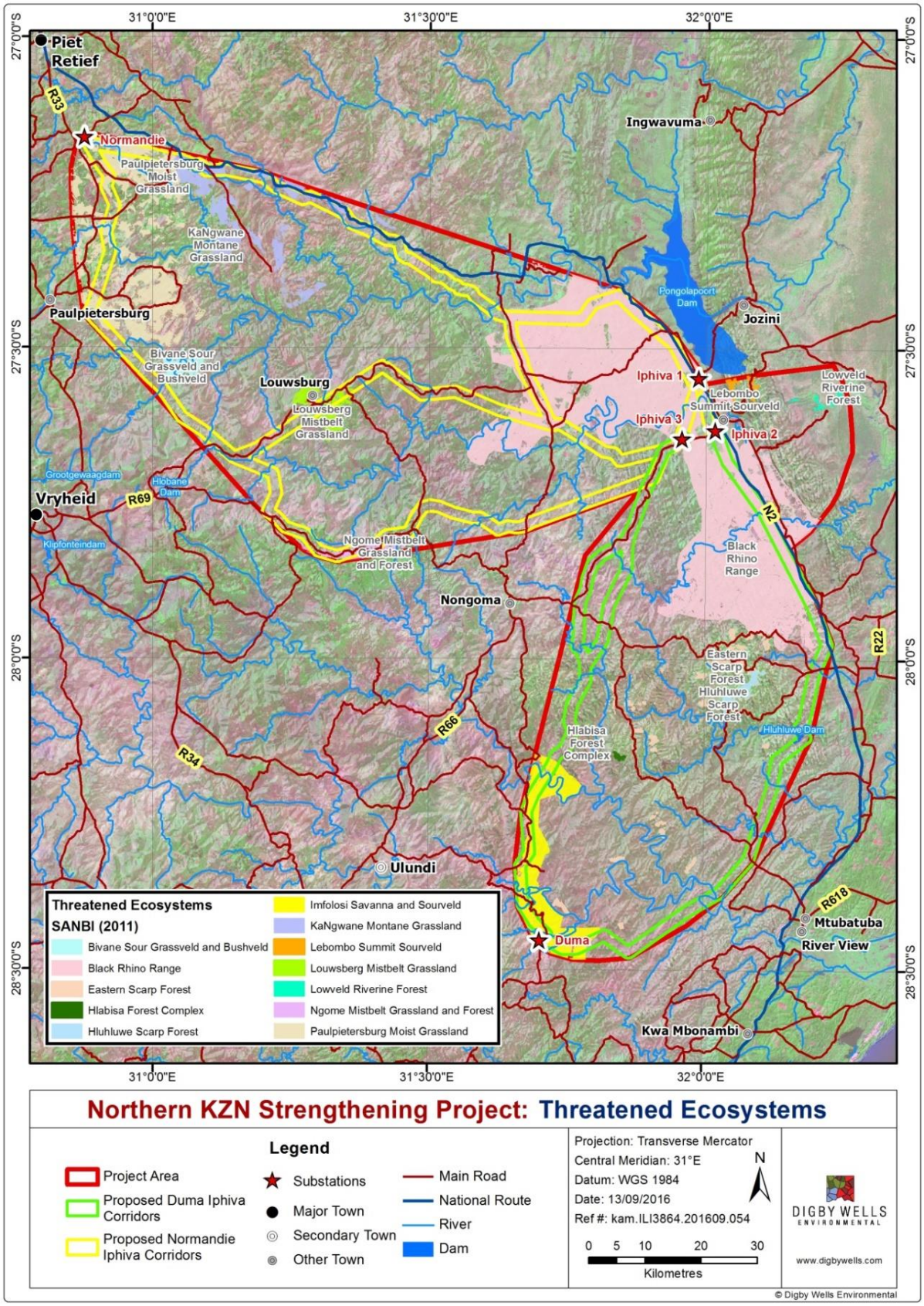


Figure 9.5: Nationally Threatened Ecosystems

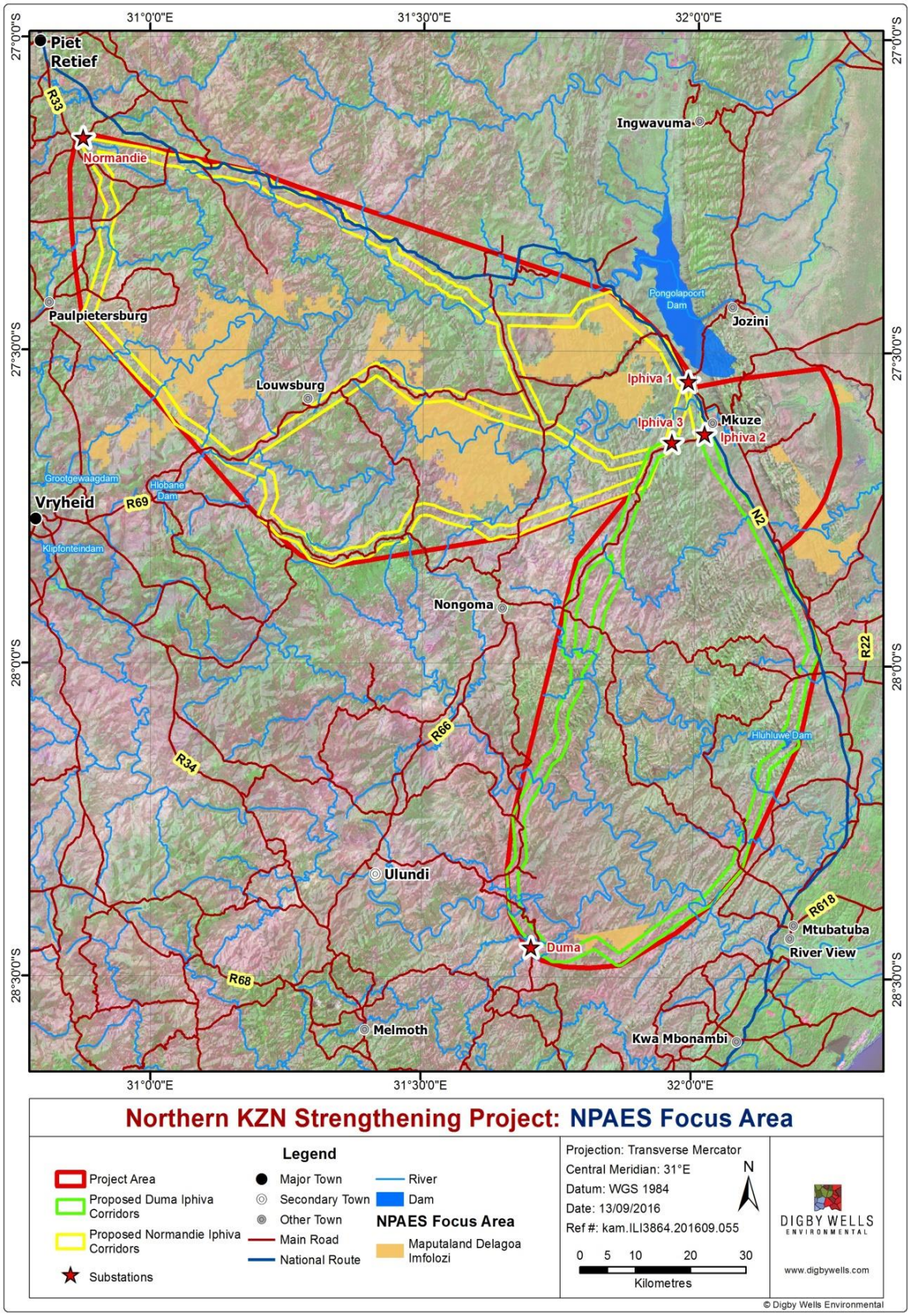


Figure 9.6: NPAES Focus Areas

9.9 HERITAGE

The baseline profile and identified heritage resources show that the study area is underlain by a palaeontologically sensitive area. Known heritage resources and events span from the Stone Age through to the historical period.

These underlay a significant portion of the Duma – Iphiva West 1, West 2 and East options. While surface disturbance through project related activities are unlikely to expose fossiliferous material, rock outcrops would need to be surveyed to identify any potential fossil heritage.

Archaeological resources associated with the Stone Age, rock art and farming community period have been identified in the region. In situ archaeological sites and heritage resources are more likely to be identified in areas that have been minimally disturbed through anthropogenic processes. Open / undisturbed areas are therefore considered to be of high sensitivity, where minimally disturbed areas, such as field, or heavily disturbed areas such as urban / settlements are considered to be of medium and low sensitivity respectively.

Heritage resources associated with the historical period that have been identified in the study area include the following:

- Battlefields;
- Monuments and memorials;
- Historic built structures; and
- Burial grounds and graves.

With the exception of the identified battlefield, the majority of the heritage resources associated with the historical period occur within urban / settlement areas that have been altered through time by people. While the individual resources themselves may be considered to have a high cultural sensitivity, the proposed development will like have a negligible impact to these resource types.

9.10 LAND USE

The majority of the study area's land use consist of:

- **Commercial farming** - large sugarcane plantations occur around Pongola as well as an area on the R66 towards Nongoma, where the R66 crosses the Mkhuze River. Croplands coincide with the more evenly sloped areas.
- **Forestry** - Significant forestry areas occur in the following high-lying areas:
    - Areas north of Frischgewaagd; and
    - Along the R69 to Louwsburg.
- **Dispersed rural settlement** - informal housing settlements (villages) and single isolated homesteads are scattered throughout the study area, coinciding with subsistence agriculture.
- **Larger formalised towns** - these include Louwsburg, located more towards the west of the study area and Pongola, located towards the north of the study area.
- **Existing infrastructure** – The presence of infrastructure such as roads, rail and powerlines affect the visual sensitivity of the landscape.
- **Conservation / game farming** – there are large areas in the study area with formal status under NEM:PAA.

9.11 SOCIO-ECONOMIC CHARACTERISTICS

The study area is mostly located in the KZN province, with a small portion located in the Mpumalanga Province. There are only a few large towns in the area. The rest of the area consist of settlements in areas under traditional leadership, commercial farms as well as some game reserves.

For the baseline description of the area, data from Census 2011, Community Survey 2016, municipal IDP's and websites were used. It must be noted that some of the municipalities amalgamated or were incorporated in other municipalities on 3 August 2016. As the most of the data is based on the 2011 demarcation boundaries, these are used for a description of the area **(Table 9.2) (Figure 9.7).**

The results should be viewed as indicative of the population characteristics in the area and should not be interpreted as absolute.

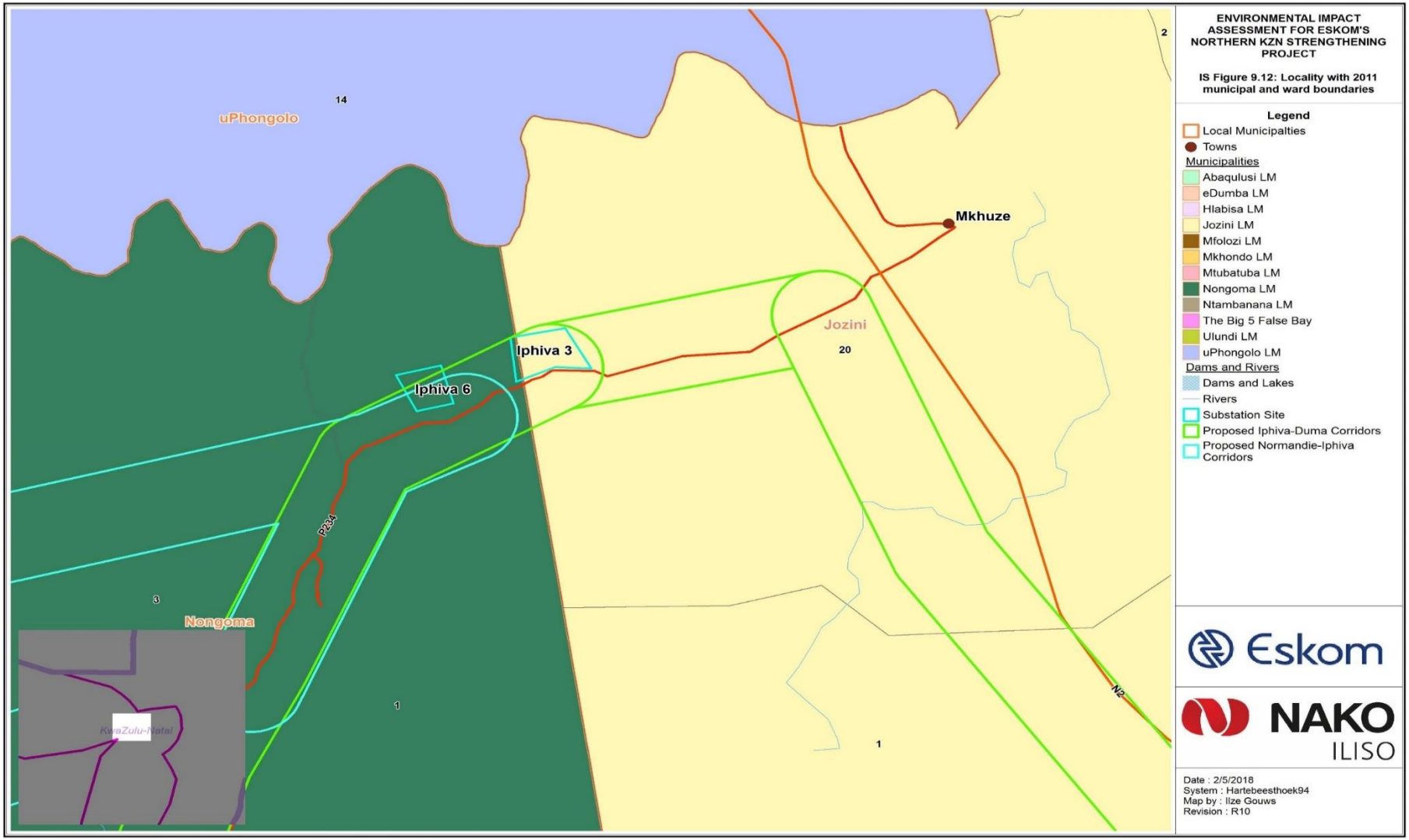


Figure 9.7: Locality with 2011 municipal and ward boundaries

Table 9.2: Project area in municipal context (2011 demarcation boundaries)

Province	District Municipality	Local Municipality	Wards
Mpumalanga	Gert Sibande	Mkhondo	9, 15
KZN	Zululand	eDumbe	2, 4, 5, 6, 7, 8
		Uphongolo	1, 2, 3, 4, 5, 6 ,7, 8, 9, 10, 11, 12, 13, 14
		Abaqulusi	1, 2, 3, 4, 5, 6, 7
		Nongoma	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 17, 18, 19, 20
		Ulundi	14, 15
	Umkhanyakude	Jozini	1, 2, 4, 20
		Mtubatuba	7, 15, 18, 19
		Big 5 False Bay*	3
		Hlabisa*	1, 2, 3, 4, 5, 6, 7, 8
	Uthungulu**	Mfolozi	10, 12, 13
		Ntambanana***	1, 2, 5, 6

* The Hlabisa and Big 5 False Bay Local Municipalities have merged into the Big 5 Hlabisa Local Municipality on 3 August 2016)
** The Uthungulu District Municipality was renamed the King Cetshwayo District Municipality
*** The Ntambanana Local Municipality was disestablished on 3 August 2016 and merged with the uMhlatuze, Mthonjaneni and Mfolozi Local Municipalities

The Iphiva 3 Substation Site is located in the Jozini LM (Umkhanyakude DM) while the Iphiva 6 Substation Site is located in the Nongoma LM (Zululand DM). The two sites are located close to one another close to the town of Mkuze. There are no dwellings on the Iphiva 3 Substation Site, while the Iphiva 6 Substation Site is populated. The closest social infrastructure such as clinics and police stations are at Mkuze. The people residing on the Iphiva 6 Substation Site are under traditional leadership.

The Nongoma LM has a very high (88.0) total dependency ratio (proportion of dependents per 100 working-age population). Both the Jozini LM and the Nongoma LM had a high poverty intensity in 2016, indicating people in the area are considered poor on more than one dimension of poverty. The majority of the residents have IsiZulu as home language. Levels of illiteracy is high with low levels of employment especially in the Nongoma LM. As the Iphiva 6 Substation Site is in relative close proximity to a number of private game reserves as well as the town of Mkuze, the levels of employment in the area on and around the site is likely to be slightly higher, but still relatively low.

In Ward 1 of the Nongoma LM where Iphiva 6 Substation Site is located, most households have access to either water from a water scheme, or water from a river or stream. More than 60% of households do not have access to sanitation, those that do, use pit toilets without

ventilation or some other system. Most of the households in this ward do not have access to electricity or refuse removal.

9.11.1 Description of the Population

The baseline description of the population will take place on three levels, namely provincial, district and local. Impacts can only truly be comprehended by understanding the differences and similarities between the different levels. The baseline description will focus on the municipalities in the study area, as these are the areas that will be most affected by the proposed project. Where practical, the data will be reviewed on a ward level. The data used for the socio-economic description was sourced from Census 2011. Census 2011 was a de facto census (a census in which people are enumerated according to where they stay on census night) where the reference night was 9-10 October 2011. The results should be viewed as indicative of the population characteristics in the area and should not be interpreted as absolute.

Population and Household Size

According to the Community Survey 2016, the population of South Africa is approximately 55.7 million and has shown an increase of about 7.5% since 2011. The household density for the country is estimated on approximately 3.29 people per household, indicating an average household size of 3-4 people (leaning towards 3) for most households, which is down from the 2011 average household size of 3.58 people per household. Smaller household sizes are in general associated with higher levels of urbanisation.

In the study area the Mtubatuba LM (15.25%) and the Abaqulusi LM (14.28%) showed the greatest increase in population since 2011, much greater than on a national level. The population in the Ntambanana LM (0.61%) showed virtually no increase.

Population Composition, Age, gender and Home Language

More than 90% of the population in the study area belong to the Black population group. In some wards, especially in the urban areas, the proportions differ and larger proportions of people belonging to other population groups are found.

The average age in all the municipal areas are below 27 years, with the lowest average age (22.91) in the Nongoma LM. More than half of the population in the Nongoma LM are younger than 20 years of age. Such a young population place a lot of pressure on resources and

infrastructure of the area, and a great demand for future infrastructure and creation of livelihoods can be expected.

In all the municipalities in the study area, there are more females than males. Females are usually regarded as more disadvantaged in terms of resources, especially in areas under traditional leadership, and are therefore a very vulnerable group. Many males of economically active age have migrated to the cities and other urban areas in search of employment.

IsiZulu is the home language of more than 90% of the residents of the area (Census 2011), except in the Mkhondo LM, where only 89.06% of people have isiZulu as home language.

Education

The highest proportion of people with no schooling who are aged 20 years or older are in the Jozini LM (27.37%) and the Big 5 False Bay LM (26.05%) (Census 2011). There proportions vary on a ward level within the municipal areas and in some wards more than 30% of the population older than 20 years have received no schooling. These high levels of illiteracy should be taken into consideration when consulting with these communities on the project.

Employment, Livelihoods and Economic Activities

The area is characterised by scattered settlement patterns with only a few towns. Levels of employment vary, with the highest proportion of employed people in the Mkhondo LM (29.98%) (Census 2011) in Mpumalanga. The proportion of employed people vary on a ward level within the local municipalities. The wards with the highest levels of employment are not the wards where the towns are located and it can be assumed that commercial farms, forestry and/or tourism attractions are located in these wards.

The Mkhondo LM in Mpumalanga has a well-diversified economy with the main activities being forestry, commercial agriculture, some coal mining and a few tourism attractions. There is industry in the area that supports forestry. In the remaining local municipalities, the economy is not well diversified and the economic activities are mostly limited to agriculture and tourism in the form of game farms, private and public game reserves. In terms of agriculture two main types of agricultural activities can be identified, namely commercial agriculture and then small-scale and subsistence farming. The communities in the areas under traditional leadership rely heavily on small-scale and subsistence farming for their livelihoods. Informal trading is another important livelihood strategy in the study area and some municipalities are trying to regulate or manage informal trading, acknowledging the importance of this strategy for the

communities. There is very little industry that supports commercial agricultural activities in most of the municipal areas.

Housing

Most of the dwellings in the study area are houses or brick/concrete block structures that are on a separate yard, stand or farm (Census 2011), followed by traditional dwellings/huts/structures made of traditional materials. The proportions differ per municipal area as well as per ward in each municipal area. Ntambanana LM is the only area where there are slightly more traditional dwellings (45.58%) than brick structures (45.13%).

The majority of the dwellings in the study area are owned and fully paid off, or occupied rent free (Census 2011). It must be noted that the Ingonyama Trust is the custodian of the land under traditional authority in KZN, and although a household may own their dwelling, they may not own the land the dwelling was built on.

