PROJECT DETAILS

DEAT Reference No.	:	12/12/20/1187
Title	:	Environmental Impact Assessment Process Draft Scoping Report for the Proposed Mokopane Integration Project Limpopo Province: Proposed Mokopane Substation and Turn-in Lines
Authors	:	Savannah Environmental (Pty) Ltd Jo-Anne Thomas Karen Jodas John von Mayer
Sub-consultants	:	Bathusi Environmental Consultants Endangered Wildlife Trust (EWT) Julius Pistorius MetroGIS MasterQ ILISO Consulting
Client	:	Eskom Holdings Limited (Eskom Transmission)
Report Status	:	Draft Scoping Report for public review
Review Period	:	15 September – 15 October 2008

When used as a reference this report should be cited as: Savannah Environmental (2008) Draft Scoping Report for the Proposed Mokopane Integration Project, Limpopo Province: Mokopane Substation and Turn-in Lines

PURPOSE OF THE DRAFT SCOPING REPORT

In order to evacuate the power from the new Medupi Power Station (near Lephalale), to support the upsurge in demand for the platinum group metals in the Mokopane area, and to improve the reliability of electricity supply to the Polokwane area, Eskom Transmission is proposing the introduction of the Mokopane Integration project. This project includes the construction of the following components:

- A **new transmission substation** on a site near Mokopane.
- **Two 400 kV transmission power lines** in parallel looping in and out of one of the existing Matimba-Witkop 400kV transmission lines (i.e. two lines in parallel for a distance of up to 10 km) in order to integrate the new substation into the transmission system.
- **Two new 765 kV transmission power lines in parallel** between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:
  - A new 765kV transmission power line between the Delta Substation and the new Mokopane Substation (a distance of approximately 150 km); and
  - a new 765kV transmission power line between the new Mokopane Substation and the Witkop Substation (a distance of approximately 60 km).
  - A new 765kV transmission power line between Delta Substation and the Witkop Substation (a distance of approximately 200 km).
- **Associated works** to integrate the new transmission power lines and substation into the Transmission grid (such as access roads, communication tower, etc) and accommodate the new lines at existing substations (such as the construction of new feeder bays within the existing Witkop substation site).

As two applications were submitted to DEAT for this proposed project, two separate reports have been compiled by Savannah Environmental:

- The **nature and extent of the proposed substation and turn-in lines and the extension of the Witkop Substation**, as well as potential environmental impacts associated with its construction, operation and decommissioning are **evaluated in this Draft Scoping Report (Reference Number 12/12/20/1187)**.
- The **nature and extent of the proposed 765kV transmission power lines**, as well as potential environmental impacts associated with its construction, operation and decommissioning are **evaluated in a separate Draft Scoping Report (Reference Number 12/12/20/1140)**.

Eskom has appointed Savannah Environmental, as independent environmental consultants, to undertake the EIA. The EIA process is being undertaken in accordance with the requirements of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Draft Scoping Report represents the outcome of the Scoping Phase of the EIA process and contains the following sections:

» **Chapter 1** provides background to and need for the proposed Mokopane Integration project and the environmental impact assessment process
» **Chapter 2** provides an overview of the proposed project and the process followed in identifying reasonable and feasible alternatives
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the EIA process
» **Chapter 4** provides a description of the environment which may be potentially affected by the proposed project
» **Chapter 5** provides an evaluation of the potential issues associated with the proposed project
» **Chapter 6** presents the conclusions and recommendations of the Scoping Study
» **Chapter 7** describes the Plan of Study for the EIA and outlines the process and tasks of the Environmental Impact Assessment phase of the proposed project.

In accordance with the EIA Regulations, a primary purpose of the Draft Scoping Report is to provide stakeholders with an opportunity to verify that the issues they have raised to date have been captured and adequately considered within the study, and to raise any additional key issues for consideration. The Final Scoping Report will incorporate all issues and responses prior to submission to the National Department of Environmental Affairs and Tourism (DEAT), the decision-making authority for the project.

PUBLIC REVIEW OF THE DRAFT SCOPING REPORT

The Draft Scoping Report has been made available for public review at the following public places in the project area from **15 September to 15 October 2008** at the following locations:

Lephalale Library – corner of Joe Slovo and Douwater Street	Agri Lephalale Offices – 6A Jacobus Street
Marken Farmers Hall	Vaalwater Agric Association – NTK Building, Meule Street
Waterberg District Municipality Offices, Modimolle	Potgietersrus DLU, Mokopane

Polokwane Municipality – Environmental Management Office	Polokwane Library – Hans van Rensburg Street
www.eskom.co.za/eia	www.savannahSA.com

Copies of the draft report will also be made available to the Lephalale Local Municipality and the Mogalakwena Municipality. Affected parties and stakeholders will also receive CDs containing the report, on request. The Executive Summary is also available in Sepedi and Afrikaans.