More than 40% of households in the Big 5 False Bay LM (49.14%), Uphongolo LM (44.51%), Mkhondo LM (40.72%) and the Abaqulusi LM (40.5%) have only one or two members (Census 2011). Most of large towns in the study area are located in these municipalities. In the municipalities with a more traditional character such as Nongoma, Hlabisa and Ntambanana, the household sizes tend to be larger. There are large differences between the wards in the municipalities, giving an indication of the character of the different wards.

Access to Basic Services

Access to basic services such as water, sanitation and electricity relate to standard of living according to SAMPI (Statistics South Africa, 2014). Households that use paraffin, candles or nothing for lighting; or fuels such as paraffin, wood, coal, dung or nothing for cooking or heating; have no piped water in the dwelling or on the stand and do not have flush toilets can be described as deprived in terms of these basic services.

The majority of households in all the local municipalities, except for Nongoma and Hlabisa have access to water from a local or regional water scheme (Census 2011). The majority of households in Nongoma or Hlabisa get their water from a river or a stream. In Ntambanana quite a large proportion of households get their water from water tankers. The source of water differs between wards in local municipalities. More than half of the households, except in Big 5 False Bay (43.52%), Hlabisa (34.34%), Jozini (30.33%), Nongoma (27.48%) and

Ntambanana (22.28%) have access to piped water inside their dwellings or yards (Census 2011).

The incidence of flush toilets (connected to sewerage system or septic tank) is relative low in most areas except for Mkhondo (42.11%) and Abaqulusi (43.76%) (Census 2011). The highest incidence of households with no access to toilet services is in Nongoma (29.1%), Uphongolo (27.45%), Ntambanana (24.26%) and Jozini (23.13%).

Access to electricity for lighting purposes give an indication of whether a household has access to electricity, as poor households sometimes only use electricity for lighting, but use other sources of energy for heat and cooking. The Jozini LM (29.09%) has the lowest incidence of households with access to electricity for lighting purposes, followed by Big 5 False Bay (42.57%) (Census 2011). This differs on a ward level, and a number of the wards in the study area have a low incidence of access to electricity.

The incidence of refuse removal varies across municipalities and according to wards, and in many areas people have their own refuse dumps. In municipalities like Ntambanana (2.19%), Nongoma (4.25%), Hlabisa (5.39%), and Mfolozi (7.18%) the incidence of refuse removal once a week by local authorities or a private company is less than 10%.

10 IMPACT AND RISK ASSESSMENT

3 (h) (v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts—
(aa) can be reversed;
(bb) may cause irreplaceable loss of resources; and
(cc) can be avoided, managed or mitigated;
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

10.1 APPROACH

For this project, authorisation of an approximately 1 km^2 site on which a substation with a footprint of approximately 400 m x 400 m can be constructed has been applied for. The acquisition of the land will only be undertaken after Environmental Authorisation (EA) has been received.

10.1.1 Regulated activities and the scope of Impact Assessment

The NEMA 2014 EIA Regulations require authorisation for specific **activities** only, as detailed in **Table 3.1**. The EMPr, however, required in terms of these Regulations, however, requires the management of a broader set of aspects. The impact assessment, therefore, needs to extend beyond these activities.

10.1.2 Activities, Aspects and Impacts

Environmental **impacts** occur as a result of an activity, that through the associated **aspects** bring about changes in the environment. The significance of such changes is a direct function of the intensity of the aspects in combination with the sensitivity or vulnerability of the receiving environment. Environmental impacts are defined as 'changes' in the environment, where the requirement of an EIA process is to characterise the changes and the significance of the changes for decision-making.

The Regulations (GN 982 Appendix 2 item 2 (i) (ii) to (v), as amended by Appendix 2 item 2(h) (ii), (iii), (iv) of GN 326 of 7 April 2017) require that aspects be described and assessed in the impact assessment.

Environmental aspects can be understood as resource use, such as land, water, fuels etc., waste and pollution such as dust, noise, solid waste, spills etc., and social aspects such as jobs and spending.

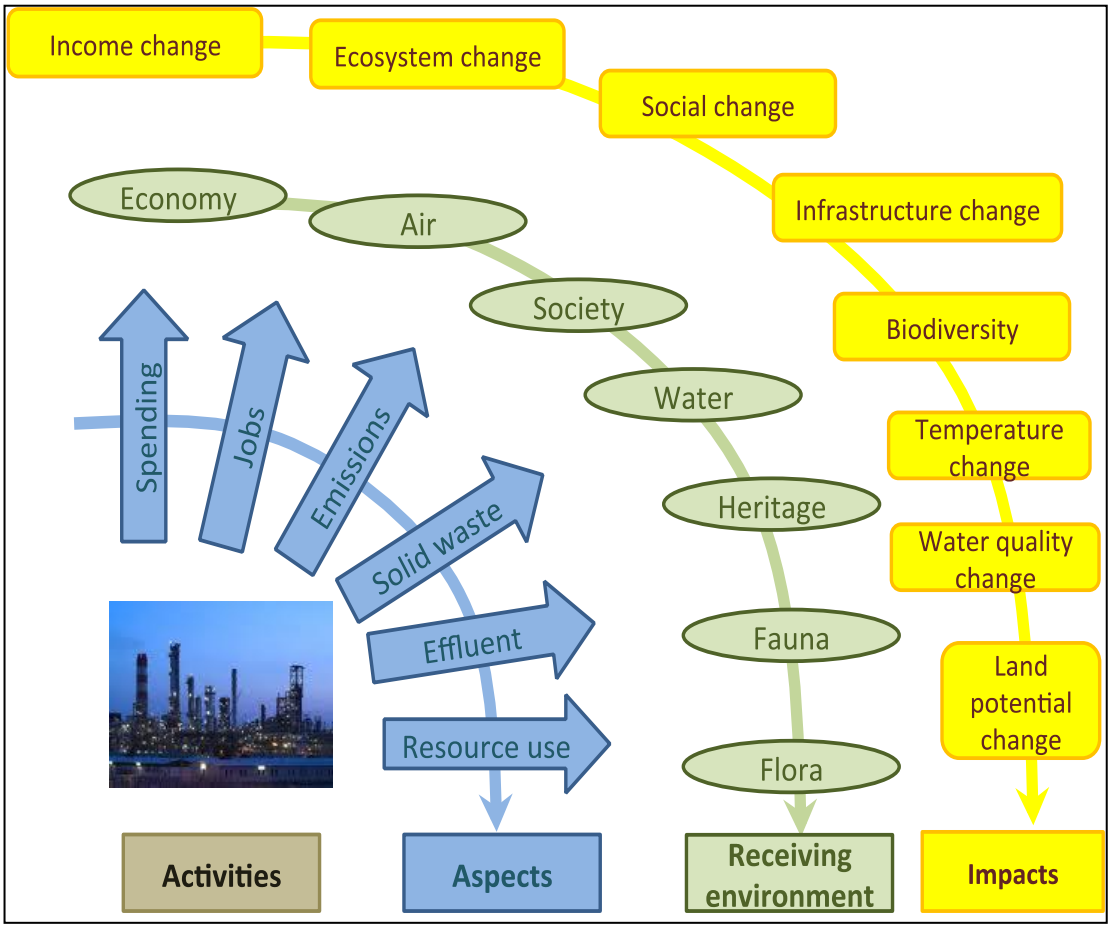


Figure 10.1: Schematic presentation of how activities bring about environmental and social aspects, which result in changes to the receiving environment, which are defined as impacts

Source: O'Beirne, S: Draft Good Practice Manual, prepared for IAIAsa, 2017

The aspects that have been identified for the project are listed in **Table 10.1**.

Table 10.1: Aspects assessed by specialists

Aspect Category	Aspect	Specialist study that will address this aspect
Resource use	Water	None
	Energy	None
	Land (land transformation)	Fauna and Flora, Avifauna, Heritage, Wetlands, Agricultural potential, Visual Impact Assessment and Social
	Raw materials	None
Waste and pollution	Atmospheric emissions	None
	Effluent	None
	Solid/liquid wastes	None
	Energy emitted (noise, light)	Visual Impact Assessment
Socio-Economic	Jobs	Socio-economic
	Spending	Socio-economic
	Skills	Socio-economic

10.2 ASPECTS TO BE ASSESSED BY SPECIALISTS

The following specialist studies have been undertaken:

- Social (see **Section 11.1** for a summary);
- Soils and Land Capability (i.e. agricultural potential) (see **Section 11.2** for a summary);
- Heritage (see **Section 11.3** for a summary);
- Fauna and Flora (see **Section 11.4** for a summary);
- Avifauna (see **Section 11.5** for a summary);
- Wetlands (see **Section 11.6** for a summary);
- Visual (see **Section 11.7** for a summary);
- Economic (see **Section 11.8** for a summary); and
- Geotechnical (see **Section 11.9** for a summary).

10.3 ASSESSMENT METHODOLOGY

The key issues identified informed the terms of reference of the specialist studies. Each issue consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative, from the project onto the environment or from the environment onto the project. The significance of the potential impacts has been

considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term.

A description of the nature of the impact, any specific legal requirements and the stage (construction or operation) have been detailed in the specialist studies given. A separate EIA will be required at a later stage for decommissioning.

The following criteria have been used to evaluate significance:

- **Nature:** This is an appraisal of the type of effect the activity is likely to have on the affected environment. The description includes what is being affected and how. The nature of the impact will be classified as positive or negative, and direct or indirect.
- **Extent:** This indicates the spatial area that may be affected (**Table 10.2**).

Table 10.2: Geographical extent of impact

Rating	Extent	Description
1	Site	Impacted area is only at the site – the actual extent of the activity.
2	Local	Impacted area is limited to the site and its immediate surrounding area
3	Regional	Impacted area extends to the surrounding area, the immediate and the neighbouring properties.
4	Provincial	Impact considered of provincial importance
5	National	Impact considered of national importance – will affect entire country.

- **Duration:** This measures the lifetime of the impact (**Table 10.3**).

Table 10.3: Duration of Impact

Rating	Duration	Description
1	Short term	0 – 3 years, or length of construction period
2	Medium term	3 – 10 years
3	Long term	> 10 years, or entire operational life of project.
4	Permanent – mitigated	Mitigation measures of natural process will reduce impact – impact will remain after operational life of project.
5	Permanent – no mitigation	No mitigation measures of natural process will reduce impact after implementation – impact will remain after operational life of project.

- **Intensity / severity:** This is the degree to which the project affects or changes the environment; it includes a measure of the reversibility of impacts (**Table 10.4**).

Table 10.4: Intensity of Impact

Rating	Intensity	Description
1	Negligible	Change is slight, often not noticeable, natural functioning of environment not affected.
2	Low	Natural functioning of environment is minimally affected. Natural, cultural and social functions and processes can be reversed to their original state.
3	Medium	Environment remarkably altered, still functions, if in modified way. Negative impacts cannot be fully reversed.
4	High	Cultural and social functions and processes disturbed – potentially ceasing to function temporarily.
5	Very high	Natural, cultural and social functions and processes permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. Negative impacts cannot be reversed.

- **Potential for irreplaceable loss of resources:** This is the degree to which the project will cause loss of resources that are irreplaceable (**Table 10.5**).

Table 10.5: Potential for irreplaceable loss of resources

Rating	Potential for irreplaceable loss of resources	Description
1	Low	No irreplaceable resources will be impacted.
3	Medium	Resources can be replaced, with effort.
5	High	There is no potential for replacing a particular vulnerable resource that will be impacted.

- **Probability:** This is the likelihood or the chances that the impact will occur (**Table 10.6**).

Table 10.6: Probability of Impact

Rating	Probability	Description
1	Improbable	Under normal conditions, no impacts expected.
2	Low	The probability of the impact to occur is low due to its design or historic experience.
3	Medium	There is a distinct probability of the impact occurring.
4	High	It is most likely that the impact will occur
5	Definite	The impact will occur regardless of any prevention measures.

- **Confidence:** This is the level of knowledge or information available, the environmental impact practitioner or a specialist had in his/her judgement (**Table 10.7**).

Table 10.7: Confidence in level of knowledge or information

Rating	Confidence	Description
1	Low	Judgement based on intuition, not knowledge/ information.
2	Medium	Common sense and general knowledge informs decision.
3	High	Scientific / proven information informs decision.

- **Consequence:** This is calculated as extent + duration + intensity + potential impact on irreplaceable resources.
- **Significance:** The significance will be rated by combining the consequence of the impact and the probability of occurrence (i.e. consequence x probability = significance). The maximum value which can be obtained is 100 significance points (**Table 10.8**).

Table 10.8: Significance of issues (based on parameters)

Rating	Significance	Description
1-14	Very low	No action required.
15-29	Low	Impacts are within the acceptable range.
30-44	Medium-low	Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible.
	Medium-high	Impacts are important and require attention; mitigation is required to reduce the negative impacts to acceptable levels.
	High	Impacts are of great importance, mitigation is crucial.
81-100	Very high	Impacts are unacceptable.

- **Cumulative Impacts:** This refers to the combined, incremental effects of the impact, taking other past, present and future developments in the same area into account. The possible cumulative impacts will also be considered.
- **Mitigation:** Mitigation for significant issues will be incorporated into the EMPr.

Digby Wells undertook the Fauna and Flora, Avi-fauna, Wetlands and Heritage specialist studies. Their methodology differs quite significantly from the above and their matrix has a rating range that extends from -147 to +147. A table that converts the Digby Wells significance ratings to the NAKO ILISO scale is included in **Table 10.9**.

Table 10.9: Conversion of Digby Wells to NAKO ILISO Scoping Systems

NAKO ILISO Rating	NI Significance	NI Description	DWE Rating	DWE description	DWE Significance
1-14	Very low	No action required.	3 – 35	Negligible	A small positive impact. The impact will result

NAKO ILISO Rating	NI Significance	NI Description	DWE Rating	DWE description	DWE Significance
					in medium to short term effects.
					An acceptable negative impact for which mitigation is desirable but not essential.
15-29	Low	Impacts are within the acceptable range.	36 – 72	Minor	An important positive impact.
					An important negative impact which requires mitigation.
30-44	Medium-low	Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible.	72 – 90	Moderate	A beneficial impact which may help to justify the implementation of the project.
45-59	Medium-high	Impacts are important and require attention; mitigation is required to reduce the negative impacts to acceptable levels.	91 – 108		A serious negative impact which may prevent the implementation of the project.
60-80	High	Impacts are of great importance, mitigation is crucial.	109 – 127	Major	A very beneficial impact which may be sufficient by itself to justify implementation of the project.
81-100	Very high	Impacts are unacceptable.	128 – 147		A very serious negative impact which may be sufficient by itself to prevent implementation of the project.

10.4 FINDINGS OF IMPACT ASSESSMENTS

Detailed assessment tables have been included in each specialist study (**Appendices D to K**) and are summarised in **Tables 10.10** to **10.17**.

10.4.1 Fauna and Flora

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present. The resultant impacts are listed in **Tables 10.10** to **10.12**.

Table 10.10: Potential Impacts on fauna and flora of Construction of the Iphiva 3 Substation Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Direct loss of floral species/vegetation types and biodiversity			
Prior to mitigation/ management			
Duration	Permanent (7)	Total loss of 16 ha of floral species/vegetation will occur.	Moderate (negative) – 91
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site.	
Intensity x type of impact	Serious (4)	The footprint of Iphiva 3 covers undisturbed grassland.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
Mitigation/ Management actions			
▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site. Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur.			
Post- mitigation			
Duration	Permanent (7)	No mitigation possible.	

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	Moderate (negative) – 77
Intensity x type of impact	Moderate (-2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of infrastructure.	Minor (negative) – 60
Extent	Limited (2)	Species/habitat loss will only occur within the project site.	
Intensity x type of impact	High (4)	Natural vegetation occur in this substation site.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	
Nature	Negative		
Mitigation/ Management actions			
▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral species of special concern. ▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site, Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Applications for permits for removal of certain plants, where required by provincial authorities. If plant species of special concern are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery.			
Post management			

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Negligible (negative) – 24
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate - negative (-3)	Dependent on sensitivity of the specific site.	
Probability	Unlikely (3)	It is unlikely that compaction will have an effect after rehabilitation	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Alien vegetation establishment			
Prior to mitigation/ management			
Duration	Long term (4)	Alien vegetation will colonise any area that is available (open areas).	Minor (negative) – 48
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	
Intensity x type of impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		
Mitigation/ Management actions			
▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. ▪ If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place.			

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Post management			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	
Nature	Negative		

Table 10.11: Potential Impacts on fauna and flora of Construction of the Iphiva 6 Substation Infrastructure

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Direct loss of floral species/vegetation types and biodiversity			
Prior to mitigation/ management			
Duration	Project Life (5)	Total loss of 16 ha of floral species/vegetation will occur.	Minor (negative) – 70
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site.	
Intensity x type of impact	Moderate(3)	The footprint of Iphiva 6 covers disturbed grassland and agricultural areas.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
Mitigation/ Management actions			
▪ Limit degradation and destruction of natural environment to designated project area by keeping the footprint of the disturbed areas to the minimum and within designated areas only, preferably cultivated land. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid sensitive landscapes such as riparian and wetland areas that were encountered on and east of the site, Water Use Licences/Registrations must be obtained for any construction			

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur.			
Post- mitigation			
Duration	Project Life (5)	Total loss of 16 ha of degraded floral species/vegetation will occur.	Minor (negative) – 69
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate(2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Project Life (5)	Loss floral species/vegetation will occur within the footprints of infrastructure.	Minor (negative) – 59
Extent	Limited (2)	Species/habitat loss will only occur within the project site.	
Intensity x type of impact	High (-2)	No Sensitive sites occur in this substation site.	
Probability	High (6)	It is likely that destruction of vegetation types will occur without management measures.	
Nature	Negative		
Mitigation/ Management actions			
▪ Limit degradation and destruction of natural environment to designated project areas by keeping the footprint of the disturbed areas to the minimum and within designated areas only. Re-vegetate open areas to limit erosion, which will also aid in water infiltration and flood attenuation. ▪ Avoid known areas of faunal and floral species of special concern.			

Activity and Interaction Construction of infrastructure require vegetation clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
▪ Avoid sensitive landscapes such as riparian and ridge areas that were encountered on site, Water Use Licences/Registrations must be obtained for any construction in a regulated area (below 1:00 floodline or 100 m from water course and 500 m from a wetland. ▪ Applications for permits for removal of certain plants, where required by provincial authorities. If plant species of special concern are to be removed, they should be either translocated to a similar habitat to the donor site or relocated to a nursery.			
Post management			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Negligible (negative) – 24
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate - negative (-3)	Dependent on sensitivity of the specific site.	
Probability	Unlikely (3)	It is unlikely that compaction will have an effect after rehabilitation	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Alien vegetation establishment			
Prior to mitigation/ management			
Duration	Long term (4)	Alien vegetation will colonise any area that is available, and is already present (open areas).	Minor (negative) – 48
Extent	Municipal area (4)	Such an infestation can easily spread to the entire municipal area, and infest water sources.	
Intensity x type of impact	Moderate - (-4)	Serious loss of sensitive habitats due to alien vegetation colonisation.	
Probability	Probable (4)	It is unlikely that without mitigation measures, alien vegetation will establish	
Nature	Negative		

Activity and Interaction Construction of infrastructure require vegetation clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Mitigation/ Management actions			
▪ Manage nationally restricted alien invasive plant species by ensuring the removal of vegetation during construction and operation are controlled so that no open areas occur. ▪ If alien vegetation is encountered, remove these plants, in the correct way and timeously. Alien plants should be removed as seedlings before they reach seed-bearing age. Alien plants can establish on a site after removal for up to 2-7 years, therefore appropriate monitoring must take place.			
Post management			
Duration	Medium term (3)	Alien vegetation colonisation will be eradicated asap.	Negligible (negative) – 21
Extent	Limited (2)	An infestation will not be allowed to spread.	
Intensity x type of impact	Minor (-2)	Only limited areas will experience this for a short duration.	
Probability	Unlikely (3)	It is unlikely that alien vegetation will establish, if mitigation is adhered to.	
Nature	Negative		

Table 10.12: Summary of Impact Ratings for fauna and flora

	Listed Activity	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Direct loss of floral species/vegetation types and biodiversity	Moderate (negative)
2		Loss of species of special concern (protected species)	Minor (negative)
3		Alien vegetation establishment	Negligible

10.4.2 Avi-fauna

Table 10.13: Potential Impacts on avi-fauna of Construction of the Iphiva 3 Substation Infrastructure

Activity and Interaction: Construction of infrastructure requires habitat clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Direct loss of habitat types and biodiversity			
Prior to mitigation/ management			
Duration	Permanent (7)	A permanent and total loss of 16 ha of habitat will occur.	Moderate (negative) – 91
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site.	
Intensity x type of impact	Serious (4)	The footprint of Iphiva 3 covers undisturbed grassland, which may provide habitat to protected species.	
Probability	Definite (7)	It is likely that destruction of habitat will occur where construction is completed.	
Nature	Negative		
Mitigation/ Management actions			
▪ A walk through of the selected substation site as well as tower positions that feed into the substation, should be conducted by a suitable qualified Avifauna specialist in order to determine the presence of any threatened, protected, endemic bird species of special concern within or in close proximity to the construction areas (tower supports). Nesting sites of any protected bird species must also be determined during this walkthrough. ▪ The exact locations of the towers along the powerline route alignment within the corridor should be determined in consultation with an appointed Avifauna Specialist; ▪ An avifauna specialist should be advised regarding the proximity of the powerline route alignment to habituated feeding sites (i.e. Vulture Restaurants); ▪ Factors taken into account when selecting the tower design must include the risk of electrocution of birds posed by each tower design; ▪ It is recommended that reflectors with LED lights should also be used particularly near nest sites and in areas in relatively close proximity to water or wetlands; ▪ Appoint an avifauna specialist to provide recommendations regarding the placement of bird diverters; and ▪ Pylons should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action;			

Activity and Interaction: Construction of infrastructure requires habitat clearing			
Dimension	**Rating**	**Motivation**	**Significance**
▪ Where the possibility or risk of a 'flash-over' might occur it is essential that additional mitigation measures that would increase the visibility of the powerline be instituted should towers be placed. ▪ Ensure tower design and type is best for preventing the electrocution of birds and discourages the roosting of birds on the structures; ▪ It must be ensured that suitable bird repelling structures, such as bird guards are considered in the design; and ▪ Ensure that the cross arms of the tower structures in areas of heavy bird activity (such as wetlands and vulture nesting grounds and vulture restaurants) are all fitted with anti-roosting spikes.			
Post- mitigation			
Duration	Permanent (7)	No mitigation possible.	Moderate (negative) – 77
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	
Intensity x type of impact	Moderate (-2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require habitat clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Project Life (5)	The potential for collisions and electrocution will be for the life of the project.	Moderate (negative) – 78
Extent	Municipal area (4)	Species/habitat loss will only occur within the project site, which is linear and stretches across the region.	
Intensity x type of impact	High (4)	The home ranges of protected bird species coincide with this route.	
Probability	High (6)	It is likely that loss of species due to collisions will occur.	
Nature	Negative		

Activity and Interaction Construction of infrastructure require habitat clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Mitigation/ Management actions			
▪ A walk through of the selected substation site as well as tower positions that feed into the substation, should be conducted by a suitable qualified Avifauna specialist in order to determine the presence of any threatened, protected, endemic bird species of special concern within or in close proximity to the construction areas (tower supports). Nesting sites of any protected bird species must also be determined during this walkthrough. ▪ The exact locations of the towers along the powerline route alignment within the corridor should be determined in consultation with an appointed Avifauna Specialist; ▪ An Avifauna Specialist should be advised regarding the proximity of the powerline route alignment to habituated feeding sites (i.e. Vulture Restaurants); ▪ Factors taken into account when selecting the tower design must include the risk of electrocution of birds posed by each tower design; ▪ It is recommended that reflectors with LED lights should also be used particularly near nest sites and in areas in relatively close proximity to water or wetlands; ▪ Appoint an avifauna specialist to provide recommendations regarding the placement of bird diverters; and ▪ Pylons should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action; ▪ Where the possibility or risk of a 'flash-over' might occur it is essential that additional mitigation measures that would increase the visibility of the powerline be instituted should towers be placed. ▪ Ensure tower design and type is best for preventing the electrocution of birds and discourages the roosting of birds on the structures; ▪ It must be ensured that suitable bird repelling structures, such as bird guards are considered in the design; and ▪ Ensure that the cross arms of the tower structures in areas of heavy bird activity (such as wetlands and vulture nesting grounds and vulture restaurants) are all fitted with anti-roosting spikes.			
Post management			
Duration	Project Life (5)	The potential for collisions and electrocution will be for the life of the project.	Minor (negative) – 72
Extent	Local (3)	Bird/ power station interactions can be limited with mitigation measures	
Intensity x type of impact	High (4)	The home ranges of protected bird species coincide with this route.	

Activity and Interaction Construction of infrastructure require habitat clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Probability	High (6)	It is likely that loss of species due to collisions will occur.	
Nature	Negative		

Table 10.14: Potential Impacts of Construction of the Iphiva 6 Substation Infrastructure

Activity and Interaction Construction of infrastructure require habitat clearing			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Direct loss of habitat types and biodiversity			
Prior to mitigation/ management			
Duration	Project Life (5)	Total loss of 16 ha of habitat will occur.	Minor (negative) – 70
Extent	Limited (2)	Species/habitat loss will only occur within and immediately around the project site.	
Intensity x type of impact	Moderate(3)	The footprint of Iphiva 6 covers disturbed grassland habitat and agricultural areas.	
Probability	Definite (7)	It is likely that total destruction of vegetation types will occur.	
Nature	Negative		
Mitigation/ Management actions			
▪ A walk through of the selected substation site as well as tower positions that feed into the substation, should be conducted by a suitable qualified Avifauna specialist in order to determine the presence of any threatened, protected, endemic bird species of special concern within or in close proximity to the construction areas (tower supports). Nesting sites of any protected bird species must also be determined during this walkthrough. ▪ The exact locations of the towers along the powerline route alignment within the corridor should be determined in consultation with an appointed Avifauna Specialist; ▪ An Avifauna Specialist should be advised regarding the proximity of the powerline route alignment to habituated feeding sites (i.e. Vulture Restaurants); ▪ Factors taken into account when selecting the tower design must include the risk of electrocution of birds posed by each tower design; ▪ It is recommended that reflectors with LED lights should also be used particularly near nest sites and in areas in relatively close proximity to water or wetlands; ▪ Appoint an avifauna specialist to provide recommendations regarding the placement of Bird diverters; and			

Activity and Interaction Construction of infrastructure require habitat clearing			
Dimension	**Rating**	**Motivation**	**Significance**
▪ Pylons should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action; ▪ Where the possibility or risk of a 'flash-over' might occur it is essential that additional mitigation measures that would increase the visibility of the powerline be instituted should towers be placed. ▪ Ensure tower design and type is best for preventing the electrocution of birds and discourages the roosting of birds on the structures; ▪ It must be ensured that suitable bird repelling structures, such as bird guards are considered in the design; and ▪ Ensure that the cross arms of the tower structures in areas of heavy bird activity (such as wetlands and vulture nesting grounds and vulture restaurants) are all fitted with anti-roosting spikes.			
Post- mitigation			
Duration	Project Life (5)	Total loss of 16 ha of degraded habitat will occur.	Minor (negative) – 69
Extent	Limited (2)	Mitigation measures can alleviate this impact.	
Intensity x type of impact	Moderate(2)	Dependent on sensitivity of the specific site.	
Probability	Definite (7)	This impact will occur	
Nature	Negative		

Activity and Interaction Construction of infrastructure require habitat clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
Impact Description: Loss of species of special concern (protected species)			
Prior to mitigation/ management			
Duration	Project Life (5)	Infrastructure will be permanent.	Minor (negative) – 59
Extent	Limited (2)	Species loss will only occur within and immediately around the project site.	
Intensity x type of impact	Moderate(3)	The footprint of Iphiva 6 covers disturbed grassland habitat and agricultural areas.	
Probability	Definite (7)	It is likely that protected bird species could be affected.	

Activity and Interaction Construction of infrastructure require habitat clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
Nature	Negative		
Mitigation/ Management actions			
▪ A walk through of the selected substation site as well as tower positions that feed into the substation, should be conducted by a suitable qualified Avifauna specialist in order to determine the presence of any threatened, protected, endemic bird species of special concern within or in close proximity to the construction areas (tower supports). Nesting sites of any protected bird species must also be determined during this walkthrough. ▪ The exact locations of the towers along the powerline route alignment within the corridor should be determined in consultation with an appointed Avifauna Specialist; ▪ An Avifauna Specialist should be advised regarding the proximity of the powerline route alignment to habituated feeding sites (i.e. Vulture Restaurants); ▪ Factors taken into account when selecting the tower design must include the risk of electrocution of birds posed by each tower design; ▪ It is recommended that reflectors with LED lights should also be used particularly near nest sites and in areas in relatively close proximity to water or wetlands; ▪ Appoint an avifauna specialist to provide recommendations regarding the placement of Bird diverters; and ▪ Pylons should preferably be positioned so as to alternate with those of the existing powerline (i.e. out- of-step) and not be placed opposite one another (in-step). This mitigation will increase the visibility of both sets of powerlines to flying large raptors and the birds may then be in a better position to take timely collision avoidance action; ▪ Where the possibility or risk of a 'flash-over' might occur it is essential that additional mitigation measures that would increase the visibility of the powerline be instituted should towers be placed. ▪ Ensure tower design and type is best for preventing the electrocution of birds and discourages the roosting of birds on the structures; ▪ It must be ensured that suitable bird repelling structures, such as bird guards are considered in the design; and ▪ Ensure that the cross arms of the tower structures in areas of heavy bird activity (such as wetlands and vulture nesting grounds and vulture restaurants) are all fitted with anti-roosting spikes.			
Post management			
Duration	Medium term (3)	With vegetation management including rehabilitation, vegetation can recover in 1-5 years.	Negligible (negative) – 24
Extent	Limited (2)	If contractors adhere to mitigation such as to limit the footprint of disturbance to only essential areas.	

Activity and Interaction Construction of infrastructure require habitat clearing)			
Dimension	**Rating**	**Motivation**	**Significance**
Intensity x type of impact	Moderate - negative (-3)	Dependent on sensitivity of the specific site.	
Probability	Unlikely (3)	It is unlikely that compaction will have an effect after rehabilitation	
Nature	Negative		

Table 10.15: Summary of Impact Ratings for Avi-fauna

	Listed Activities	**Impact Description**	**Significance after mitigation**
1	Construction of infrastructure requires habitat clearing	Direct loss of habitat types and biodiversity	Iphiva 3: Moderate (negative) Iphiva 6: Minor (negative)
2	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Loss of species of special concern (protected species)	Iphiva 3: Minor (negative) Iphiva 6: Negligible (negative)

10.4.3 Wetlands

The site clearing activity will result in a direct loss of wetland areas covering a relatively small extent. The intensity of the impact will be high, however, as all wetlands are protected by the National Water Act, 1998 (Act No. 36 of 1998). The following impacts are expected as a result of site clearing for the construction of the substations:

- Direct loss of habitat;
- Increased sedimentation;
- Onset of erosion, and;
- Establishment of alien invader plant species (AIPs).

Table 10.16: Potential Impacts on wetlands of the Construction Phase

Dimension	Rating	Motivation	Significance
Activity and Interactions: Site access and disturbance			
Prior to Mitigation/Management			
Duration	Long term (4)	6-15 years and impact can be reversed with management.	Minor (negative) – 36
Extent	Local (3)	Limited to the immediate development site and its immediate surroundings.	
Intensity x type of impact	Minor loss and/or effects to biological or physical resources (2)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in some loss and/or damage to physical or biological resources or highly sensitive environments, resulting in a limited loss of ecosystem function.	
Probability	Probable (4)	Should no precautionary measures be implemented, further impacts to the wetlands and flora present are considered probable.	
Nature	Negative		
Post-Mitigation			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible (negative) - 18
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the construction phase.	
Intensity x type of impact	Minimal to no loss and/or effect to biological or physical resources (1)	Should the appropriate management and mitigation measures be employed, impacts are expected to be minimal in the operational phase of the proposed project.	
Probability	Unlikely (3)	Should the proposed project proceed, impacts to the ecological integrity of the systems present are considered unlikely.	
Nature	Negative		
Dimension	**Rating**	**Motivation**	**Significance**
Activity and Interactions: Site clearing activities for construction of substations, towers and access roads			
Prior to Mitigation/Management			

Dimension	Rating	Motivation	Significance
Duration	Long term (4)	6-15 years and impact can be reversed with management.	Minor (negative) – 78
Extent	Municipal area (4)	Will affect the whole municipal area.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Highly probable (6)	Should no precautionary measures be implemented, <80% probability impacts to the wetlands and flora present will occur.	
Nature	Negative		
Post-Mitigation			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Negligible (negative) - 30
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the construction phase.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Unlikely (3)	Should the proposed project proceed, impacts to the ecological integrity of the systems present are considered unlikely.	
Nature	Negative		
Dimension	**Rating**	**Motivation**	**Significance**
Activity and Interactions: Construction of substations, towers and access roads			
Prior to Mitigation/Management			
Duration	Long term (4)	6-15 years and impact can be reversed with management.	Minor (negative) – 78

Dimension	Rating	Motivation	Significance
Extent	Municipal area (4)	Will affect the whole municipal area.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Highly probable (6)	Should no precautionary measures be implemented, <80% probability impacts to the wetlands and flora present will occur.	
Nature	Negative		
Post-Mitigation			
Duration	Medium term (3)	1-5 years and impact can be reversed with minimal management.	Minor (negative) – 40
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the construction phase.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Probable (4)	Should the proposed project proceed, impacts to the ecological integrity of the systems present are considered unlikely.	
Nature	Negative		

Table 10.17: Potential Impacts on wetlands of the Operational Phase

Dimension	Rating	Motivation	Significance
Activity and Interactions: Site access and roads for maintenance			
Prior to Mitigation/Management			
Duration	Project life (4)	The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Minor (negative) – 52
Extent	Local (3)	Limited to the immediate development site and its immediate surroundings.	
Intensity x type of impact	Serious medium term environmental effects (5)	Due to the sensitive nature of the systems present, should no management or mitigation measures be employed, activities could result in a serious loss and/or damage to physical or biological resources or highly sensitive environments, limiting ecosystem function.	
Probability	Unlikely (3)	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur. <25% probability.	
Nature	Negative		
Post-Mitigation			
Duration	Project life (5)	The impact will cease after the operational life span of the project and can be reversed with sufficient management.	Negligible (negative) – 8
Extent	Limited (2)	Impacts will be limited only to the project footprint area and will be rehabilitated accordingly on completion of the decommissioning phase.	
Intensity x type of impact	Minimal to no loss and/or effect to biological or physical resources (1)	Should the appropriate management and mitigation measures be employed, impacts are expected to be minimal in the operational phase of the proposed project.	
Probability	Highly unlikely (1)	Expected never to happen. <1% probability.	
Nature	Negative		

Table 10.18: Summary of Impact Ratings for Wetlands

	Listed Activities	Impact Description	Significance after mitigation
	Potential impacts of the construction phase		
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Site access and disturbance	Negligible-(negative)
2		Site clearing activities for construction of substations, pylons and access roads	Negligible-(negative)
3		Construction of substations, pylons and access roads	Minor-(negative)
	Potential impacts of the operational phase		
4	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Site access and roads for maintenance	Negligible-(negative)

10.4.4 Heritage

The preliminary assessment considers construction activities associated with the two (2) proposed alternate locations, specifically Iphiva 3 and 6 respectively. Taking into consideration the results of the data collection, various resource types are anticipated to occur within the proposed site-specific study areas. These include but are not limited to:

- Archaeological resources from various time periods; and
- Burial grounds and graves.

Table 10.19: Assessment summary for archaeological resources with a medium Cultural Significance

<table>
<tr><th colspan="5">IMPACT DESCRIPTION: Direct impact to archaeological resources with medium CS</th></tr>
<tr><th>Dimension</th><th>Rating</th><th colspan="3">Motivation</th></tr>
<tr><td colspan="5">PRE-MITIGATION</td></tr>
<tr><td>Duration</td><td>Permanent (7)</td><td>Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites</td><td rowspan="3">Consequence: Highly detrimental (-16)</td><td rowspan="4">Significance: Minor - negative (-48)</td></tr>
<tr><td>Extent</td><td>Province/ Region (5)</td><td>The manifested impacts will results in changes to the archaeological record of the region which is presently, relatively unknown or under researched</td></tr>
<tr><td>Intensity x type of impact</td><td>Moderately high - negative (-4)</td><td>Given the CS of the heritage resource type, this is considered a major change to heritage resources with a medium CS classified as a moderately high impact</td></tr>
<tr><td>Probability</td><td>Unlikely (3)</td><td colspan="2">Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.</td></tr>
<tr><td colspan="5">MITIGATION:</td></tr>
<tr><td colspan="5">It is recommended:
- A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and
- A project specific Chance Finds Protocol be developed and included in the EMPr as a condition of authorisation.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
</table>

IMPACT DESCRIPTION: Direct impact to archaeological resources with medium CS				
Dimension	**Rating**	**Motivation**		
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 10.20: Assessment summary for archaeological resources with a high Cultural Significance

IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	**Rating**	**Motivation**		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites	Consequence: Extremely detrimental (-20)	Significance: Minor - negative (-60)

IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	**Rating**	**Motivation**		
Extent	National (6)	The manifested impacts will result in changes to the archaeological record which is presently, relatively unknown or under researched. These sites may contribute to the understanding of the national pre-history.		
Intensity x type of impact	Extremely high - negative (-7)	Given the CS of the heritage resource type, this is considered a major change to heritage resources with a high CS classified as an extremely high impact		
Probability	Unlikely (3)	Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.		
MITIGATION:				
It is recommended: - A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities; - Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and - A project specific Chance Finds Protocol be developed and included in the EMPr as a condition of authorisation.				
POST-MITIGATION				
Duration	Immediate (1)	Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate	Consequence: Negligible (3)	Significance: Negligible - positive (21)

IMPACT DESCRIPTION: Direct impact to archaeological resources with high CS				
Dimension	**Rating**	**Motivation**		
Extent	Very limited (1)	Avoidance will remove the impact to the heritage resources.		
Intensity x type of impact	Very low - positive (1)	The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.		
Probability	Certain (7)	Where the recommended project related mitigation measures are implemented, it is certain that the potential impacts to the heritage resources will be avoided.		

Table 10.21: Assessment summary for burials, monuments and memorials with a high Cultural Significance

IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS				
Dimension	**Rating**	**Motivation**		
PRE-MITIGATION				
Duration	Permanent (7)	Unmitigated changes to archaeological sites will result in permanent loss of information and destruction of the sites	Consequence: Extremely detrimental (-21)	Significance: Minor - negative (-63)
Extent	International (7)	The manifested impacts may result in changes to the heritage resources that may: - Be associated with Next-of-Kin across international borders; and - Have international reputational risks and repercussions.		

<table>
<tr><th colspan="5">IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS</th></tr>
<tr><th>Dimension</th><th>Rating</th><th colspan="3">Motivation</th></tr>
<tr><td>Intensity x type of impact</td><td>Extremely high - negative (-7)</td><td>Given the CS of the heritage resource type, this is considered a major change to heritage resources with a high CS classified as an extremely high impact</td><td></td><td rowspan="2"></td></tr>
<tr><td>Probability</td><td>Unlikely (3)</td><td colspan="2">Based on the nature of the Project and known distribution of heritage resources, it is unlikely that this impact will manifest.</td></tr>
<tr><td colspan="5">MITIGATION:</td></tr>
<tr><td colspan="5">It is recommended:
- A detailed Heritage Walk-down and Impact Assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources; and
- A project specific Chance Finds Protocol be developed and included in the EMPr as a condition of authorisation.</td></tr>
<tr><td colspan="5">POST-MITIGATION</td></tr>
<tr><td>Duration</td><td>Immediate (1)</td><td>Project related mitigation through avoidance of the potential impacts to heritage resources will be immediate</td><td rowspan="3">Consequence: Negligible (3)</td><td rowspan="4">Significance: Negligible - positive (21)</td></tr>
<tr><td>Extent</td><td>Very limited (1)</td><td>Avoidance will remove the impact to the heritage resources.</td></tr>
<tr><td>Intensity x type of impact</td><td>Very low - positive (1)</td><td>The project related mitigations will result in no change to the heritage resource which, in this instance, is considered a very low positive in respect of intensity.</td></tr>
<tr><td>Probability</td><td>Certain (7)</td><td colspan="2">Where the recommended project related mitigation measures are implemented, it</td></tr>
</table>

IMPACT DESCRIPTION: Direct impact to burials, monuments and memorials with high CS			
Dimension	**Rating**	**Motivation**	
		is certain that the potential impacts to the heritage resources will be avoided.	