Please submit your comments to
Bhavani Daya at ILISO consulting P O Box 68735, Highveld, 0169 Tel: (012) 665 3602 Fax: (012) 665 1886 E-mail: bhavani@iliso.com
The due date for comments on the Draft Scoping Report is **15 October 2008**

Comments can be made as written submission via fax, post or e-mail.

SUMMARY

Background and Project Overview

Eskom, as the primary supplier of electricity in South Africa, is currently responding to the growing electricity demand and predicted future demand within South Africa through the establishment of new generation and transmission capacity in South Africa.

Eskom uses a modelling tool called Integrated Strategic Electricity Planning (ISEP) to plan its future capacity strategy. By analysing usage patterns and growth trends in the economy, and matching these with the performance features of various generation technologies and demand side management options, ISEP identifies the timing, quantity and type (base load or peaking) of new generation capacity options required in the long-term (i.e. over the next 15 – 20 years). These options include the return-to-service of the three mothballed coal-fired Simunye Power Stations (i.e. Camden, Komati and Grootvlei), the establishment of new coal fired power plants, pumped storage schemes, gas-fired power plants, nuclear plants, renewable energy technologies (mainly wind and solar projects), and import options within the Southern African Power Pool. As the older Eskom power plants reach the end of their design life from approximately 2025 onwards, the use of all available technologies will need to be exploited to replace these in order to supply the country's growing electricity demand.

As part of its capacity expansion programme, Eskom is currently constructing the new Medupi coal-fired power station, in the Lephalale area of the Limpopo Province. In order to integrate this power station into the electricity transmission grid, Eskom Transmission is considering linkages to various points within the electricity transmission system. In order to support the upsurge in demand for the platinum group metals in the Mokopane area, and to improve the reliability of electricity supply to the Polokwane area, Eskom Transmission is proposing the introduction of the Mokopane Integration project. This proposed project includes the construction of the following:

» A **new transmission substation** on a site near Mokopane.
» **Two 400 kV transmission power lines** in parallel looping in and out of one of the existing Matimba-Witkop 400kV transmission lines (i.e. two lines in parallel for a distance of up to 10 km) in order to integrate the new substation into the transmission system.
» **Two new 765 kV transmission power lines in parallel** between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:

- A new 765kV transmission power line between the Delta Substation and the new Mokopane Substation (a distance of approximately 150 km); and
- a new 765kV transmission power line between the new Mokopane Substation and the Witkop Substation (a distance of approximately 60 km).
- A new 765kV transmission power line between Delta Substation and the Witkop Substation (a distance of approximately 200 km).

» **Associated works** to integrate the new transmission power lines and substation into the Transmission grid (such as access roads, communication tower, etc) and accommodate the new lines at existing substations (such as the construction of new feeder bays within the existing Witkop substation site).

Currently the existing Witkop substation close to Polokwane is the only nodal point within the broader Polokwane area that supports the Platinum group metals' load growth and the associated electricity demand. The load forecast for this group indicated a load shift towards the Mokopane area, which cannot be supplied from the Witkop substation alone as a result of thermal, voltage stability and spatial constraints.

As two separate applications were submitted to DEAT for this proposed project, two separate reports have been compiled by Savannah Environmental:

» The **nature and extent of the proposed substation and turn-in lines and the extension of the Witkop Substation**, as well as potential environmental impacts associated with its construction, operation and decommissioning are **evaluated in this Draft Scoping Report (Reference Number 12/12/20/1187)**.

» The **nature and extent of the proposed 765kV transmission power lines**, as well as potential environmental impacts associated with its construction, operation and decommissioning are **evaluated in a separate Draft Scoping Report (Reference Number 12/12/20/1140)**.

Four technically feasible alternative substation sites have been identified for investigation within the EIA process (refer to Figure 1). The four options are situated north of Mokopane on the farms Doornfontein 721 LS (Option 1), Aronsfontein 722 LS (Option 2), Zuidholland 773 LS (Option 3) and Noord Braband 774 LS (Option 4). The proposed sites are all located in close proximity to the Matimba-Witkop 400kV transmission lines in order to allow for turn-in line infrastructure from these lines into the new Mokopane Substation.