Table 10.22: Summary of Impact Ratings for Heritage

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Direct impact to archaeological resources with medium CS	Significance: Negligible - positive
2		Direct impact to archaeological resources with high CS	Significance: Negligible - positive
3		Direct impact to burials, monuments and memorials with high CS	Significance: Negligible - positive

10.4.5 Agricultural Potential

Table 10.23: Planning and Construction Phase of Iphiva Substation

Impact Description: Disturbance of topsoil in construction phase. Footprint of substation	**Mitigation**
	Avoid: Construction of unnecessary roads and generation of dust
	Minimise: Excessive removal of vegetation
	Restore/Rehabilitation: Revegetate disturbed areas with natural vegetation. Install surface water drainage structures to minimise erosion
	Compensate/Offset:

	Nature	Extent	Duration	Intensity	Potential for irreplaceable loss	Probability	Confidence	Consequence	Significance
Iphiva 3 with Iphiva-Duma West									

Without Mitigation	1	1	1	2	3	5	3	7	35
With Mitigation	1	1	1	2	3	5	3	7	35
Iphiva 6 with Iphiva-Duma West									
Without Mitigation	1	1	1	2	3	5	3	7	35
With Mitigation	1	1	1	2	3	5	3	7	35

Table 10.24: Operational Phase of Iphiva substation

Impact Description: Disturbance of topsoil in operational phase.	**Mitigation**								
	Avoid:								
	Minimise:								
	Restore/Rehabilitation: Revegetate disturbed areas with natural vegetation. Install surface water drainage structures to minimise erosion								
	Compensate/Offset:								
	Nature	Extent	Duration	Intensity	Potential for irreplaceable loss	Probability	Confidence	Consequence	Significance
Iphiva 3									
Without Mitigation	1	1	1	2	3	5	3	7	35
With Mitigation	1	1	1	2	3	5	3	7	35
Iphiva 6									
Without Mitigation	1	1	1	2	3	5	3	7	35
With Mitigation	1	1	1	2	3	5	3	7	35

Table 10.25: Summary of Impact Ratings for Soils and Agricultural potential

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	Disturbance of topsoil in construction phase. Footprint of substation	Iphiva 3 and 6 with mitigation (35)
2		Disturbance of topsoil in operational phase.	Iphiva 3 and 6 with mitigation (35)

10.4.6 Social

Table 10.26: Qualitative discussion of impacts of the Iphiva Substation during the Planning, design and pre-construction phase

Impact	Stakeholder group	Description
Uncertainty	All	The presence of two alternatives creates uncertainty with the potentially affected landowners as they need to keep the possibility of the change in land use in mind when planning future activities. Very few people want to spend money on expansions or improvements on land that may not be available to them in the relatively near future. The Manyoni Private Game Reserve is assisting the community with business plans to develop the area around the Iphiva 3 site. These plans cannot be finalised or taken forward until a final site has been selected. According to the members of the traditional community in the area, the Iphiva 6 site is under a land claim, meaning there is uncertainty surrounding the proposed site even without the proposed project. Eskom should attempt to finalise the site selection as soon as possible and swiftly enter into negotiations with the relevant land owners. Once the land negotiations have been finalised, it is important that the project should started and completed as soon as possible. Before construction has started there is always the possibility of a change in plans or priorities, which would result in prolonging uncertainty. Eskom should have a communication strategy in place to keep stakeholders up to date with the process.
Expectations	Community members	The traditional communities have an expectation that Eskom will follow the correct procedure to engage with traditional leadership structures to obtain permission to use their land for the intended purpose. The traditional community members in the area close to the proposed sites do not currently have access to electricity. They are hopeful that Eskom would be able to address this and assist the community further in terms of their Corporate Social Responsibility. Eskom should have a strategy in place for engaging with traditional leadership structures. They must ensure that they are familiar with the right processes to follow. It must be considered that this will take some time, and sufficient time should be allowed in the negotiation process to engage with the leadership and allow the leadership to consult with their constituencies. It must be acknowledged that this process may take longer than engaging with most of the other landowners. Following the right process also include respect for local

		customs and Eskom's representatives should know what is expected from them in terms of behaviour and dress code. Eskom should manage expectations in terms of their Corporate Social Responsibility. There should be a system that will allow community members to bring their need or proposed project to the attention of Eskom. Eskom should be clear about the criteria for further consideration and should keep the community up to date with the status of their application. Requests for assistance should be treated with respect and not disappear in a black hole. It is acknowledged that there are limits to the extent to which Eskom can accommodate projects in their CSR programme, and these should be communicated to the relevant stakeholders. Eskom should manage expectations and need to find a balance between making promises that they cannot keep and not being involved at all.

Table 10.27: Quantitative discussion of impacts of the Iphiva Substation during the Planning, design and pre-construction phase

Impact Description			**Mitigation**					
Uncertainty			**Avoid**					
			Minimise	Attempt to finalise site selection and start project as soon as possible.				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation	3	1	2	1	4	2	7	28
With Mitigation	3	1	2	1	3	2	7	21
Iphiva Site 6								
Without Mitigation	3	1	2	1	4	2	7	28
With Mitigation	3	1	2	1	3	2	7	21

Impact Description			**Mitigation**					
Expectations			**Avoid**					
			Minimise	Manage expectations in terms of Corporate Social Responsibility. There should be a system that will allow community members to bring their need or proposed project to the attention of Eskom. Eskom should be clear about the criteria for further consideration and should keep the community up to date with the status of their application. Requests for assistance should be treated with respect and not disappear in a black hole. It is acknowledged that there are limits to the extent to which Eskom can accommodate projects in their CSR programme, and these should be communicated to the relevant stakeholders. Eskom should manage expectations and need to find a balance between making promises that they cannot keep and not being involved at all.				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation	3	2	2	1	4	2	8	32
With Mitigation	3	2	2	1	3	2	8	24
Iphiva Site 6								
Without Mitigation	3	2	2	1	4	2	8	32
With Mitigation	3	2	2	1	3	2	8	24

Table 10.28: Qualitative discussion of impacts of the Iphiva Substation during the Construction Phase

Impact	Stakeholder group	Description
Traffic impacts	All	The road up to both sites is a gravel road, and although it seems to be a relatively busy road, it was not designed for heavy vehicles. Heavy vehicles using this road can lead to damage and deterioration of the road. The area is populated and there are many pedestrians. Employees of Eskom and Eskom's contractors must ensure that they drive safely and comply with the speed restrictions on these roads. Eskom should have an enforceable road use policy in place that includes fines for transgressors.
Impacts on livelihoods	Traditional communities	A livelihood refers to the way of life of a person or household and how they make a living, in particular, how they secure the basic necessities of life, e.g. their food, water, shelter and clothing, and live in the community (Vanclay et al., 2015). The Iphiva 6 site is populated with people from communities under traditional authority. Livelihood activities of people in the traditional communities include farming with chickens, goats, cattle, maize and beans. Families in traditional communities are in general poor on many levels and not resilient to impacts on their livelihoods. Any impacts on their livelihoods should be treated with extreme caution to ensure that they are not worse off than before. The Iphiva 6 site is furthermore privately owned, and should this site be selected, fair compensation should be negotiated with the owner.
Relocation of people	Traditional communities	Relocation can be a traumatic experience for the people that have to be relocated, disrupting their sense of place, their social networks and community connectedness. Families have often lived in an area for many years and they are in close proximity to their extended family and friends. If they have to move to somewhere further away, they have to establish new social networks. In addition, relocation of people can have an impact on their ability to make a livelihood. The Iphiva 6 site is populated and people will need to be relocated if this site is selected. If relocation cannot be avoided, Eskom should follow the correct procedures for engaging with the community through their leadership structures. The leadership will decide whether the families can be moved and the individual families would not have much of a say in the decision. An important aspect to take into consideration is the moving of graves. In some areas graves can be found at the homesteads and in other areas graves are limited to a graveyard.

		Moving graves is a very sensitive issue in these communities, and whether permission will be given to move the graves should be part of the negotiation process when considering the placement of the substation. Sacred sites such as initiation sites should be identified early in the process, as it is unlikely that these sites could be moved. The communities have indicated that compensation will play an important role when deciding whether families can be moved. It is expected that the families will be in the same situation or better off. Families should be able to continue their livelihood activities in the same way than currently. Communities have indicated that Eskom should relocate people according to a set policy.
Impacts relating to construction camps and newcomers	Traditional communities	Although the communities did not highlight this as a great concern, there are a number of social impacts that are associated with the presence of construction workers which should be taken into consideration. Construction workers usually travel from site to site and their culture is likely to be different from that of the host community. This could result in conflict if their values clash with that of the host community. In areas with high levels of poverty, young females are often attracted to construction workers as they can provide them with a lifestyle that the local young men can't. The presence of construction workers can result in an increase in the incidence of sexually transmitted diseases, HIV and AIDS, and unwanted pregnancies. Eskom should have guidelines for the general conduct of the construction workers and their interaction with the surrounding communities. If there is a construction camp close to the site, it should be set up and managed according to international best practice. The town of Mkhuze is close by, and if possible, the construction workers should stay there, making use of existing infrastructure, rather than erecting a construction camp.
	Urban communities	A temporary increase in economically active people in the area can have a positive impact on trade and businesses that offer accommodation. Construction workers often just spend the most necessary amounts and send the rest of the money home to their families. The presence of construction workers may temporarily put more pressure on existing infrastructure such as the availability of housing, sanitation, water and waste management.
Creation of jobs	Local communities	Local communities have expectations that some of their members will be employed during the construction phase. Although they realise that the project will require specialised skills that they don't have, they are of the opinion that there should be a few jobs that require unskilled or semi-skilled labour that members from the community could perform. Where possible, Eskom should recruit local labour for unskilled or semi-skilled positions on the project. Preference should be given to locals that are currently unemployed. The recruitment process should be agreed with local leadership structures. Potential jobs should be advertised in an accessible way and no false expectations should be created.

		Indirect employment/entrepreneurship opportunities must be enhanced. Eskom and the contractor must support local entrepreneurs as far as possible. Eskom should consider a local economic development programme that can stretch across the entire project. An example would be to buy a mobile kitchen, and train women along the construction route to cater for the construction forces. This kitchen can move with the labour force and women in different areas will be given the opportunity to get trained and earn an income.

Table 10.29: Quantitative discussion of impacts of the Iphiva Substation during the Construction Phase

Impact Description			**Mitigation**					
Traffic impacts			**Avoid**					
			Minimise	Attempt to transport equipment during off-peak times. Put rules and consequences in place for employees and contractors in terms of road use.				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation	3	1	2	1	4	2	7	28
With Mitigation	3	1	2	1	3	2	7	21
Iphiva Site 6								
Without Mitigation	3	1	2	1	4	2	7	28
With Mitigation	3	1	2	1	3	2	7	21

Impact Description			**Mitigation**					
Impacts on livelihoods			**Avoid**					
			Minimise	Minimise impacts on livelihoods by selecting the site with the lowest impact on livelihoods.				
			Restore/Rehabilitate	Restore livelihoods where possible. This is particularly important in communities that are under traditional authority as they are usually not very resilient to impacts on livelihoods.				
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation	2	5	5	5	5	3	17	85
With Mitigation	2	5	3	1	4	2	11	44
Iphiva Site 6								
Without Mitigation	2	5	5	5	5	3	17	85
With Mitigation	2	5	3	3	4	2	13	52

Impact Description			**Mitigation**					
Relocation of people			**Avoid**	Avoid relocation of people as far as possible.				
			Minimise					
			Restore/Rehabilitate	If relocation is unavoidable, restore living conditions and livelihoods to the same or better than previously.				
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation			No people on site					
With Mitigation								
Iphiva Site 6								
Without Mitigation	1	5	5	5	5	3	16	80
With Mitigation	1	5	3	3	4	2	12	48

Impact Description Impacts relating to construction camps and newcomers			**Mitigation**					
			Avoid					
			Minimise	Eskom needs to ensure that there are rules and consequences in place for their employees and contractors with reference to these issues. Their employees and contractors should be easily identifiable and have identification with them. Where possible, Eskom should inform landowners in advance when they are going to be in the area.				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation	3	5	4	3	4	2	15	60
With Mitigation	3	5	2	3	3	2	13	39
Iphiva Site 6								
Without Mitigation	3	5	4	3	4	2	15	60
With Mitigation	3	5	2	3	3	2	13	39

Impact Description			**Mitigation**					
Creation of jobs			**Avoid**					
			Minimise	Where possible, Eskom should recruit local labour for unskilled or semi-skilled positions on the project. Preference should be given to locals that are currently unemployed. The recruitment process should be agreed with local leadership structures. Potential jobs should be advertised in an accessible way and no false expectations should be created. Indirect employment/entrepreneurship opportunities must be enhanced. Eskom and the contractor must support local entrepreneurs as far as possible. Eskom should consider a local economic development programme that can stretch across the entire project. An example would be to buy a mobile kitchen, and train women along the construction route to cater for the construction forces. This kitchen can move with the labour force and women in different areas will be given the opportunity to get trained and earn an income.				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation	3	1	2	1	3	2	7	21
With Mitigation	3	1	2	1	2	2	7	14
Iphiva Site 6								
Without Mitigation	3	1	2	1	3	2	7	21
With Mitigation	3	1	2	1	2	2	7	14

Table 10.30: Qualitative discussion of impacts of the Iphiva Substation during the Operational Phase

Impacts	Stakeholder group	Description
Negative community relations	All	Negative community relations can develop when Eskom's employees or contractors behave in a way that cause harm, or could potentially cause harm to the members of the community. If Eskom does not diligently maintain their servitudes, it could create hazards for the community. Contractors leaving gates open or drive off road or litter could result in harm to livestock or crops. Eskom needs to ensure that there are rules and consequences in place for their employees and contractors with reference to these issues. Their employees and contractors should be easily identifiable and have identification with them. Where possible, Eskom should inform landowners in advance when they are going to be in the area.

Table 10.31: Quantitative discussion of impacts of the Iphiva Substation during the Operational Phase

Impact Description			**Mitigation**					
Negative community relations			**Avoid**					
			Minimise	Eskom needs to ensure that there are rules and consequences in place for their employees and contractors with reference to these issues. Their employees and contractors should be easily identifiable and have identification with them. Where possible, Eskom should inform landowners in advance when they are going to be in the area.				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva Site 3								
Without Mitigation	3	3	3	3	3	2	12	36
With Mitigation	3	3	2	1	2	2	9	18

Iphiva Site 6								
Without Mitigation	3	3	3	3	3	2	12	36
With Mitigation	3	3	2	1	2	2	9	18

Table 10.32: Summary of the Impact Ratings for Social impacts and risks

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	The presence of two alternatives creates uncertainty with the potentially affected landowners as they need to keep the possibility of the change in land use in mind when planning future activities. Very few people want to spend money on expansions or improvements on land that may not be available to them in the relatively near future. The Manyoni Private Game Reserve is assisting the community with business plans to develop the area around the Iphiva 3 site. These plans cannot be finalised or taken forward until a final site has been selected. According to the members of the traditional community in the area, the Iphiva 6 site is under a land claim, meaning there is uncertainty surrounding the proposed site even without the proposed project. Eskom should attempt to finalise the site selection as soon as possible and swiftly enter into negotiations with the relevant land owners. Once the land negotiations have been finalised, it is important that the project should started and completed as soon as possible. Before construction has started there is always the possibility of a change in plans or priorities, which would result in prolonging uncertainty. Eskom should have a communication strategy in place to keep stakeholders up to date with the process.	21 (Low negative)
2		Pre-construction phase: The traditional communities have an expectation that Eskom will follow the correct procedure to engage with traditional leadership structures to obtain	24 (Low)

		permission to use their land for the intended purpose. The traditional community members in the area close to the proposed sites do not currently have access to electricity. They are hopeful that Eskom would be able to address this and assist the community further in terms of their Corporate Social Responsibility.	
3		Traffic Impacts during construction	21 (Low – negative)
4		Impacts on livelihoods during construction	Iphiva 3 – 44 (Medium Low Negative) Iphiva 6 – 52 (Medium High negative)
5		Relocation	Iphiva 3 – Not applicable Iphiva 6 – 48 (Medium High negative)
6		Impacts relating to construction camps and newcomers	Both sites – 39 (Medium Low negative)
7		Creation of jobs	Both sites – 14 (positive)

10.4.7 Visual

Table 10.33: Impact ratings for the visual impacts of the Iphiva Substation

No:	Impact Description			Mitigation					
V-IS-1	Visual impact as a result of the Iphiva Substation on: > National / provincial road users (N2 / R33 / R69 / R66) > Formal settlements (such as Mkhuze) > Informal settlements / villages			**Avoid** **Minimise** **Restore/ Rehabilitate** **Compensate/ Offset**					
	Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probablility**	**Confidence**	**Consequence**	**Significance**
	ISS 3								
	Without Mitigation	2	5	4	3	4	3	14	57
	With Mitigation	2	4	2	2	4	3	10	40
	ISS 6								
	Without Mitigation	2	5	4	3	3	3	14	42.5
	With Mitigation	2	4	2	2	3	3	10	30

No:	Impact Description			Mitigation					
V-IS-2	Visual impact as a result of the Iphiva Substation on: > Rural (commercial farming) homesteads			**Avoid** **Minimise** **Restore/ Rehabilitate** **Compensate/ Offset**					
	Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probablility**	**Confidence**	**Consequence**	**Significance**
	ISS 3								
	Without Mitigation	1	5	3	4	3	3	13	40
	With Mitigation	1	4	3	3	2	3	11	22
	ISS 6								
	Without Mitigation	1	5	3	3	3	3	12	37
	With Mitigation	1	4	2	2	2	3	9	18

No:	Impact Description			Mitigation					
V-IS-3	Visual impact as a result of the Iphiva Substation on: > Protected areas: > Protected areas: Existing lodge locations in Rhino Reserve Complex (including Zululand Rhino, Thanda, Somkhanda			**Avoid** **Minimise** **Restore/ Rehabilitate** **Compensate/ Offset**					
	Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplceable loss**	**Probablility**	**Confidence**	**Consequence**	**Significance**
	ISS 3								
	Without Mitigation	2	5	4	5	4	3	16	65
	With Mitigation	2	4	3	4	4	3	13	52
	ISS 6								
	Without Mitigation	2	5	3	3	4	3	13	53
	With Mitigation	2	4	3	3	3	3	12	36

No:	Impact Description			Mitigation					
V-IS-4	Visual impact as a result of the night-time light of the Iphiva Substation on nearby Protected area receptors			**Avoid** **Minimise** **Restore/ Rehabilitate** **Compensate/ Offset**					
	Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplceable loss**	**Probablility**	**Confidence**	**Consequence**	**Significance**
	ISS 3								
	Without Mitigation	2	5	3	4	4	3	14	57
	With Mitigation	2	4	3	3	3	3	12	36
	ISS 6								
	Without Mitigation	2	5	3	3	3	3	13	40
	With Mitigation	2	4	2	2	2	3	10	20

Table 10.34: Summary of the Impact Ratings for Visual impacts

	Listed Activities	Impact Description	Significance after mitigation
1	GN983 (11) – powerlines GN983 (19) – depositing/infilling from a watercourse GN983 (28) – Institutional Developments GN 983 (56) – Widening of a road GN 984 (4) – New Roads in sensitive area GN 984 (12) – Clearing vegetation in sensitive area	National / Provincial road users. Formal settlement (such as Pongola/ Mkhuze) Informal settlements/ villages	Iphiva 3 Medium-Low with mitigation (40) Iphiva 6 Medium Low with mitigation (30)
2		Rural (commercial farming) homestead	Iphiva 3 Low with mitigation (22) Iphiva 6 Low with mitigation (18)
3		Protected areas: existing lodge locations in Rhino Reserve Complex (including Zululand Rhino, Thanda, Somkhanda)	Iphiva 3 Medium High with mitigation (52) Iphiva 6 Medium Low with mitigation (36)
4		Night time light of the Iphiva Substation on nearby Protected area receptors	Iphiva 3 Medium Low with mitigation (36) Iphiva 6 Low with mitigation (20)

10.4.8 Economic

Table 10.35: Assessment of impact of the Iphiva Substation on a reduction in property value

Impact Description: Construction & operational phase impact - A **reduction in property value** for the affected property.			**Mitigation**					
			Avoid	The substation should not be constructed on property used for tourism activity				
			Minimise	Place the substation in an area that is not visible from the tourism areas				
			Restore/Rehabilitate					
			Compensate/Offset	Market related compensation for the affected property should be provided				
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva 3								
Negative, direct without mitigation	2	5	5	5	5	3	17	85
Negative, direct with mitigation	1	4	5	5	4	3	15	60
Iphiva 6								
Negative, direct without mitigation	1	5	3	1	3	3	10	30
Negative, direct with mitigation	1	4	3	1	3	3	9	27

Table 10.36:Assessment of the impact of the Iphiva Substation on a reduction in property values for adjacent properties

Impact Description: Construction & operational phase impact - A **reduction in property value** for the adjacent properties if the substation is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes)			**Mitigation**					
			Avoid					
			Minimise	Place the substation in an area that is not visible from the tourism areas				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva 3								
Negative, direct without mitigation	2	5	4	5	5	3	16	80
Negative, direct with mitigation	1	4	3	5	4	3	13	52
Iphiva 6								
Negative, direct without mitigation	2	5	4	5	5	3	16	80
Negative, direct with mitigation	1	4	3	5	4	3	13	52

Table 10.37: Assessment of the impact of the Iphiva Substation on a reduction in economic value for the economy

Impact Description: Construction & operational impact - **reduction in economic value** for the economy. Due to the establishment of a substation, the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.			**Mitigation**					
			Avoid	The substation should not be constructed on property used for tourism activity				
			Minimise	Place the substation in an area that is not visible from the tourism areas				
			Restore/Rehabilitate					
			Compensate/Offset					
Nature	**Extent**	**Duration**	**Intensity**	**Potential for Irreplaceable loss**	**Probability**	**Confidence**	**Consequence**	**Significance**
Iphiva 3								
Negative, direct & indirect without mitigation	4	5	5	5	5	3	19	95
Negative, direct & indirect with mitigation	4	5	5	5	4	3	19	76
Iphiva 6								
Negative, direct without mitigation	4	5	4	5	4	3	18	72
Negative, direct with mitigation	1	4	3	1	3	3	9	27

Table 10.38: Summary of Impact Ratings for Economic impacts

	Listed Activities	Impact Description	Significance after mitigation
1		Construction & operational phase impact - A **reduction in property value** for the affected property.	Iphiva 3: Negative, direct with mitigation (60 - High). Iphiva 6: Negative, direct with mitigation (27 - Low)
2		Construction & operational phase impact - **A reduction in property value** for the adjacent properties if the substation is visible from areas that are often visited by tourist (hides, look-out areas hiking trails, game drive routes).	Iphiva 3 and 6: Negative, direct with mitigation (52 – Medium-High).
3		Construction & operational impact - **reduction in economic value** for the economy. Due to the establishment of a substation, the affected area will not be utilised for tourism, thus reducing the productivity. Additionally, future expansion/investment in tourism activity is lost due to the loss in productive land.	Iphiva 3: Negative, direct & indirect with mitigation (76 - High) Iphiva 6: Negative, direct with mitigation (27 - Low)
4		Construction & operational phase - a **loss in tourism employment** is associated with the loss in productive land.	Iphiva 3: Negative, direct with mitigation (76 - High) Iphiva 6: Negative, direct with mitigation (27 Medium Low)
5		Construction phase impact - **Displacement effect of residential owners**	Iphiva 3: Negative, direct with mitigation (16 Low) Iphiva 6: Negative, direct with mitigation (44 Medium Low)

11 SUMMARY OF SPECIALIST STUDIES

GNR 982 Appendix 3:

3(1) (k) where applicable, a summary of the findings and recommendations of any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final assessment report;

11.1 SOCIAL SPECIALIST STUDIES

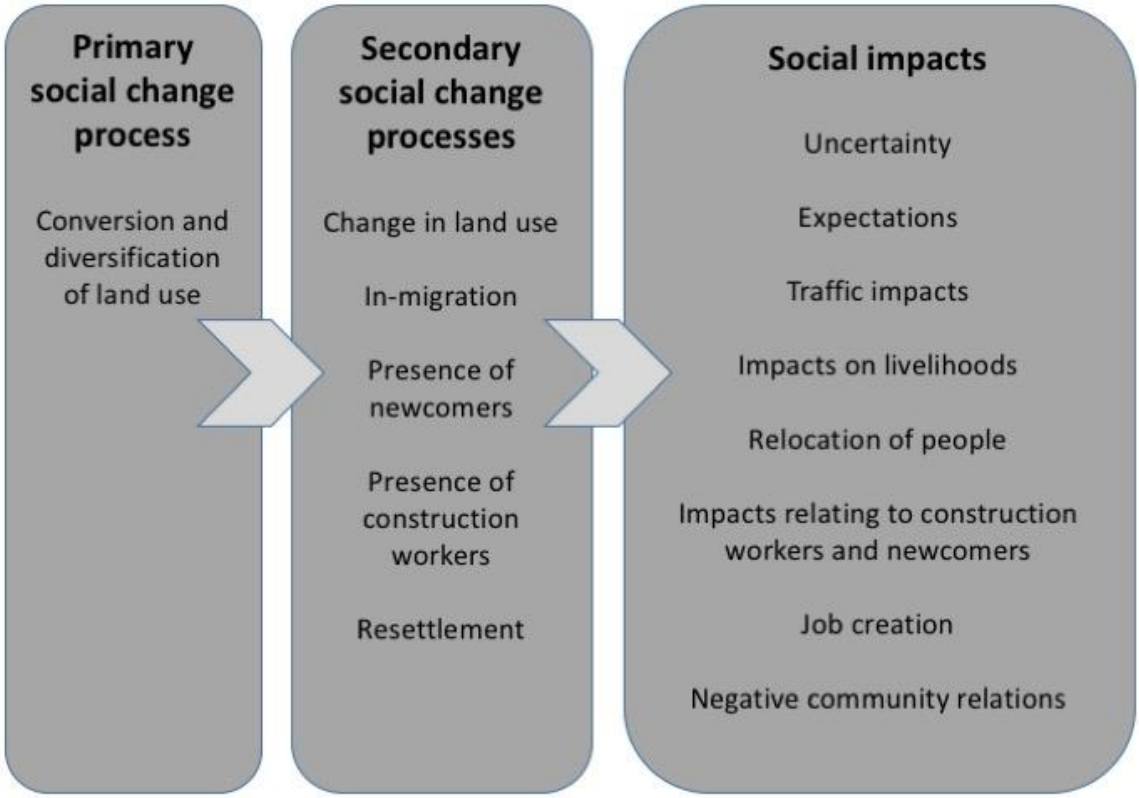
The Social Specialist Study was compiled by San-Marié Aucamp and Ilse Aucamp of Equispectives.

The social specialist identified the following key stakeholder groups potentially impacted by the project:

- Communities under traditional authority;
- Commercial farming;
- Tourism establishments; and
- Surrounding urban areas.

The proposed project activities set into motion certain social change processes, and these change processes can lead to the experience of social impacts. Social impacts are context specific and may be experienced differently by different groups in the area. The social environment is very dynamic and is constantly changing.

The following change processes and impacts have been identified for the proposed project:



The following mitigation and management measures are recommended by the social specialist:

- Appoint a Community Liaison Officer;
- Compile and implement a community relations strategy;
- Compile and implement a communication strategy;
- Compile and implement a grievance mechanism;
- Compile and implement an employment policy;
- Compile and implement a CSI strategy;
- Compile and implement a road use policy;
- Construction camps should be established in accordance with international best practice;
- Compile and implement a policy for conduct of employees and contractors;
- Compile and implement an access control policy specifically for protected and game reserve areas;
- Join local fire protection agencies and have and implement a firefighting strategy;
- Have and implement a strategy for community safety and security,
- Have and implement a HIV and life skills strategy;
- Compile and implement a relocation and compensation policy in accordance with international best practice; and

- Appoint a relocation specialist should relocation be required.

The social specialist concluded that the project will make an important contribution to the supply of electricity in Northern KZN and will be of service to many previously disadvantaged communities. She therefore recommends that the project as a whole should proceed, but in the process attempt to minimise negative social impacts to the immediate environment, keeping in mind the current economic climate and broader societal picture in terms of expenditure.

Site 6 for the Iphiva substation is privately owned while Site 3 belongs to the Mbulungwane Communal Property Trust. There are people residing on Site 6, but not on Site 3. The traditional community has indicated that they would like the substation on their land (Site 3) and they have indicated that there is a land claim on Site 6. There are no tourism establishments on, or directly adjacent to either of the sites. There is however a stewardship area near Site 3 and there are plans to develop the area around Site 3 in a conservation corridor area.

In this context, it is complex recommending a site for the substation. On the surface Site 3 seems ideal as the landowners would prefer the site there, no people are living on the site, and there is no land claim on the site. For this site to become part of the conservation corridor, and thus part of the tourism attractions in the area, will be of greater socio-economic value to the community than having a substation on their land. Given what the private game reserves have already achieved in the area, and as they are part of the development plan, it is very likely that this development will materialise.

As not the total Site 6 will be used for the substation, but only a relatively small portion, it should theoretically be possible to position the site in such a way that no households need to be resettled. It is further understood that the same community that owns Site 3, will be the beneficiaries if the land claim on Site 6 is successful. From this perspective, Site 6 will be a more appropriate choice for the substation than Site 3, and is thus the recommended site.

11.2 SOIL AND AGRICULTURAL POTENTIAL SPECIALIST STUDY

The Soil and Agricultural Potential Specialist Study was undertaken by Francois Botha and Astrid Magdalena Hattingh from Eco-Soil.

The investigation of agricultural potential involved the collation of climate, geology, topography information and determining the broad soil groups of the area as background for further interpretation. Properties of the soil groups, soil depth, clay content, soil restrictions as well as land capability classes were considered. The soil investigation was based on a field investigation and additional available information from the Land Type Survey of the Institute of Soil Climate and Water, as well as other relevant information.

The soils in the project area were then classed in four land capability/potential classes, namely:

- Soils of intermediate suitability for arable agriculture;
- Soils not suitable for arable agriculture, but suitable for forestry or grazing;
- Soils of poor suitability for arable agriculture; and
- No dominant class.

Properties like clay content and susceptibility to erosion is highly dependent on the parent material. The mudstone underlying this area can give rise to soils severely susceptible to erosion when exposed. Exposed surfaces should therefore be limited or prevented. It should be covered with any vegetation even for short periods.

Arable crop production is not restricted by the climate of the area but may become risky in the areas with lower and irregular rainfall patterns.

The specialist has no objections to the project from the agricultural and soil potential standpoint. Iphiva 6 is recommended for implementation because it has soil that is more marginal in terms of agricultural potential, and the site is more disturbed than Iphiva 3.

Recommendations include that all land disturbed by Eskom should be vegetated and left in the condition it was before the construction of the powerlines and that no disturbed areas should be left uncovered to prevent erosion. The powerlines should be constructed on farm boundaries as far as possible, specifically in areas where land is used for forestry.

The number of roads and road crossings should be kept to a minimum.

11.3 HERITAGE

The Heritage Specialist Study (**Appendix F**) was undertaken by Justin du Piesanie from Digby Wells. The Terms of Reference (ToR) of the specialist heritage study was to complete a Heritage Screening Assessment to comply in part with the KZNHA and NHRA to predict preliminary heritage impacts and outline activities to be undertaken in the subsequent phases of the Project as a condition of authorisation.

Through the review of available information, Digby Wells demonstrated the greater cultural landscape to contain heritage resources spanning from palaeontological through to contemporary living heritage resources. A Summary of the Cultural Significance of each heritage resource type is presented in **Table 11.1**.

Table 11.1: Summary of Cultural Significance of heritage resource types in the local study area

Very High
Burial grounds and graves
Medium High
Historical built environment associated with living groups with good integrity
Medium
Historical built environment not associated with living groups with good integrity
Negligible
Historical built environment associated with living groups with poor integrity
Historical built environment not associated with living groups with poor integrity

The assessor determined the cultural significance of the landscape to be medium based on criteria defined in Section 3 of the NHRA.

During the field survey, two (2) heritage resources were identified on Iphiva 6 and none on Iphiva 3, as presented in **Table 11.2 and Figure 11.1.** Detailed Impact Assessment tables for each of these is presented in **Appendix F**.

Table 11.2: Identified heritage resources from the field survey

Site Name	Latitude	Longitude	Heritage Resource Type	Alternative affected
ILI3864/002	-27.649434	31.93692	Burial Grounds & Graves	Iphiva 6 Substation
ILI3864/003	-27.64916	31.93713	Historical Built Environment	Iphiva 6 Substation

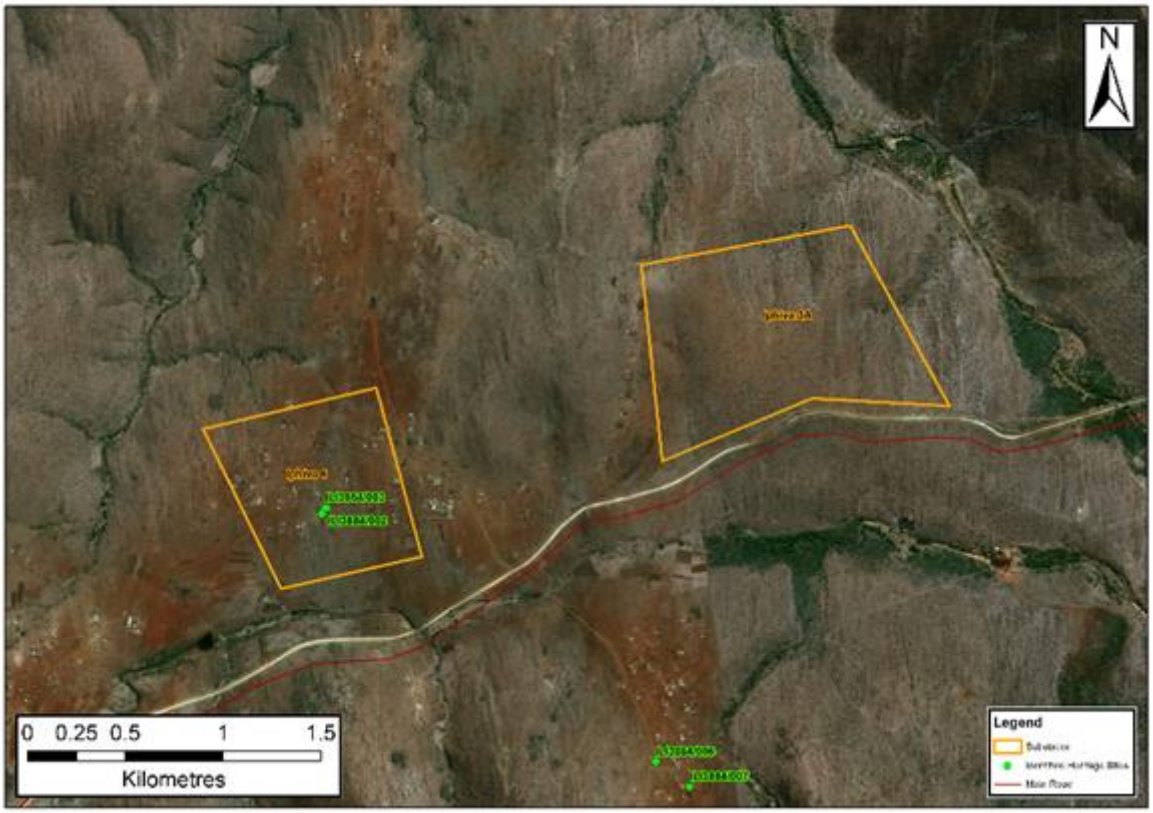


Figure 11.1: Iphiva Substations site-specific study areas with identified heritage resources

The following project related activities are expected to have the greatest likelihood of direct impacts on heritage resources:

- Earth moving activities, such as vegetation and surface clearing, or excavation for the relevant infrastructures;

- Construction and/or upgrading of access roads; and
- Stringing of conductors.

The assessment also compared the suitability of the proposed alternative substation sites with a multi-criteria decision analysis utilising a simple linear additive evaluation model. Defined criteria included:

- Criteria 1: The level of existing anthropogenic disturbance of the various site-specific study areas that will reduce the likelihood of identifying *in situ* heritage resources;
- Criteria 2: Potential for occurrence of unidentified heritage resources, both on the surface and at sub-surface levels, in the development footprint that may be impacted upon;
- Criteria 3: If heritage resources occur within or in proximity to the development footprint and may be impacted upon; and
- Criteria 4: The potential that permitting requirements may be applicable if EA of the development footprint is approved.

These criteria were rated on a scale from 1 (unsuitable) to 5 (most suitable) to quantifiably compare the suitability of the alternative sites. Once the ratings were determined against the criteria above, these were calculated to determine the overall suitability ranking of the alternative sites.

A summary of the assessment is presented in **Table 11.3**

Table 11.3: Summary of potential impacts to heritage resource types by project related activities

Impact	Pre-mitigation:						Post-mitigation:					
	Duration	**Extent**	**Intensity**	**Consequence**	**Probability**	**Significance**	**Duration**	**Extent**	**Intensity**	**Consequence**	**Probability**	**Significance**
Burials, monuments and memorials with high significance	Permanent	International	Extremely high - negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive
Living heritage sites with high significance	Permanent	Province/ Region	Extremely high - negative	Extremely detrimental	Unlikely	Minor - negative	Immediate	Very limited	Very low - positive	Negligible	Certain	Negligible - positive

Table 11.4: Comparative Rating of Alternative Corridors

Alternative	Criteria 1	Criteria 2	Criteria 3	Criteria 4	Total %	Rating	
Iphiva 6	5	5	2	4	80%	4	Suitable
Iphiva 3	2	2	4	2	60%	3	Negligible / insignificant

The site-specific study areas of the proposed alternatives have varying levels of anthropogenic disturbance. Iphiva 6 is presently the location of a rural settlement where anthropogenic disturbance through establishing of structures and agricultural fields may have disturbed or removed previous *in situ* subsurface heritage resources. Iphiva 3 in contrast remains largely free from anthropogenic disturbance, reducing the suitability of the site against criteria 1 and 2.

Conversely, based on criteria 3, Iphiva 3 is more suitable as no heritage resources have been recorded within the site-specific study area. This does not however, preclude the potential permitting requirements in the event of accidental exposure of *in situ* subsurface heritage resources. Iphiva 6 is known to contain burial grounds and graves. While these will have permitting requirements in the event that they are to be impacted upon, because they are known the potential impacts can be easily avoided therefore making it more suitable in respect of criteria 4.

This assessment therefore demonstrated that **Iphiva 6** is the more suitable alternative from a heritage perspective based on the available information.

The following recommendations were made:

- Exemption from further palaeontological assessment and the inclusion of a Fossil Chance Find Procedure in the EMPr;
- A detailed heritage walk-down and impact assessment of the authorised proposed infrastructures development footprint be undertaken prior to any construction activities to identify any heritage resources that may be impacted upon;
- Final infrastructure designs must be amended to avoid direct impacts to identified heritage resources;
- The final HIA must be submitted to SAHRA and Amafa for approval prior to construction activities; and

- A project specific Chance Finds Protocol, inclusive of the fossils finds procedure as recommended above, be developed and included in the EMPr as a condition of authorisation.

Palaeontological and archaeological resources commonly occur at subsurface levels. These types of resources may not be adequately recorded or documented by assessors without intrusive and destructive methodologies. Therefore, the reviewed literature and previously completed assessments are in themselves limited to surface observations.

Fossil Chance Find Procedure

- Surface excavations should be monitored by a geologist in areas defined as having a high palaeontological sensitivity and any fossil material disturbed should be put aside and the palaeontologist called to inspect the material within a reasonable timeframe to minimise delays to the project. The geologist should also review visual references and descriptions of relevant palaeontological material.
- If it is not feasible for the palaeontologist to visit the site timeously then digital photographs of good quality and resolution should be sent to the palaeontologist to assess and make recommendations.
- From visits or photographs supplied the palaeontologist must make the following recommendations:
    - Material is of no value so development can proceed, or
    - Fossil material is of some interest where a representative sample should be carefully collected with the necessary permits as regulated by Chapter IV of GN R 548 before the development may proceed. The collected samples must be incorporated into a recognised repository (e.g. Ditsong Museum, Council for Geosciences, Pretoria; Evolutionary Studies Institute, University of the Witwatersrand, Johannesburg) to comply with the requirements of the Regulations to the Act; or
    - Fossils are scientifically important and the palaeontologist must obtain the necessary permits as regulated by Chapter IV of GN R 548 to study the fossiliferous material in situ, where necessary excavate incorporate into a recognised repository. The development may not proceed in the identified area.

11.4 FAUNA AND FLORA SPECIALITY STUDY

The Fauna and Flora Specialist Study was undertaken by Rudi Greffrath from Digby Wells. The Terms of Reference of the fauna and flora screening and comparative specialist study was to evaluate the presence of sensitive species and landscapes/habitat present that could be affected by the various options available for the project infrastructure. Thereafter to determine the preliminary impacts on these natural resources and recommend mitigation measures to alleviate negative impacts. The consideration of alternative for the project infrastructure, from a biodiversity perspective, cantered on the ecological sensitivity present in each alternative.

In terms of ecological sensitivity, the following features were assessed to determine how sensitive the habitats identified within the alternatives are:

- Presence or absence of Red Data or protected plant and animal species;
- Presence or absence of exceptional species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems such as Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.

The site specific field work carried out during the screening survey found Substation Site 3 to be undisturbed and characterised by *Ximenia caffra, Dovyalis rhamnoides, Carissa microcarpa, Vachelia nilotica.* Site 6 was found to have undergone transformation due to anthropogenic activities, such as building of roads, housing and open areas.

The results of the comparison of alternatives demonstrated that **Iphiva 6** is the preferred options from a fauna and flora perspective.

The construction of various surface infrastructure components will mean the removal, partial or complete of vegetation/habitat types present. With the clearing of vegetation, open areas will occur, here indigenous vegetation will be replaced by fast growing alien and weed vegetation. This impact can be greatly reduced with the correct implementation of alien vegetation management plan.

The destruction of the vegetative cover must be limited, this can be achieved by restricting the removal and disturbance of vegetation to those areas absolutely essential for the infrastructure placements.