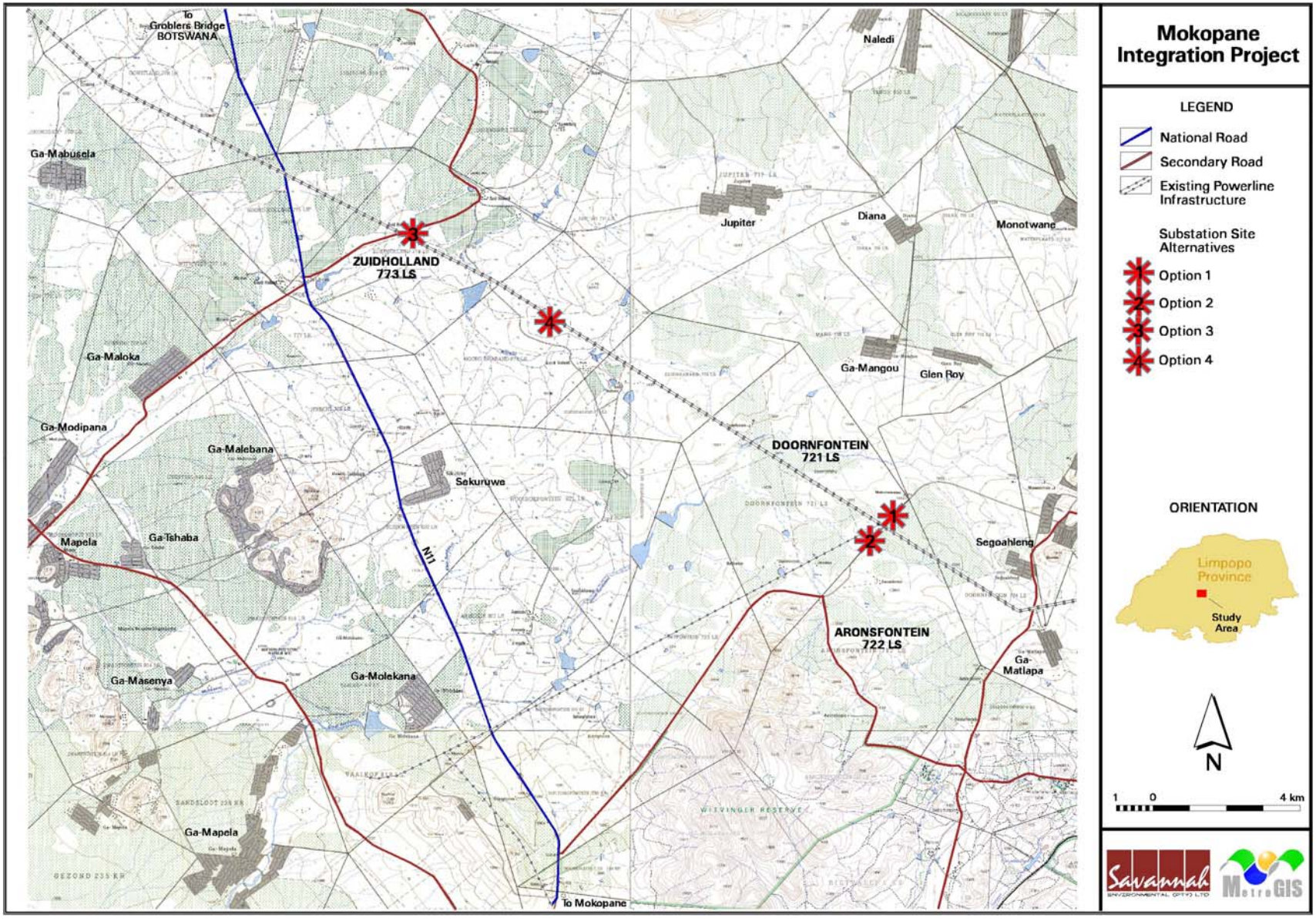

Figure 1: Map showing the alternate substation sites identified for consideration in the EIA process

Environmental Impact Assessment

The proposed Mokopane Integration Project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in GN 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). In terms of sections 24 and 24D of NEMA, as read with GNs R385 (Regulations 27–36) and R387, a Scoping and EIA are required to be undertaken for this proposed project.

The National Department of Environmental Affairs and Tourism (DEAT) is the competent authority for this project as Eskom is a statutory body. An application for authorisation has been accepted by DEAT (under Application Reference number 12/12/20/1187). Through the decision-making process, DEAT will be supported by the Limpopo Department of Economic Development, Environment and Tourism (DEDET) as the commenting authority.

The scoping phase for the proposed project forms part of the EIA process and has been undertaken in accordance with the EIA Regulations. This Draft Scoping Report aimed to identify potential issues associated with the proposed project, and define the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs).