Red Data Status plants located in areas of development should be marked prior to construction of any infrastructure and the necessary permits for relocations of these protected species must be obtained from the relevant government department. The relocation strategy must be approved by relevant provincial authorities prior to relocation to a safe place to avoid destruction and stipulations made by the authorities must be followed. A nursery should be developed on site for this purpose. No protected plant species can be disturbed without authorisation.

Three basic rules of conservation apply to populations of Red List Plant Species, as set out hereunder, according to Red List Plant Guidelines (2012).

- All populations of Near Threatened and Threatened plant taxa must be conserved *in situ*.
- All populations of Near Threatened and Threatened plant taxa must be protected with a buffer zone in accordance with guidelines.
- An Ecological Management Plan must be compiled in respect of all actions that affect populations of Red List Plant Species, and such Ecological Management Plans must conform with the Guidelines set out for buffer zone widths.

Illegal waste dumping, including building waste and rubble, should be prohibited. Such illegal dumping sites are prone to alien vegetation recruitment. The environmental manager must ensure that after the building site is rehabilitated, there are no rubble piles remaining.

Training should be given to onsite staff on which plants and animals have red data status and how they may be identified. Thereafter the Environmental Officer must initiate the red data management plan. The incidence of plant or animal red data removal or death must be quantified and records kept, this will ensure that management actions are adapted of they are not successful.

Detailed Impact Rating tables are presented in **Appendix G**.

11.5 AVI-FAUNA SPECIALIST STUDY

Avi-Fauna Specialist Study was undertaken by Phil Patton from Digby Wells. The Terms of Reference of this avifauna screening and comparative specialist study was to evaluate the presence of sensitive avifauna species and landscapes/habitat present that could be affected by the various options available for the project infrastructure. Thereafter to determine the preliminary impacts on these natural resources and recommend mitigation measures to alleviate negative impacts.

The consideration of alternative corridors from an avifaunal perspective, was primarily determined by the ecological sensitivity present based on the following:

- Presence or absence of Red Data or protected bird species;
- Presence or absence of exceptional Avifaunal species diversity;
- Extent of intact habitat in good ecological condition in the absence of disturbance; and
- Presence or absence of important ecosystems protected areas, such as IBAs, Protected Areas, areas demarcated for future protected area status (NPAES) and wetlands.

The results of the comparison of alternatives is that Iphiva 6 is recommended for implementation.

The construction of various surface infrastructure components will mean the removal, partial or complete of habitat types present and the loss of avifaunal species of special concern (protected species), due to collision or electrocution.

With the clearing of vegetation, habitat will be removed; here indigenous vegetation will be replaced by fast growing alien and weed vegetation, degrading the general habitat quality. The construction of infrastructure especially at height, which includes distribution lines emanating from the substation will pose a risk to avifaunal species in the form of collision and electrocution risk.

High structures, such as the radio tower pose a risk of collision, and suitable measures must be applied to make the mast visible to birds, the same principle applies to electrical infrastructure but these have the added risk of electrocution. The destruction of the habitat/vegetative cover must be limited, this can be achieved by restricting the removal and disturbance of vegetation to those areas absolutely essential for the infrastructure placements.

Known Protected and Red Data status bird nesting, foraging and dispersion areas must be avoided. This can be achieved by incorporating provincial government and other existing databases into this report.

11.6 WETLAND SPECIALIST STUDY

Wetland areas were identified and preliminary wetland boundaries were delineated at the desktop level using detailed aerial imagery (Southern Mapping, 2015) along with 1m contours for the two Iphiva Substations under consideration (**Figure 11.2** and **11.3**). Baseline and

background information was researched and used to understand the area on a desktop level prior to fieldwork; this included but was not limited to:

- The Ramsar Convention;
- NFEPA (Nel et al., 2011);
- Water Management Areas and Quaternary Catchments; and
- The KZN 2012 Critical Biodiversity Areas Map.

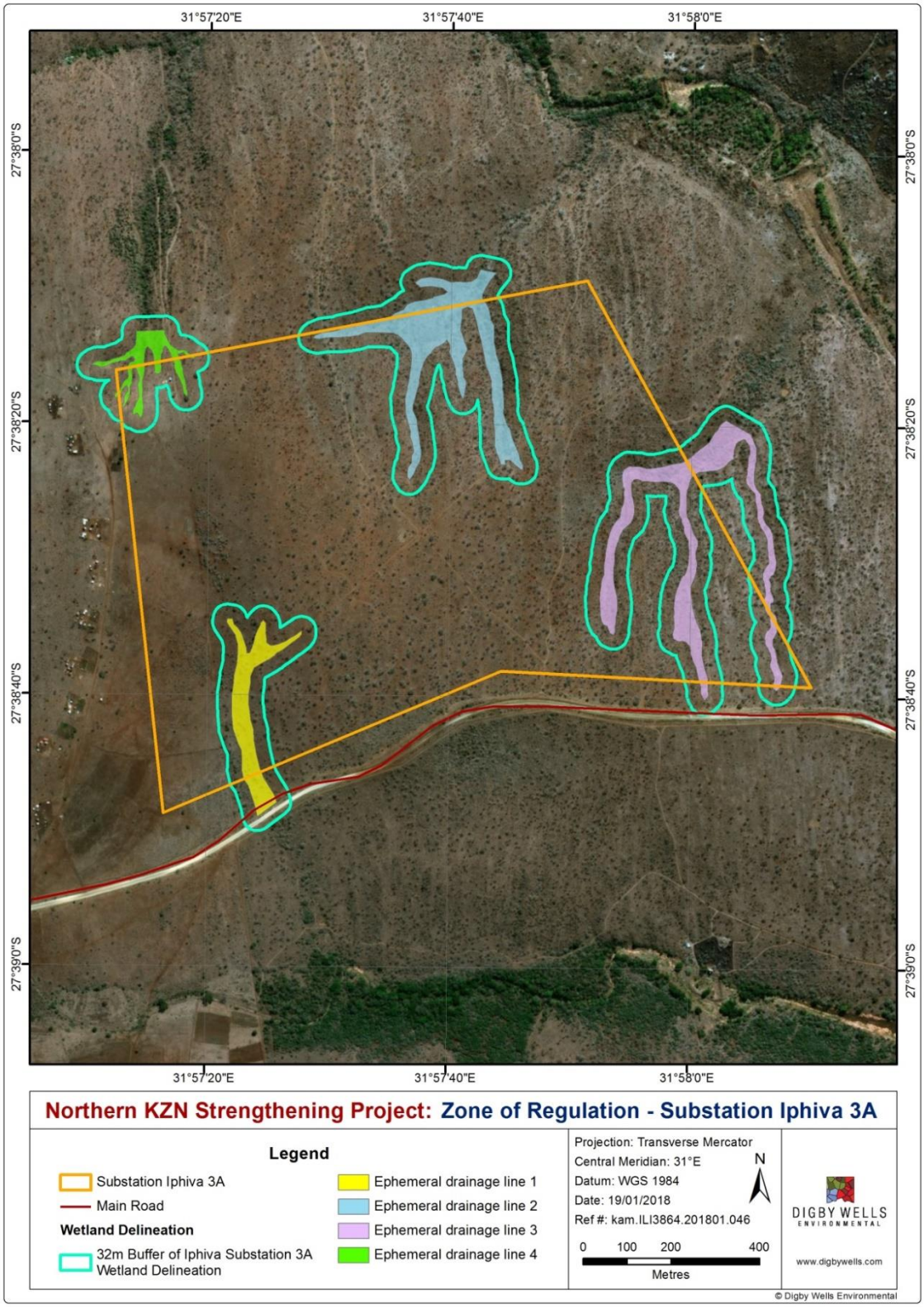


Figure 11-2: Desktop delineation and 32 m Zone of Regulation associated with the potential identified wetland/ephemeral drainage line areas in the vicinity of the proposed Iphiva 3 substation

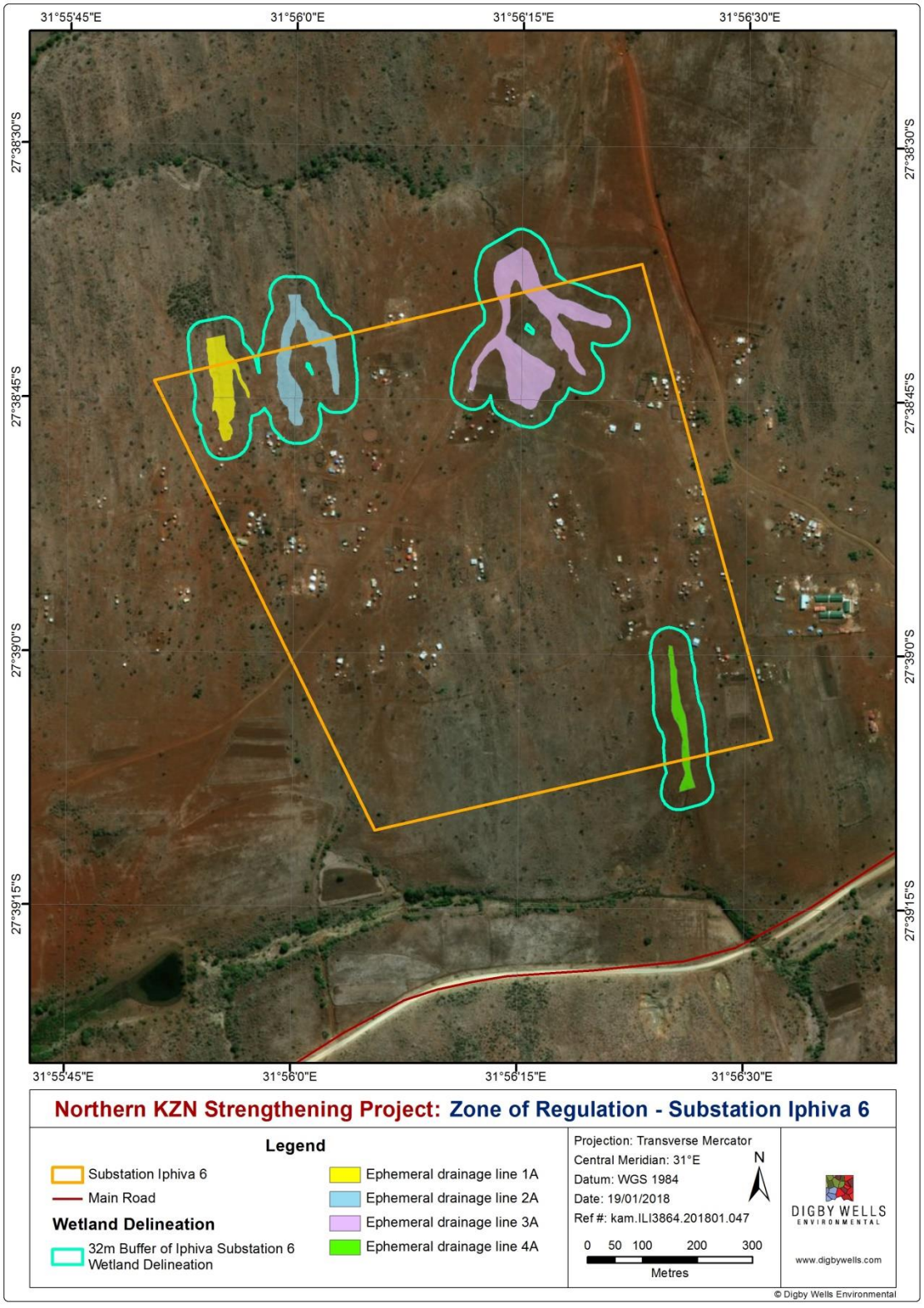


Figure 11-3: Desktop delineation and 32 m Zone of Regulation associated with the potential identified wetland/ephemeral drainage line areas in the vicinity of the proposed Iphiva 6 substation

The site clearing activity will result in a direct loss of wetland areas covering a relatively small extent. The intensity of the impact will be high, however, as all wetlands are protected by the National Water Act, 1998 (Act No. 36 of 1998). The following impacts are expected as a result of site clearing for the construction of the substations:

- Direct loss of habitat;
- Increased sedimentation;
- Onset of erosion, and;
- Establishment of alien invader plant species.

The site-specific study areas of the proposed alternatives have varying levels of anthropogenic disturbance. Iphiva 6 is presently the location of a rural settlement where anthropogenic disturbance through establishing of structures and agricultural fields may have disturbed or impacted on wetland habitats present. Iphiva 3, in contrast remains largely free from anthropogenic disturbance, reducing the suitability of the site.

Existing anthropogenic disturbance is by far considered a larger driver of transformation of wetland habitats and Iphiva 6 is therefore considered the more suitable site for development. In addition, while wetland areas may be impacted on for both sites, infrastructure layout can be planned in such a way as to avoid and minimise impacts to the wetland resources present.

11.7 VISUAL SPECIALIST STUDY

The Visual Specialist Study was undertaken by Johan Goosen from Aurecon South Africa.

The Iphiva 3 site along the P-234 road has a moderate slope, with natural vegetation cover consisting mostly of scrubland. Most importantly, it is directly adjacent to the Manyoni Private Game Reserve and proposed Zimanga Private Game Reserve, and visible from various important vantage points in these reserves.

Plate 8: View along P-234 road close to proposed Iphiva Substation Site 3 (Viewpoint P)

The Iphiva 6 site along the P-234 road has a moderate slope, with bare soil associated with the dispersed rural settlement in which it occurs. The landscape is therefore largely transformed. It is expected that the viewer sensitivity of the settlement is low.

Plate 9: View along P-234 road close to proposed Iphiva Substation Site 6 (Viewpoint R)

The Visual Impact Assessment is based on the Oberholzer (2005) guideline that draws on best practice in EIA and provides guidance applicable to visual specialist assessments. Projects-specific receptor (viewer) sensitivity is based on accepted international practice, previous experience of the visual specialists, social specialist and the economic specialist.

Guest houses, game lodges and nature-based tourism in protected areas dependent upon a pristine visual resource for tourism value are considered to have a High viewer sensitivity. rural (commercial farming) homesteads a Moderate viewer sensitivity, and National / provincial road users where other infrastructure is present and transformation has already taken place, Formal settlements (such as Pongola / Mkuze / Ulundi) and informal settlements / villages (likely considers transmission lines as a sign of progress) a Low viewer sensitivity.

The greatest factor that influenced visual impact for this project was the presence of conservation areas, due to their dependence upon the landscape as visual resource as income generator for tourism-related activities. The avoidance and minimisation of the visual impact was mostly focused around reducing impact on these areas.

Impacts were identified for each of the viewer groups against each of the infrastructure components. Visibility and visual exposure were combined in the GIS viewsheds generated. These aspects and visual intrusion were combined to calculate the intensity / magnitude of each impact. The visual intensity was then combined with pre-defined impact assessment aspects such as the nature, duration, extent to determine the significance of each impact before and after mitigation.

The existing environment impacting on visual impacts for the two alternative sites is compared in **Table 11.5**.

Table 11.5: Summary of Existing Environment: Iphiva Substation alternatives

Receiving environment parameter	**Site 3**	Description	**Site 6**	Description
Landscape character (main land cover / uses)	**% of site represented**	The landscape is largely unmodified, and remains natural grassland / low shrubland, with a small area of subsistence crops. Directly adjacent (north of) Manyoni Private Game Reserve.	**% of site represented**	The landscape is largely transformed due to dispersed rural settlement, but remains rural. Manyoni Private Game Reserve is approximately 1,7 km east of the site.
Grasslands	**51%**		5%	
Low shrubland	40%		18%	
Cultivated subsistence crops	7%		24%	
Woodland/Open bush	0.6%		0%	
Degraded	0.5%		0%	
Settlements	0%		**53%**	
Sense of Place	The site has rolling topography, with deep ravines, and generally slopes from east down to west. P-234 forms the southern boundary		Due to the existing dispersed rural settlement of this study area, the sense of place is not unique. Such settlement pattern	

Receiving environment parameter	Site 3	Description	Site 6	Description
	of the site. Open bush savannah does not provide an especially unique sense of place.		commonly occurs across Northern KZN. The east-west ridge creates a visual barrier between north and south.	
Landscape quality rating	2	Although disturbed, the area is largely natural (unmodified) and therefore of a moderate to high landscape quality rating	1	Due to the existing informal settlement, this area is classified as "transformed human intervention" and therefore of low landscape quality
Visual Absorption Capacity (VAC) rating	**1.67**	**Low to moderate VAC**	**1.50**	**Low to moderate VAC**
VAC Topography	2	Slope between 3 - 7%	2	Slope between 3 -7%
VAC pattern/diversity	1	Uniform visual pattern, due to undeveloped area	1.5	Moderate diverse visual pattern, due to the rural informal settlement
VAC vegetation height	2	Vegetation height between 1-5m	1	Vegetation height <1m
Receptor sensitivity	**Sum of receptor sensitivity elements is score of 5/21**		**Sum of receptor sensitivity elements is score of 3/21**	
National / provincial road users (N2 / R33 / R69 / R66) [gravel D / P roads]	2	N2 not present. Smaller road users of gravel road (close to Nature Reserve) likely not used to disturbed / transformed environment	n/a	N2 not present. Smaller road users at informal settlement likely used to disturbed / transformed environment
Formal settlements (such as Pongola / Mkuze / Ulundi)	n/a		n/a	
Informal settlements / villages	n/a		1	
Rural (commercial farming) homesteads	n/a	It appears there are no rural homesteads in close proximity to this alternative	n/a	It appears there are no rural homesteads in close proximity to this alternative
Protected areas: Private: Lodge locations in Rhino Reserve complex (including Zululand Rhino, Thanda, Somkhanda and propose Zimanga Nature Reserves)	3	High receptor sensitivity (directly adjacent to 1 major conservation complex and income-generating potential of the	2	Moderate receptor sensitivity (1,7 km from 1 major conservation complex and income-
Protected areas: Private: Lodge locations in Ithala Reserve	n/a		n/a	

Receiving environment parameter	Site 3	Description	Site 6	Description
Protected areas: Public: Hluhluwe-Umfolozi complex	n/a	landscape as visual resources)	n/a	generating potential of the landscape as visual resources)
Concluding statement (receiving environment)	Higher landscape quality rating of two alternatives. Higher receptor sensitivity rating of two alternatives. VAC similar. **Higher visual sensitivity**		Lower landscape quality rating of two alternatives. Lower receptor sensitivity rating of two alternatives. VAC similar. **Lower visual sensitivity**	

The legend on the viewshed maps **(Figures 11.4 and 11.5)** should be interpreted as follows:

- Under normal circumstances, the viewshed applies to a maximum 7 km distance from substation. Due to the radio mast – the viewshed has been increased to 10 km for the substation sites;
- The viewshed is based on line of sight modelling (i.e. ground level) to the top of the infrastructure;
- White colour (i.e. low visual magnitude/intensity) means that at least 1 tower is visible from one place at the outer edges of the viewshed (6-7 km away).
- Yellow colour (i.e. moderate visual magnitude/intensity) means that approximately 6-8 towers are visible from one place at a moderate distance (3-5 km away)
- Red colour (i.e. high visual magnitude/intensity) means that approximately 15 towers are visible from one place in close proximity (1-2 km away).

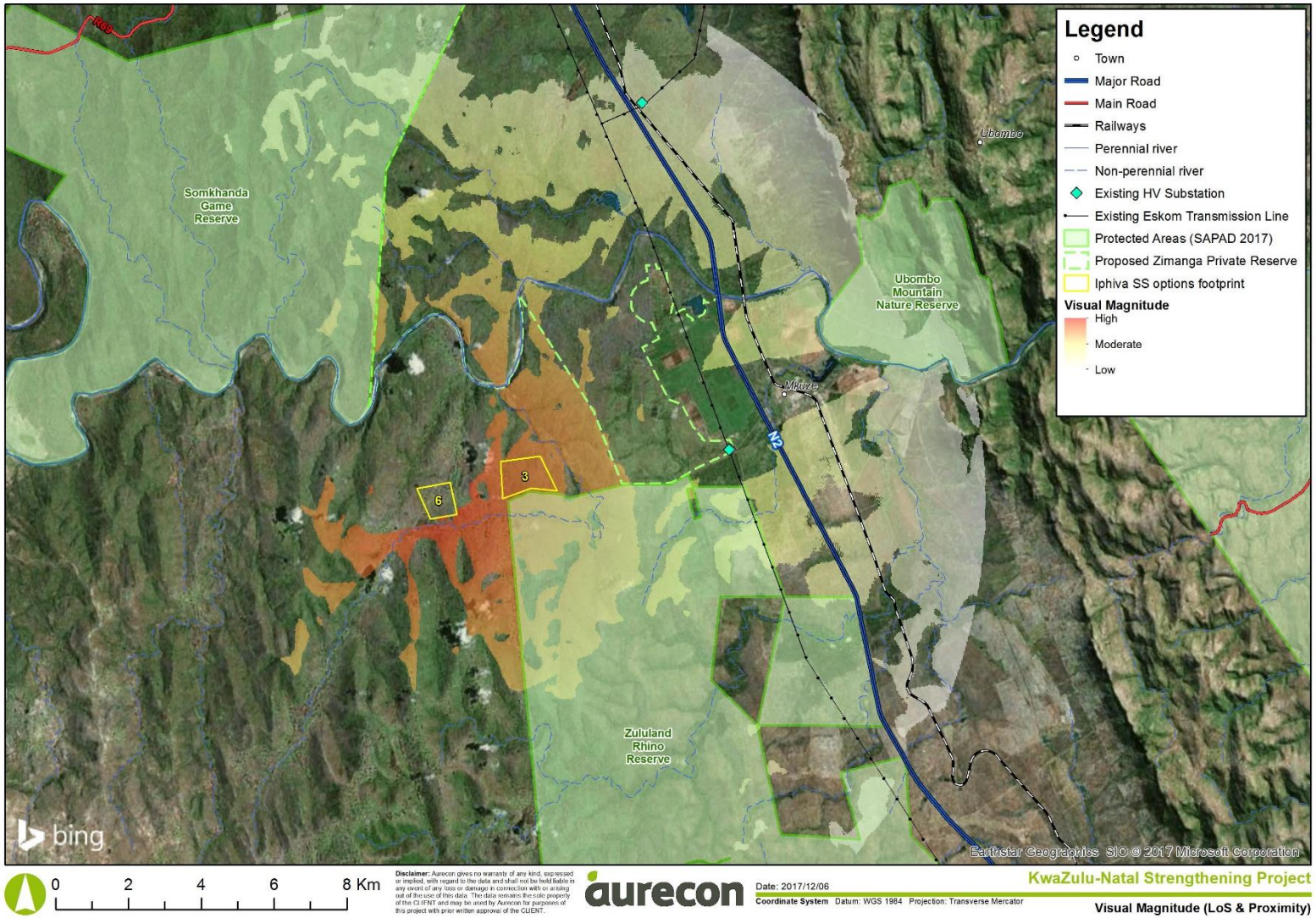


Figure 11-4: Viewshed of Iphiva Substation (Site 3 Alternative)

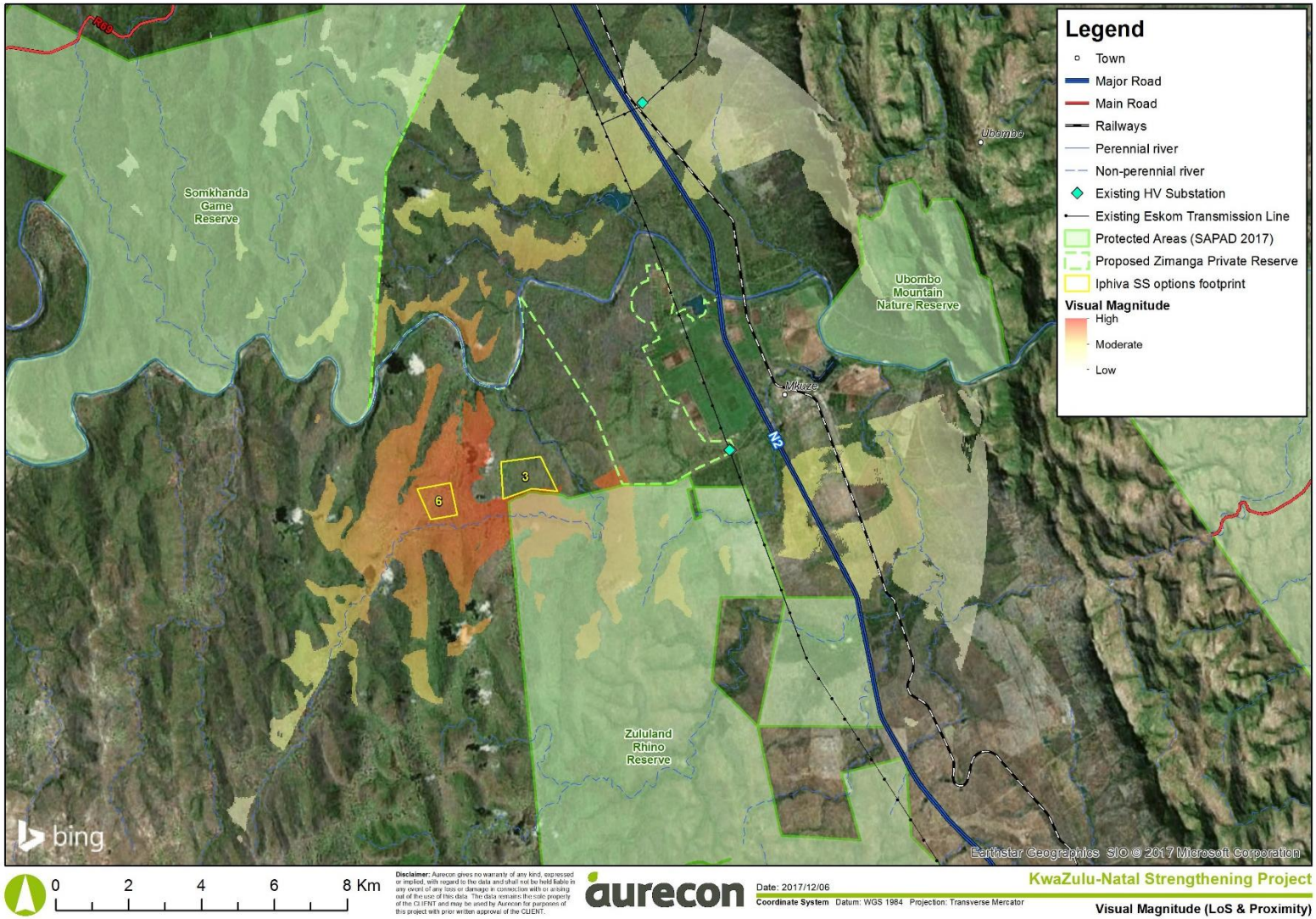


Figure 11-5: Viewshed of Iphiva Substation (Site 6 Alternative)

By analysis of the viewshed maps created, the intensity of each visual impact was calculated and is presented in **Tables 11.6** and **11.7**. The intensity of these have been carried forward to the impact assessment tables in **Chapter 11**.

Table 11.6: Impact Identification: Iphiva Substation

Impact number	Impact description
V-IS-1	Visual impact as a result of the Iphiva Substation on: > National / provincial road users (N2 / R33 / R69 / R66) > Formal settlements (such as Mkhuze) > Informal settlements / villages
V-IS-2	Visual impact as a result of the Iphiva Substation on: > Rural (commercial farming) homesteads
V-IS-3	Visual impact as a result of the Iphiva Substation on: > Protected areas: > Protected areas: Existing lodge locations in Rhino Reserve Complex (including Zululand Rhino, Thanda, Somkhanda and proposed Zimanga Nature Reserves)
V-IS-4	Visual impact as a result of the **night-time light** of the Iphiva Substation on nearby Protected area receptors

Table 11.7: Comparative visual impact intensity - identified impacts for Iphiva Substation

Impact no.	Impact Assessment Parameter	Site 3	Description	Site 6	Description
V-IS-1	**Visibility** (viewshed analysis) AND Visual Exposure (How far is the activity from viewers)	3	Refer to viewshed map	3	Refer to viewshed map
	Visual Intrusion (how project fits environment)	2	No similar existing infrastructure	2	Some disturbance due to settlement already present
	Intensity / Magnitude (1-5) before mitigation	**4**		**4**	
V-IS-2	**Visibility** (viewshed analysis) AND Visual Exposure (How far is the activity from viewers)	2	Refer to viewshed map - no farming homesteads in close proximity	2	Refer to viewshed map - no farming homesteads in close proximity
	Visual Intrusion (how project fits environment)	2	No similar existing infrastructure	2	Some disturbance due to settlement already present
	Intensity / Magnitude (1-5) before mitigation	**3**		**3**	

Impact no.	Impact Assessment Parameter	Site 3	Description	Site 6	Description
V-IS-3	**Visibility** (viewshed analysis) AND Visual Exposure (How far is the activity from viewers)	3	Refer to viewshed map - high visibility for Rhino Reserve	2	Refer to viewshed map - low visibility for protected areas
	Visual Intrusion (how project fits environment)	2	No similar existing infrastructure	2	Some disturbance due to settlement already present
	Intensity / Magnitude (1-5) before mitigation	**4**		**3**	
V-IS-4	**Visibility** (viewshed analysis) AND Visual Exposure (How far is the activity from viewers)	2	Refer to viewshed map - radio mast main impact - site lighting only 4 m high	2	Refer to viewshed map - radio mast main impact - site lighting only 4 m high
	Visual Intrusion (how project fits environment)	2	No similar existing infrastructure	2	Some disturbance due to settlement already present
	Intensity / Magnitude (1-5) before mitigation	**3**		**3**	

The primary impact of both substation sites will be on the Manyoni Private Game Reserve (as sensitive receptor due to conservation land use). Due mainly to topography, the impact on the proposed Zimanga Private Reserve will be negligible.

Figure 11.6 to 11**.8** show visibility analyses (viewpoint to impact area) from the high points (**Figure 11.6**) in the MPGR, the roads of the MPGR (**Figure 11.7**), and scenic views (i.e. lodge locations) (**Figure 11.8**) to substation alternatives. This illustrates the preference for Iphiva 6, which is less visible than Iphiva 3.

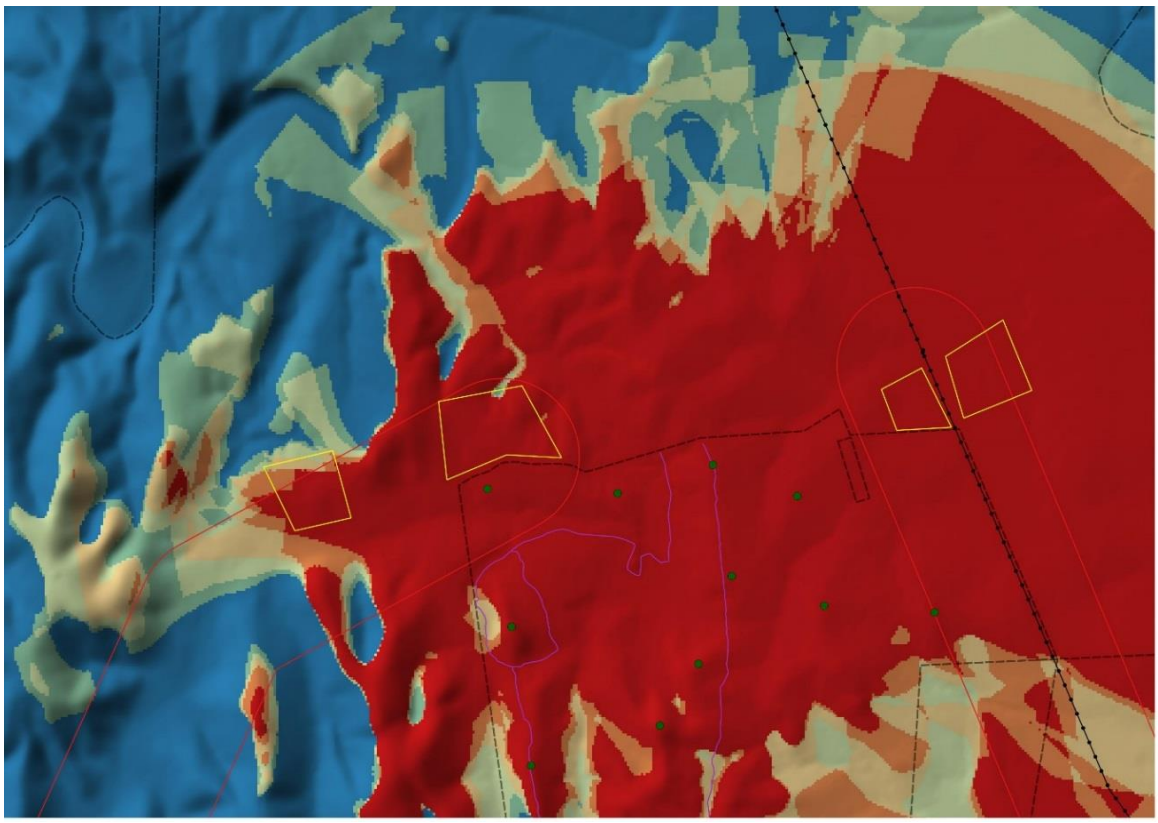


Figure 11-6: Visibility analysis from high points in MPGR to substation alternatives

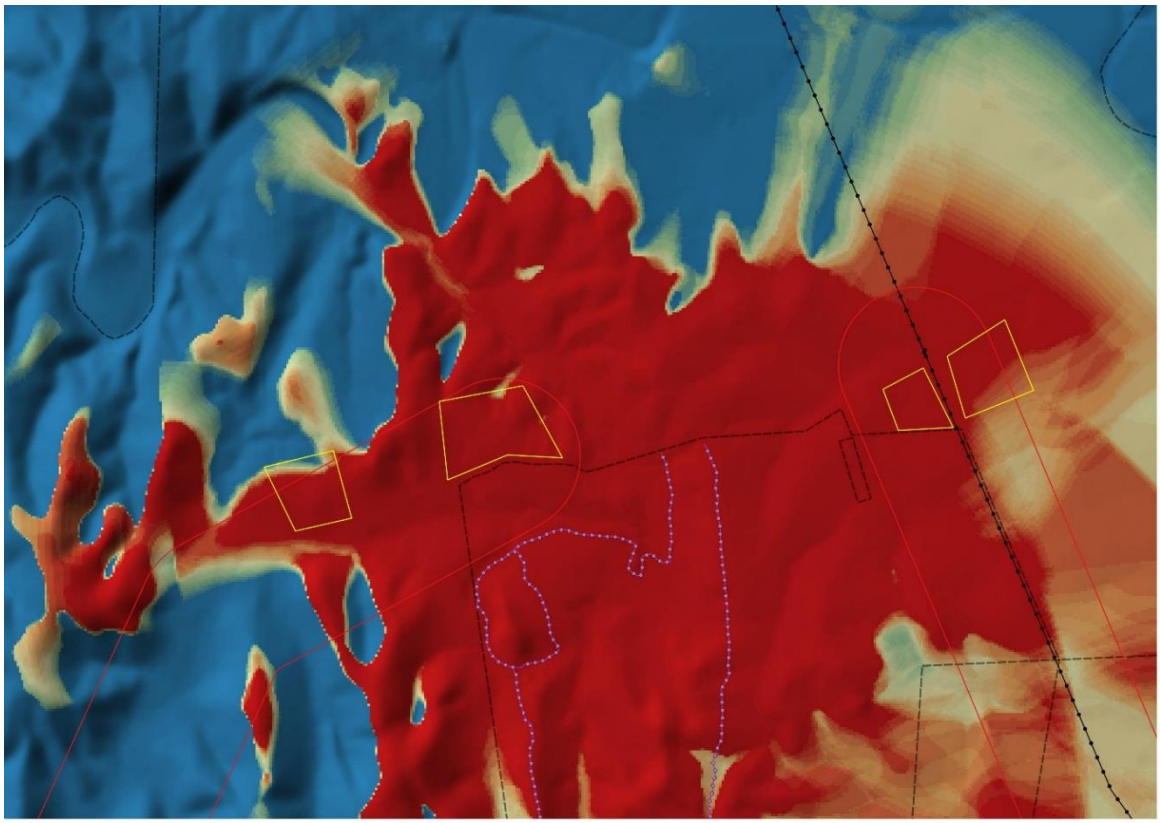


Figure 11-7: Visibility analysis from game drive roads in MPGR to substation alternatives

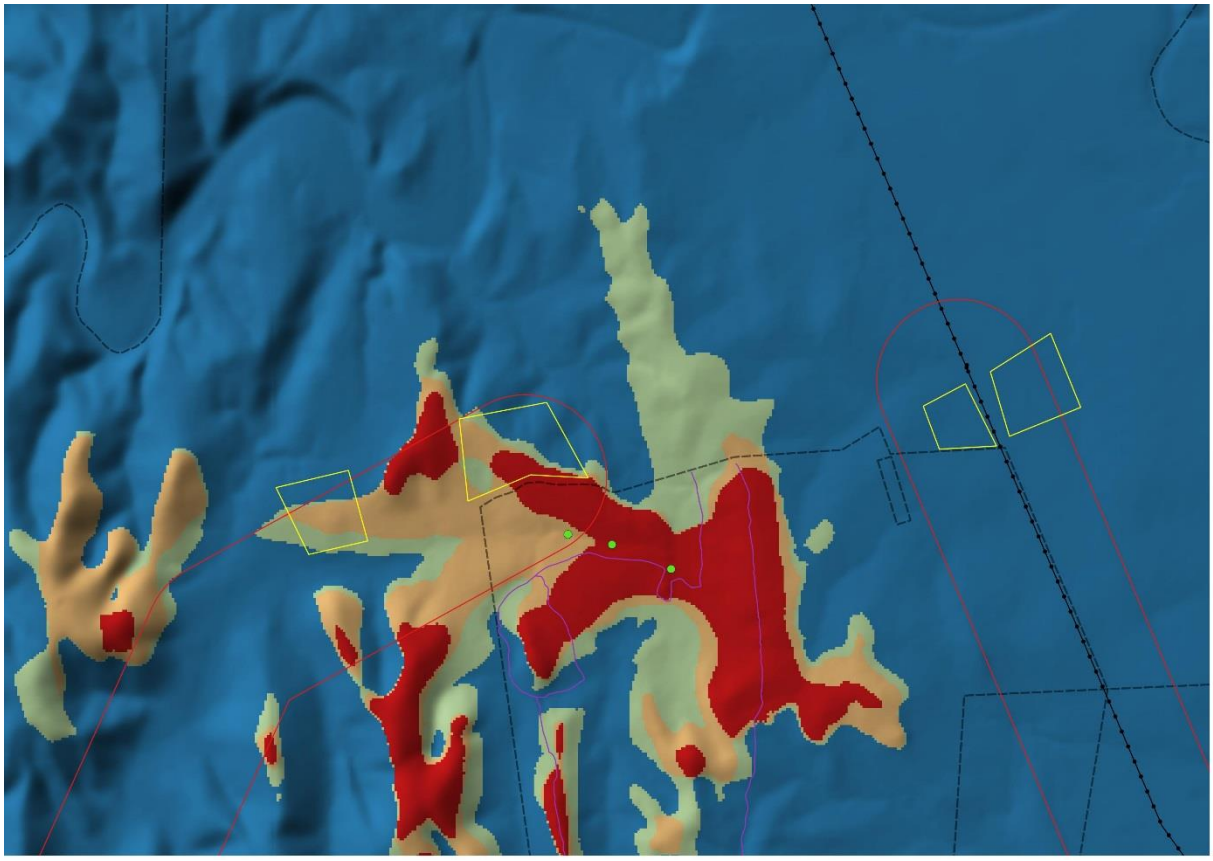


Figure 11-8: Visibility analysis from scenic points in MPGR to substation alternatives

11.8 ECONOMICS SPECIALIST STUDY

The economic assessment, with a focus on tourism, was be undertaken by Davis Dyason from TRADE that is part of the North West University.

The economy for the region entails a number of sectors. Tourism is not an economic sector in its own right, but is a complex and composite sector comprising mainly of the following sectors: accommodation, transportation, food and beverages, cultural and recreational activities. The activities undertaken by the tourist relate with the travel, destination, and entertainment activities and expenditure that tourists make. The tourism sector contributes approximately 6% to the value of economic activity for all goods and services produced within a geographical area for the regional economy. This is slightly higher than the national average. The total number of people employed in tourism amounts to approximately 4.6% of all employment within the regional economy. The tourism value of the region is estimated at R1.9 billion for the geographical area for 2016, and employment amounts to approximately 9 831 for the corresponding year.

In terms of locational theory, various land uses / economic activities reveal distinctly different location preferences (and sensitivities). In this context, the concept of highest and best use is important. In a free market society, on-going competition between different land uses is regulated by the market mechanism. Every site in the urban system has a highest and best economic use and equilibrium in the market will only be reached when the highest and best uses are allocated to a site. Tourism is a major role-player for the properties under consideration in the study area. This highest and best economic use is a function of physical and economic factors. Physical factors refer to the location of the site, the size thereof, visibility etc. Economic factors mainly refer to the productivity of the land use, including the return on investment and site rent achievable. The visual quality of the area has an economic value in that it enables the tourism activity to take place and as a result generate economic value.

Economic Impact Assessment

The agglomeration of eco- and nature-based tourism is high within this region and a large share of these establishments cater for the international tourism market and even state their tariffs in Euro and Dollar instead of South African Rand. The intensity of the economic impact for tourism activity will be different for each property/activity and depends on inter alia the:

- **Land use type** – property with tourism activity, such as game farming, lodges, protected areas and nature reserves should, as far possible, be eliminated from the preferred alignment.