A comprehensive public participation process was undertaken in accordance with Regulation 56 of Government Notice No R385 of 2006 during the Scoping phase of this EIA process. This public participation process comprised the following:

- **Notification of the EIA Process** in local and regional newspapers and on site, as well as through written notification to identified stakeholders and identified affected landowners
- **Identification and registration** of I&APs and key stakeholders.
- Compilation and distribution of a **Background Information Document** (BID) to all identified I&APs and key stakeholders
- **On-going consultation** with identified I&APs and stakeholders
- Compilation and maintenance of a **database** containing the names and addresses of all identified I&APs and key stakeholders
- Preparation of a **Comments and Response Report** detailing key issues raised by I&APs as part of the EIA Process.

Evaluation of the Proposed Mokopane Substation and Turn-in Lines forming part of the Mokopane Integration Project

A specialist workshop was held on 1 August 2008, with a suite of specialists from Eskom and the EIA team[1] in attendance. The conclusions of each of the specialist studies that were conducted for the project were discussed and an overall recommendation made regarding the preferred substation sites for further investigation. In summary, the following conclusions can be drawn regarding preferred substation options for further investigation in the EIA phase:

» **Substation Site Option 3** is regarded the most preferable of the four options from an ecological perspective, **followed by Option 4**.
» From an avifauna perspective **Substation Site Option 1** is preferred. The other site alternatives are considered acceptable provided that appropriate mitigation is implemented on the turn-in lines.
» From a visual impact perspective the preferred option for the construction of the Mokopane substation, due to its relatively remote location, is **Option 4**.
» From a social perspective:

* To avoid potential negative impacts on health and safety and of displacement of people as a result of changes in current and future settlement patterns that may be affected by the proposed sites, the preferred site is identified as **Site Option 4**.
* To avoid potential negative impacts on agricultural activities as a result of the proposed transmission power line, the preferred sites are **site Options 3 and 4**.
* It was not expected that the changes and potential impacts due to the influx of job seekers and workers would differ significantly between the alternative proposed sites, and a preferred site is therefore not be selected considering demographic change processes.
* Considering the potential economic impact of the site, **site Option 4** is preferred. This recommendation was based on the potential visual impact.
* Considering institutional processes and the potential burden on the municipality, **site Option 3** is preferred because of its shorter distance from settlements and the N11, followed by **site Options 2 and 3**.
* Considering the potential socio-cultural impacts, site Option 3 is closest to settlements, followed by sites

[1] Workshop attendants included Jo-Anne Thomas, Karen Jodas, John von Mayer, Lourens du Plessis, Anita Bron, Megan Diamond, Julius Pistorius, Bhavani Daya and Karin Bowler of the EIA team.

1 and 2. **Site Option 4** is the preferred site.

It is clear from the above that Site Option 2 is not preferred in terms of most of the issues evaluated. From a technical perspective, substation site Option 2 is not considered as a preferred site due to a watercourse partly traversing the site, as well as the presence of a rock outcrop. This option is therefore ruled out as an option for further investigation.

From an integration of the findings of the specialist studies, as well as from the conclusions and recommendations of the specialist workshop, **Site Option 4 (Noord Braband) and Site Option 3 (Zuid Holland) are nominated as preferred alternatives**. These alternatives will be investigated in further detailed within the EIA phase of the EIA process.

Conclusions and Recommendations

The majority of potential impacts identified to be associated with the construction and operation of the proposed substation are anticipated to be localised and restricted to the proposed Mokopane Substation site.
No environmental fatal flaws were identified to be associated with any if the substation options, although a number of issues (associated with the substation and associated infrastructure) requiring further study have been highlighted. In order to address these issues, the following studies are required to be undertaken as part of the EIA phase of the process:

» A detailed ecological survey of the substation sites in order to establish the likelihood of any flora and/or fauna species of concern occurring on this site.
» A detailed survey of the proposed substation site in order to assess the potential impacts of the proposed project on avifauna and to recommend appropriate mitigation measures for significant impacts, where required.
» An agricultural potential survey of the site in order to determine the soil types and agricultural potential of the site.
» A visual impact assessment in order to determine the specific visual impact within identified exposed areas. The visual impact assessment within the EIA will address other crucial issues related to the visibility of the substation in order to quantify the actual visual impact and to identify areas of perceived impact.
» A Phase 1 archaeological survey in accordance with the requirements of Section 38(3) of the National Heritage Resources Act (Act No 25 of 1999).
» A Socio-Economic Impact Assessment in order to address identified information gaps and assess the significance of potential impacts on the socio-economic environment (including land use and tourism potential) as a result of the construction

and operation of the proposed substation.

» Development of appropriate and practical mitigation and management measures for potentially significant environmental impacts for inclusion in the project EMP.

Studies and/or specialist processes which are required to be undertaken outside of the EIA process include:

» An assessment of the potential impacts of climate and atmospheric conditions (e.g. potential impacts associated with lightening, precipitation and pollution levels) on the proposed transmission infrastructure, in order to provide an indication of what conditions are required to be accounted for by the design team to extend the life and reliability of the new infrastructure.

» A detailed geotechnical survey of the proposed substation site and turn-in power line alignments (once determined) in order to fully understand the soils in terms of founding conditions and erosion potential. This information is required to be used as part of the planning and design phase of the Mokopane Substation and turn-in lines.

TABLE OF CONTENTS

PAGE

APPENDICES

ABBREVIATIONS AND ACRONYMS

AC	Alternating Current
BID	Background Information Document
CAA	Civil Aviation Authority
DEAT	National Department of Environmental Affairs and Tourism
DEDET	Limpopo Department of Economic Development, Environment and Tourism
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EWT	Endangered Wildlife Trust
GDP	Gross Domestic Product
GG	Government Gazette
GGP	Gross Geographical Product
GN	Government Notice
GPS	Geographic Positioning System
HIV	Human Immuno-deficiency virus
I&AP	Interested and Affected Party
ICNIRP	International Commission for Non-Ionising Radiation Protection
IDP	Integrated Development Plan
kV	Kilovolt
LED	Local Economic Development
LIHRA	Limpopo Heritage Resources Agency
LP	Limpopo Province
LPGDS	Limpopo Provincial Growth and Development Strategy
MW	Mega Watt
NEMA	National Environmental Management Act (No 107 of 1998)
NHRA	National Heritage Resources Act (No 25 of 1999)
OHS	Occupational Health and Safety
SAHRA	South African Heritage Resources Agency
SDF	Spatial Development Framework
SEIA	Socio-economic Impact Assessment
SIA	Social Impact Assessment
STD	Sexually Transmitted Disease
UNESCO	United Nations' Education, Scientific and Cultural Organisation
WDM	Waterberg District Municipality
WHO	World Health Organisation

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

Do nothing alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Environment: the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management plan: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 2000).

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and Affected Party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

INTRODUCTION CHAPTER 1

In order to evacuate the power from the new Medupi Power Station (near Lephalale), to support the upsurge in demand for the Platinum group metals in the Mokopane area, and to improve the reliability of electricity supply to the Polokwane area, Eskom Transmission (a division of Eskom Holdings Limited) is proposing the introduction of the Mokopane Integration project. This project includes the construction of the following components:

» A **new transmission substation** on a site near Mokopane.
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  * A new 765kV transmission power line between Delta Substation and the Witkop Substation (a distance of approximately 200 km).
» **Associated infrastructure** to integrate the new transmission power lines and substation into the Transmission grid (such as access roads, communication tower, etc) and accommodate the new lines at existing substations (such as the construction of new feeder bays within the existing Witkop substation site).

As **two separate applications** were submitted to DEAT for this proposed project, two separate reports have been compiled by Savannah Environmental:

» The **nature and extent of the proposed substation and turn-in lines and the extension of the Witkop Substation**, as well as potential environmental impacts associated with its construction, operation and decommissioning are **evaluated in this Draft Scoping Report (DEAT Reference Number 12/12/20/1187)**.
» The **nature and extent of the proposed 765kV transmission power lines**, as well as potential environmental impacts associated with its construction, operation and decommissioning are **evaluated in a separate Draft Scoping Report (DEAT Reference Number 12/12/20/1140)**.

1.1. Project Overview and Purpose

Eskom Holdings Ltd is responsible for the provision of reliable and affordable power to its consumers in South Africa. Electricity cannot be stored and therefore must be used as it is generated. Electricity is generated in accordance with supply-demand requirements. In South Africa, thousands of kilometres of high voltage transmission lines (i.e. 765kV or 400kV transmission lines) transmit this power, which is mainly generated at the power stations located within Mpumalanga and Limpopo provinces, to Eskom's major substations. At these major substations, the voltage is reduced, and distributed to smaller substations all over the country through distribution lines (i.e. 132kV, 88kV or 66kV distribution power lines). Here the voltage is reduced and distributed to local substations, which distribute the power via numerous small lines (i.e. 22kV and 11kV distribution power lines) to local users. The power generated by Eskom can only be utilised from those points of supply which transform the power into a usable voltage.

If Eskom Transmission is to meet its mandate and commitment to supply the ever-increasing needs of end-users, it has to plan, establish and expand its infrastructure of transmission power lines on an on-going basis, in support of the generation processes. It is vital that transmission capacity keeps up with both electricity generation capacity and electricity demand.