- **Powerline route** – The route should be on the boundary of farms and not transcend properties diagonally or through the middle.
- **Size of the property** – A powerline that transcend properties diagonally or through the middle, for property smaller than 200 ha – tips an argument for expropriation.
- **Existing infrastructure** – Do not place powerlines over or in close proximity to tourism infrastructure.
- **Visibility of the new structure** - Place the powerlines / pylons and the substation in areas where it is not visible from tourism areas/hides/etc.
- **Market related compensation** for the affected property should be provided where the powerline is developed.
- Landowners should be **consulted** about their preferred configuration if their property is affected.

Once a servitude for the powerlines is finalised it will be possible to quantify the impact on individual property values. A registered property valuer should assess each individual affected property to determine the value impact, if any.

The impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value for game reserves/lodges/private game reserves within the regional economy is estimated to be approximately R6 303 per hectare for final sales. The alternatives where the negative economic impact is lowest is preferred.

Table 11.8: Summaries of the economic value of each corridor and site

	Alternatives	Total hectare within reserve/ lodge/ game farm	Economy-Wide Economic Value	Employment	Alternatives with lowest tourism value
Iphiva Substation	3	106	R 1 255 355	5	
	6	0	R 0	0	✓

11.9 GEOTECHNICAL

Drennan Maud (Pty) Ltd carried out a preliminary geotechnical investigation in May 2017.

Soil and rock sampling was undertaken in order to:

- Provide an indication of the near surface materials suitability for excavation and reuse in the proposed development as engineered fill in platforms as well as for use in road and pavement layer works.
- Identify potential problematic soil horizons

The materials have been classified in terms of their suitability for use in engineered fill in platforms and road construction (according to TRH 14-1985 and TRH 20-1990) on the basis of field observations and laboratory testing.

In general, the colluvium, hillwash, residual and completely to highly weathered bedrock classifies as “Soft Excavation” (after SANS 1200D-1988) below which ‘Boulder Excavation Class B” rapidly becoming “Hard Excavation” is to be expected for the weathered basalt and dolerite bedrock. At Iphiva 6, “Soft Excavation” can be inferred across the site to depths ranging between 1.00 and 1.50 m below current ground level.

Earthwork plans have not been provided in this preliminary stage; however, minor cutting / filling is envisioned (< 2-3 m). Eskom sites commonly require a 1.0 - 1.5 m capping of Engineered fill comprising G5 / G6 / G7 / G8 type material. Permanent batters of 1:2 (26°) are recommended for all cuts and fill slopes. Temporary cut slopes of limited height (< 3 m) may be steepened to 1:1 (45º). Founding of structures will be variable depending on structure type, loading and positioning due to the variable geology of the sites. The founding recommendations assume an upper 1.5 m good quality granular fill capping (G5 / G6 / G7 / G8 type) as commonly found at Eskom sites.

Small and lightly loaded structures can be founded using strip footings / pads / raft type foundations supported in the upper 1.5 m engineered fill capping. Shallow strip footing / column base pad foundations taken into bedrock are recommended where depth to bedrock is less than 1.5 m. Where thicker clayey soils overlie weathered bedrock, heavier and sensitive structures may require stiffened rafts or rafts / ground beams supported on piles to bedrock.

Iphiva 6 has shallow bedrock throughout (0.10-0.60 m) which is suitable for founding; however, this results in costly excavation issues for earthworks / service trenches.

Regarding material suitability, the active clayey colluvium/ hillwash and residual basalt horizons encountered across the sites are not considered suitable for use as engineered fill in

platforms or for use in road and pavement layerworks. The weathered basalt and dolerite bedrocks are considered suitable for use as engineered fill and layerworks; however, these materials are likely to be a thin horizon with limited volume.

The laboratory results reveal the colluvial and hillwash material encountered at **Iphiva 6.** Although the results classify the materials as having low to medium activity in terms of the Van der Merwe Classification, experience has shown these properties result in the material likely having moderate to high activity. As such, they will likely undergo volume change upon fluctuation of their natural moisture content (i.e. shrink when dry and expand when wet).

A review of Google Earth imagery reveals no dongas in the areas, providing a good indication that the subsoils are neither dispersive nor erodible to any significant degree. The upper colluvial / hillwash may be susceptible to minor erosion via wind and flowing water especially once the vegetation, the roots of which have a binding effect on the soil, are removed during development. As such erosion control should be accounted for both during and after development. Any exposed slopes, natural or unsupported cut / fill batters, must be adequately vegetated as soon as possible after construction.

No drainage lines / depressions / valleys / streams were observed within the footprints of the two candidate sites. However, the upper stiff to hard clays encountered on the sites, could become partially flooded with large areas of pooling water during periods of heavy or prolonged rainfall, as well as perched groundwater tables overlying less permeable clay horizons or along the soil / rock interface.

Prior to placement of new fills, the natural ground should be stripped of the upper organic topsoil and grubbed of any deleterious materials. Once trees have been removed from site, all roots must be removed to prevent rotting and subsequent settlement. The voids must be filled and compacted in 300 mm layers to a minimum of 95% of the materials maximum Mod AASHTO dry density prior to placement of the next layer. Cut and fill slopes should be adequately vegetated post-construction to reduce possible erosion. All cut and fills should be inspected by a Geotechnical professional to confirm stability.

Soak pits should not be used for stormwater or effluent disposal as the *in situ* stiff to hard clayey subsoils are likely to be insufficiently permeable for this purpose. All stormwater runoff must be strictly controlled during and after construction. It must be collected from paved and

roofed areas into surface drains to be discharged into the stormwater system ultimately approved for the proposed development. All ground surfaces should be graded after construction in order to prevent ponding and infiltration of surface water below founding level.

Founding conditions across Iphiva 6 are considered to be good due to the shallow dolerite bedrock across the site, shallow strip footing or pad foundations may be used. The foundations must be taken through all *in situ* soils and completely weathered dolerite to rest on hard pickable dolerite bedrock. Consideration could also be given to founding small and lightly loaded structures using strip footings / pads / raft type foundations supported in the upper 1.00 - 1.50 m good quality granular fill capping (G5/G6/G7/G8 type material).

The main geotechnical problems with Iphiva 6 include:

- The presence of hard dolerite bedrock which would require hard excavation (blasting) near surface (± 1.0 m below current ground level) makes excavations for earthworks cuts / service trenches below approximately 1.0 m costly. The negative effects of the shallow bedrock are also; however, minimised should a 1.0 to 1.5 m engineered fill (G5, G6, G7, G8) capping be placed as is common at Eskom sites.
- The lack of onsite suitable materials, i.e. although there is some G9 and G10 quality material there is no suitable G5 - G8 material. These materials will have to be imported or a crusher established to crush the dolerite bedrock.

Based on the foundations of structures alone, Iphiva 6 is marginally more favourable due to its shallower bedrock throughout (± 0.1 - 0.6 m); however as mentioned, this comes with costly excavation issues for earthworks / services.

12 ENVIRONMENTAL IMPACT STATEMENT

GNR 982 Appendix 3:

(1) (I) an environmental impact statement which contains—
(i) a summary of the key findings of the EIA:
(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred development footprint on the approved site as contemplated in the accepted scoping report indicating any areas that should be avoided, including buffers; and
(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

(n) the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;

(p) a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;

This application applies to the proposed new Iphiva 132/400 kV Substation that forms part of the larger project to strengthen and alleviate current and future network constraints in Northern KZN.

The following key issues have been identified:

- Impacts on areas protected by National and Provincial legislation resulting in loss of plants and animals of conservation value and a loss in the income from and value of the facilities, primarily due to visual impacts;
- Impacts on the rich and diverse fauna and flora (specifically large birds);
- Impacts on land use, particularly for sugar cane farmers and forestry;
- Impacts on Heritage Resources;
- Social impacts;
- Economic,
- Impacts on the biophysical environment resulting from access roads;
- Construction Impacts; and
- Cumulative impacts.

This EIA Report uses input from specialists to assess the key impacts, determine their significance, and recommend appropriate measures to mitigate negative impacts and enhance benefits. The specialist studies that have been undertaken are summarised in **Chapter 11**. A summary of the positive and negative impacts identified is included in **Chapter 10**. Aspects recommended to be included as conditions of the authorisation are listed in **Chapter 14** and mitigation measures recommended have been included in the Draft EMPr.

An extensive PPP that complies with the requirements of GN 982 has been undertaken and is documented in **Chapter 7** with substantiation in **Appendix C**.

The no-project alternative, i.e. without this substation, Eskom Distribution will have to implement localised rotational load shedding in order to avert a 132 kV system voltage collapse from as early as 2019. This will impact 40 000 customers.

Two possible sites for the substation, Iphiva 3 and Iphiva 6 were comparatively assessed. All specialists recommended that the project is authorised and that Iphiva 6 is the preferred site.

One of the key issues that landowners affected by the proposed project have raised is the impact on the eco-tourism activities and knock-on effects including decline in property values, loss of jobs, reduced budgets for conservation of animals, primarily resulting from the visual impact of the project. Interaction with the landowners highlighted that the project could be opposed should this aspect not be adequately addressed. The inclusion of a more detailed economic assessment of the impacts on tourism was therefore commissioned.

The primary visual impact of both substation sites will be on the Manyoni Private Game Reserve (as sensitive receptor due to conservation land use). Due mainly to topography, the impact on the proposed Zimanga Private Reserve will be negligible.

The visibility analyses (viewpoint to impact area) from the high points in the MPGR, the roads of the MPGR, and scenic views (i.e. lodge locations) to substation alternatives. This illustrates the preference for Iphiva 6, which is less visible than Iphiva 3.

The economic specialist found that the development of the substation site will be a significant investment for and have a positive impact on the economy. This is related to the construction and maintenance of the infrastructure as well as positive spin-off impact due to increased electricity supply. Investment costs were estimated to be in the order of R 1.2 billion.

The impact on tourism activity is in most cases higher than other land uses and varies between -5% and -30% of the existing property value and production level. The tourism value for game reserves/lodges/private game reserves within the regional economy is estimated to be approximately R6 303 per hectare for final sales.

The economic specialist found that the construction and operation of the Iphiva 3 Substation will have a high negative significant impact after mitigation on property value of the site while it will be low for Iphiva 6. The significance of the impact on adjacent properties is Medium-High for both sites. The reduction in the economic value of the regional economy as a result of a reduction in tourism activities and future expansion/investment in tourism activity may also be impacted due to the loss in productive land and is expected to be High for Iphiva 3 and Low for Iphiva 6.

The economic specialist therefore also recommended that Iphiva 6 be implemented, and in order to achieve the lowest possible negative economic impact a suitable location for the substation on Iphiva 6 should be found where the visual impact is as low as possible for the surrounding areas. This exact location will also have to take the technical viability of the topography, the possible relocation of dwellings and impacts on wetlands into account.

13 CONDITIONS TO BE INCLUDED IN THE ENVIRONMENTAL AUTHORISATION

GN 982 Appendix 3:

(m) based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as **conditions** of authorisation;

(o) any 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;

(q) 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 following conditions should be included in the Environmental Authorisation:

- Search and rescue of plant and animals (including bird) species of special concern on the footprint of the substation site prior to construction;
- Social mitigation and monitoring measures should be adhered to;
- Appoint a Community Liaison Officer;
- Have a grievance mechanism in place;
- Have a relocation and compensation policy according to international best practice;
- Appoint a relocation specialist if relocation is required;
- Construction camps should be established according to international best practice;
- a Fossil Chance Find Procedure must be included in the final EMPr;
- Any water use must be authorised by the DWS.

14 ASSUMPTIONS, LIMITATIONS AND GAPS

GN 982 Appendix 3:

(p) a description of **any assumptions, uncertainties and gaps** in knowledge which relate to the assessment and mitigation measures proposed;

The objective of this assessment was to obtain authorisation for a site on which Eskom can design and construct a new 132/400 kV Substation near Mkuze. The site is approximately 1 km^2. The footprint of the substation will be approximately 400 m by 400 m. This gives Eskom the freedom to accommodate some property specific requests from landowners to avoid local impacts.

This approach to the impact assessment and its role and stage in the project implementation process results in the exact footprint of the development not being known at this stage. This causes some difficulties with a strict interpretation of the EIA Regulations.

A combined process, specifically for public participation and specialist studies was undertaken for this application and the three applications for the powerlines that will link into the substation. The specialists did, however, pay closer attention to the substation sites than the powerline corridors and these were included in all of the field work (except for wetlands).

Each specialist lists their assumptions, uncertainties and gaps in knowledge in their specialist study reports (**Appendix D to K**) as detailed below.

The following assumptions and limitations were relevant for the **Social Specialist Study**:

1. Not every individual in the community could be interviewed therefore only key people in the community were approached for discussion. Due to the size of the study area and limitations in terms of budget, not all key people could be interviewed, but rather a representative sample of key people. These key people include directly affected landowners and traditional authorities. Additional information was obtained using existing data.
2. The social environment constantly changes and adapts to change, and external factors outside the scope of the project can offset social changes, for example changes in local political leadership, droughts or economic conditions. It is therefore difficult to predict all impacts to a high level of accuracy, although care has been taken to identify and address the most likely impacts in the most appropriate way for the current local

context within the limitations. In addition, it is also important to manage social impacts for the life of the project, especially in the light of the changing social environment.

3. Social impacts can be felt on an actual or perceptual level, and therefore it is not always straightforward to measure the impacts in a quantitative manner.
4. Social impacts commence when the project enters the public domain. Some of these impacts will occur irrespective of whether the project continues or not, and other impacts have already started. These impacts are difficult to mitigate and some would require immediate action to minimise the risk.
5. There are different groups with different interests in the community, and what one group may experience as a positive social impact, another group may experience as a negative impact. This duality will be pointed out in the impact assessment phase of the report.
6. Social impacts are not site-specific, but take place in the communities surrounding the proposed development.
7. It is assumed that Eskom would appoint a relocation specialist, or has an in-house relocation specialist that will manage this process if required.
8. The impact tables and ratings are designed for the natural environmental sciences and it must be noted that it is not always possible to compartmentalise the social impacts. For the sake of consistency this has been attempted, but it is not innate to social sciences. Allowance for the changing and adaptive nature of social impacts should be made when interpreting the impact tables. Another consideration is that the management and mitigation of some social impacts require input from a number of agencies, as these can only be addressed within the greater societal context. Proper mitigation and management would also take a number of years – this period would go far beyond the construction phase of the project. The focus of this report will therefore be on project-specific mitigation.

The following assumptions, uncertainties and gaps were experienced during the **Soil and Agricultural Potential Specialist Study**:

- The soil classification of the land types was done on a 1:250 000 scale.

The following constraints and limitations were experienced during the compilation of the **Heritage Specialist Study**:

- The assessment constitutes a high-level screening to identify the potential impacts to heritage resources that may occur within the approved development footprint. Therefore,

this report does not present an exhaustive list of tangible heritage resources that may be impacted upon;

- The development footprint of the various infrastructures will be finalised upon selection and authorisation of the preferred options. To this effect, a detailed impact assessment could not be completed in this report, and will be required as a condition of authorisation;
- Considering the nature of the Project, the extent of the routing options, and scope of work, the field survey was predominantly undertaken as a vehicular survey;
- While every effort was made to cover the extent of the various routing options, access to portions of various routing options was restricted by topography and/or landowners;
- Whilst every attempt to obtain the latest available information was made, the reviewed literature does not represent an exhaustive list of information sources for the various study areas;
- Results from the previously completed heritage studies were not subject to an assessment of CS or verified during the field survey.

The **fauna and flora study** was completed during the rainy season of KZN, and as such during 3 of the 7 days on site field work was hampered by rain, flooded river crossings and low visibility.

- The assessment constitutes a high-level screening to identify the potential impacts to the natural biological resources (plants, flora, mammals, amphibians, reptiles and invertebrates) that may occur within the approved corridors and development footprints. This report is not a reflection of the fauna and flora currently present in the development footprints as can be reported upon thorough detailed infield investigations;
- The development footprint of the various infrastructures will be finalised upon selection and authorisation of the preferred options. To this effect, a detailed impact assessment could not be completed in this report, and will be required as a condition of authorisation;
- Considering the nature of the Project, the extent of the routing options, and scope of work, the field survey was predominantly undertaken as a vehicular survey, except with regards to the substations and distribution line alternatives;
- While every effort was made to cover the extent of the various routing options, access to portions of various routing options was restricted by topography and landowners; and
- Whilst every attempt to obtain the latest available information was made, the reviewed literature does not represent an exhaustive list of information sources for the various study areas.

The **avifaunal specialist study** was completed during the rainy season (November) of KZN, and as such during 3 of the 7 days on site field work was hampered by rain, flooded river crossings and low visibility.

- The assessment constitutes a high-level screening to identify the potential impacts to avifauna that may be present within the approved corridors and development footprints. This report is not a reflection of the avifauna currently present in the development footprints as can be reported upon thorough detailed infield investigations;
- The development footprint of the various infrastructures will be finalised upon selection and authorisation of the preferred options. To this effect, a detailed impact assessment could not be completed in this report, and will be required as a condition of authorisation;
- Considering the nature of the project, the extent of the routing options, and scope of work, the field survey was predominantly undertaken as a vehicular survey, except with regards to the substations and distribution line alternatives;
- While every effort was made to cover the extent of the various routing options, access to portions of various routing options was restricted by topography and landowners; and
- Whilst every attempt to obtain the latest available information was made, the reviewed literature does not represent an exhaustive list of information sources for the various study areas.

The following assumptions and limitations were experienced during the compilation of the **Wetland Specialist Study**.

- Desktop delineations are based on the available contour and topographic data, as well as detailed aerial imagery to provide an indication of the potential extent of the wetland areas likely to be present;
- Due to the extent of the corridor options under consideration, only limited in-field verification (a 4-day field assessment undertaken in 2017) of these systems could take place, thus, these desktop delineations must be considered only as a guideline towards the decision-making process in terms of selection of the preferred powerline corridor route;
- Optimal placement of the powerline within the selected proposed corridor routes will require careful planning and consideration so as to minimise impacts;
- With ecology being dynamic and complex, as well as a result of restricted access to portions of the Project area and extremely limited time for field verification, certain aspects, some of which may be important, may have been overlooked. However, as far as possible, it is expected that the Project area has been accurately assessed and considered, based

on the limited field observations undertaken and the consideration of historical and existing studies and the desktop data available.

The following limitations and assumptions are applicable to the **Visual Specialist Study**:

- Determining a visual resource in absolute terms is not achievable. It is a complex procedure since it is determined through a combination of quantitative (visibility) and qualitative (aesthetic value) criteria. Therefore, a VIA cannot be entirely objective in this sense. Individuals will evaluate a landscape differently, based on experience, culture and social background.
- Various factors can enhance or reduce the visual impact of the proposed project, for instance, vegetation near a receptor's view of the proposed project. Other factors include weather, climatic conditions and seasonal change. It is therefore difficult to determine the visual impact of the proposed project from the viewpoint of each individual receptor.
- The layouts and technical designs provided are conceptual. Therefore, the possibility of adaption exists. Should there be any significant changes in the designs of the proposed infrastructure, these changes may have to be re-assessed.
- The exact position for construction camps and laydown areas are not available at this stage therefore related detailed viewpoints towards the proposed impact cannot be determined.
- Final design decisions on pylon structures has not yet been made, as the detail engineering stage of the project is not yet underway. The accuracy of visual impact of the powerlines is therefore limited in this regard.
- As the exact location of the powerlines within each corridor have not yet been fixed, where the proposed powerline crosses a series of ridges, they should be positioned in such a manner that it runs parallel with the lowest lying area therefore higher lying ridges on both sides will form a natural visual buffer.
- Tourism livelihood are in some instances attached to large undeveloped tracts of land with high visual resource value, such as nature reserves. An assessment of tourism value has been undertaken as part of **Appendix K**: Economics Specialist Study, and therefore not addressed here.
- Access to certain viewpoints on IAPs' properties could not be gained (due to unavailability of these persons). Photos could therefore not be taken, despite the project team's requests to the land-owner to gain such access.

- Visual assessment from the locations of tourism points of interest such as lodges can only be made from existing facilities, with proven dependence on the natural landscape as visual resource. Proposed locations of lodge sites was not assessed.
- Visual simulations were not undertaken in this study.

The following assumptions applied to the economic specialist study:

- The study area is considered as the final destination of the tourist (this implies that if the tourism activities is lost the tourist will have to consider another area outside of the study area – this results in a loss in economic value for the region) – direct impact.
- Tourists have additional expenditure that is not within the region, however it is still a benefit for the national economy that should be considered – indirect impact.
- The value per hectare is an average for the area – differences in this value between low and high season can be expected. The value will also be different between private games reserves, national and provincial nature reserves and other forms of tourism activity.
- The employment level is based on the data received by Manyoni Private Game Reserve and Stats SA.

The EAP and specialists are confident that, despite the assumptions and limitations, sufficient information exists to make an informed and motivated recommendation on whether the project should be authorisation or not, and on which if authorised, then which alternative presents the Best Practical Environmental Option and which Conditions should be included in the Authorisation.

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