Currently the existing Witkop substation close to Polokwane is the only nodal point within the broader Polokwane area that supports the platinum group metals' load growth and need for electricity. The load forecast for this mining group indicated a load shift towards the Mokopane area, which cannot be supplied from the Witkop substation alone as a result of thermal, voltage stability and spatial constraints. Eskom Transmission is therefore proposing the construction of the following:

» A new transmission substation on a site near Mokopane.
» Integration of the new substation into the transmission system by looping in and out of one of the existing Matimba-Witkop 400kV transmission lines (i.e. two lines in parallel for a distance of approximately 10 km).
» Associated works to integrate the new substation into the Transmission grid (such as access roads, communication tower, etc).

In addition, in order to accommodate the new 765kV transmission lines proposed to be constructed from the new Medupi Power Station in the Lephalale area, Eskom Transmission is proposing the construction of new feeder bays within the existing Witkop substation site.

Technically feasible alternative substation sites have been identified for investigation within the EIA process (refer to Figure 1.1).

Through the EIA process, a preferred substation site and turn-in line routes will be nominated for consideration in the decision-making process by the National Department of Environmental Affairs and Tourism (DEAT), as competent authority for this project. Should the proposed project be authorised by the DEAT, Eskom will enter into a negotiation process with each affected landowner. The negotiation process is independent of the EIA process, and will be undertaken directly by Eskom Transmission.

1.2. Requirement for an Environmental Impact Assessment Process

The proposed Mokopane Integration Project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in terms of Section 24(5) of the National Environmental Management Act (NEMA, 1998, Act No 107). This section provides a brief overview of EIA Regulations and their application to this project.

NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. The National Department of Environmental Affairs and Tourism (DEAT) is the competent authority for this project. An application for authorisation has been accepted by DEAT (under Application Reference number **12/12/20/1187**). Through the decision-making process, DEAT will be supported by the Limpopo Department of Economic Development, Environment and Tourism (DEDET).

The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess if environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project.

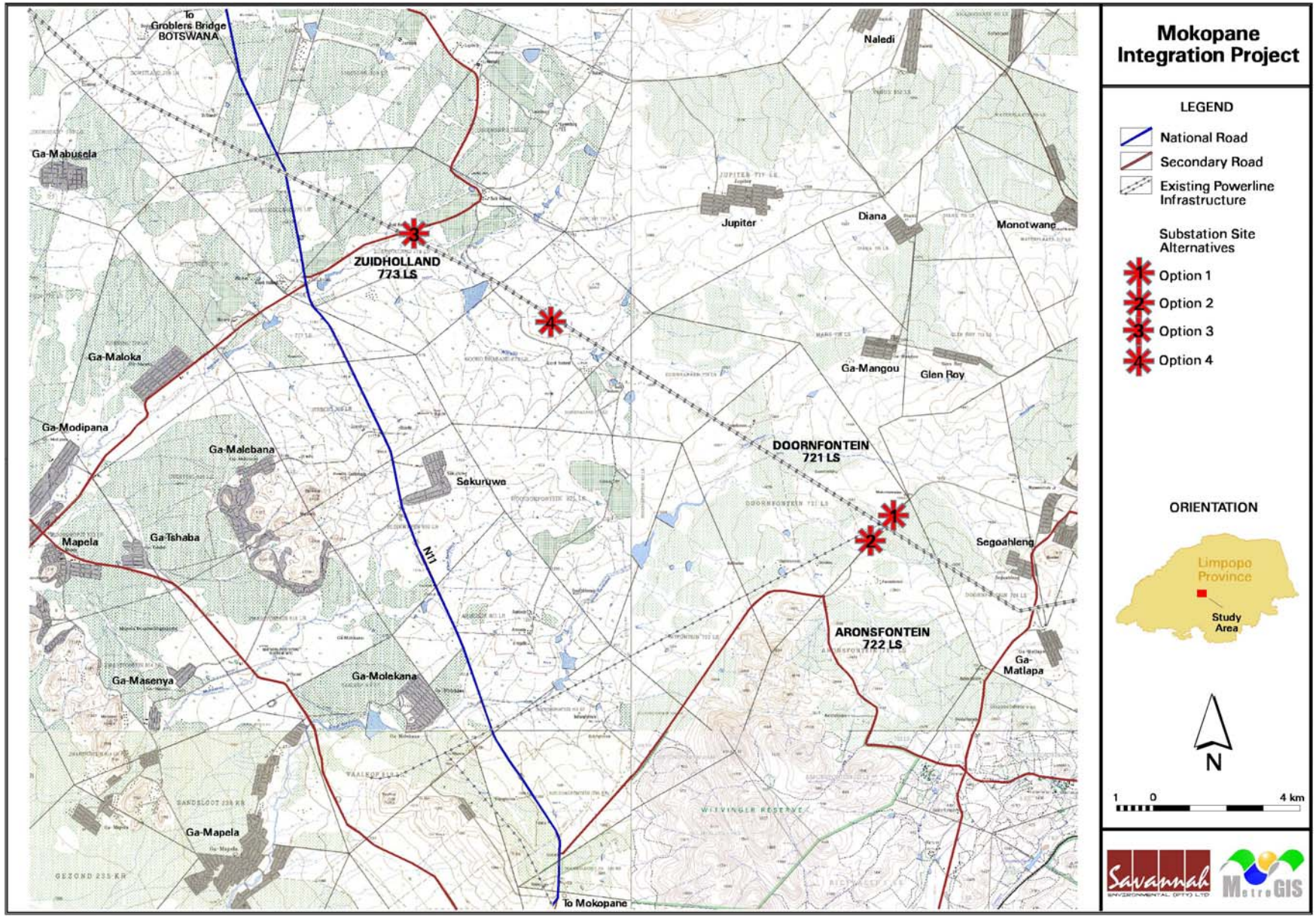

Figure 1.1: Locality map indicating the proposed alternative substation sites identified for investigation in the EIA process

In terms of sections 24 and 24D of NEMA, as read with Government Notices R385 (Regulations 27–36) and R387, a Scoping and EIA process are required to be undertaken for this proposed project as it includes the following activities listed in terms of GN R386 and R387 (GG No 28753 of 21 April 2006):

Number & date of relevant notice	Activity No (s) (in terms of relevant Regulation or notice)	Description of listed activity
Government Notice R387 (21 April 2006)	1(l)	The construction of facilities or infrastructure, including associated structures or infrastructure, for the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more
Government Notice R386 (21 April 2006)	12	The transformation or removal of indigenous vegetation of 3 hectares or more or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
Government Notice R386 (21 April 2006)	14	The construction of masts of any material of type and of any height, including those used for telecommunications broadcasting and radio transmission, but excluding (a) masts of 15m and lower exclusively used by (i) radio amateurs; or (ii) for lighting purposes (b) flagpoles; and (c) lightning conductor poles
Government Notice R386 (21 April 2006)	15	The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long.
Government Notice R386 (21 April 2006)	16(a)	The transformation of undeveloped, vacant or derelict land to residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare.
Government Notice R386 (21 April 2006)	7	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site.
Government Notice R386 (21 April 2006)	1 (m)	The construction of facilities or infrastructure, including associated structures or infrastructure, for any purpose in the one in ten year flood line of a

Number & date of relevant notice	Activity No (s) (in terms of relevant Regulation or notice)	Description of listed activity
		river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including - (i) canals; (ii) channels; (iii) bridges; (iv) dams; and (v) weirs

This report documents the scoping evaluation of the potential environmental impacts of the proposed construction, operation and decommissioning of the proposed Mokopane Substation and associated turn-in transmission power lines. This scoping assessment was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of NEMA (Act No 107 of 1998).

1.3. Eskom's Planning Process and the Role of the Environmental Impact Assessment Process

Eskom Transmission's planning process is required to be based on anticipated load requirements, rather than immediate load requirements in order to timeously supply the anticipated increased electricity demand in the country. This is due to the time-consuming process of acquiring the necessary permissions to construct such infrastructure from DEAT and the National Energy Regulator of South Africa (NERSA), servitude negotiations with landowners, and transmission power line design and construction.

The EIA process forms part of the initial planning process of a new substation and transmission lines. Substation site and transmission line route alternatives are identified (primarily based on technical feasibility), and the number of options are narrowed down based on environmental criteria through the EIA process. The findings of the EIA determine those areas in which impacts can be anticipated to be significant, and results in the nomination of a preferred site and transmission line route alternative for consideration by DEAT.

1.4.1. Servitude Negotiation and the EIA Process

Typically transmission power lines (such as the turn-in lines associated with the substation) are constructed and operated within a servitude (55 m wide for 400kV lines) that is established along the entire length of the line. Within this servitude,

Eskom Transmission registers a 'Right of Way' and has certain rights and controls that support the safe and effective operation of the line. The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or just the negotiation process. The negotiation process is undertaken directly by Eskom Transmission and is independent of the EIA process.

1.4. Objectives of the Scoping Study

The Scoping Phase of the EIA refers to the process of identifying potential issues associated with the proposed project, and defining the nature and extent of studies required within the EIA. This is achieved through an evaluation of the proposed project, involving the project proponent, specialists with experience in EIAs for similar projects and in the study area, and a consultation process with key stakeholders that includes both government authorities and interested and affected parties (I&APs).

The main purpose of the Scoping Study is to focus the environmental assessment in order to ensure that only significant issues, and reasonable and feasible alternatives are examined.

In accordance with the EIA Regulations, the main purpose of the Draft Environmental Scoping Report is to provide stakeholders with an opportunity to verify that the issues they have raised to date have been captured and considered within the study, and to raise any additional key issues for consideration. The Final Scoping Report will incorporate all issues and responses prior to submission to the DEAT, the decision-making authority.

The Scoping Report consists of eight sections:

» **Chapter 1** provides background to and need for the proposed Mokopane Integration project and the environmental impact assessment process
» **Chapter 2** provides an overview of the proposed project and the process followed in identifying reasonable and feasible alternatives
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the EIA process
» **Chapter 4** provides a description of the environment which may be potentially affected by the proposed project
» **Chapter 5** provides an evaluation of the potential issues associated with the proposed project
» **Chapter 6** presents the conclusions and recommendations of the Scoping Study
» **Chapter 7** describes the Plan of Study for the EIA and outlines the process and tasks of the Environmental Impact Assessment phase of the proposed project.

References and data sources used in the compilation of this report are contained within the specialist reports included in Appendices G – K.

1.5. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was established in January 2006, and benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental staff have acquired considerable experience in environmental assessment and environmental management over the last 10 years, and have been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa. Strong competencies have been developed in project management of environmental EIA processes, as well as strategic environmental assessment and compliance advice, and the identification of environmental management solutions and mitigation/risk minimising measures.

Savannah Environmental has successfully completed various EIAs for transmission power lines, as well as EIAs for several substations, distribution power lines and power generation projects for Eskom Holdings Limited.

Jo-Anne Thomas and Karen Jodas, the principle authors of this draft Environmental Impact Assessment Report, are both registered Professional Natural Scientists (in the practice of environmental science) with the South African Council for Natural Scientific Professions. They have gained extensive knowledge and experience on potential environmental impacts associated with electricity generation and transmission projects through their involvement in related EIA processes over the past ten (10) years. They have successfully managed and undertaken EIA processes for other power transmission projects for Eskom Holdings Limited throughout South Africa. They are supported by John von Mayer. Curricula vitae for the Savannah Environmental project team consultants are included in Appendix A.

In order to adequately identify and assess potential environmental impacts, Savannah Environmental has appointed several specialist consultants to conduct specialist studies, as required. Details of these specialist studies are included in Chapter 3. The curricula vitae for the EIA specialist consultants are also included in Appendix A.

DESCRIPTION OF THE PROPOSED PROJECT CHAPTER 2

Eskom, as the primary supplier of electricity in South Africa, is currently responding to the growing electricity demand and predicted future demand within South Africa through the establishment of new generation and transmission capacity in South Africa.

Eskom uses a modelling tool called Integrated Strategic Electricity Planning (ISEP) to plan its future capacity strategy. By analysing usage patterns and growth trends in the economy, and matching these with the performance features of various generation technologies and demand side management options, ISEP identifies the timing, quantity and type (base load or peaking) of new generation capacity options required in the long-term (i.e. over the next 15 – 20 years). These options include the return-to-service of the three mothballed coal-fired Simunye Power Stations (i.e. Camden, Komati and Grootvlei), the establishment of new coal fired power plants, pumped storage schemes, gas-fired power plants, nuclear plants, renewable energy technologies (mainly wind and solar projects), and import options within the Southern African Power Pool. As the older Eskom power plants reach the end of their design life from approximately 2025 onwards, the use of all available technologies will need to be exploited to replace these in order to supply the country's growing electricity demand.

As part of its capacity expansion programme, Eskom is currently constructing the new Medupi coal-fired power station, in the Lephalale area of the Limpopo Province. In order to integrate this power station into the electricity transmission grid, Eskom Transmission is considering linkages to various points within the electricity transmission system. In order to support the upsurge in demand for the platinum group metals in the Mokopane area, and to improve the reliability of electricity supply to the Polokwane area, Eskom Transmission is proposing the introduction of the Mokopane Integration project. This proposed project includes the construction of the following:

- A new transmission substation on a site near Mokopane.
- Two 400 kV transmission power lines in parallel looping in and out of one of the existing Matimba-Witkop 400kV transmission lines (i.e. two lines in parallel for a distance of up to 10 km) in order to integrate the new substation into the transmission system.
- Two new 765 kV transmission power lines in parallel between the Delta Substation (a new substation to be located near the Medupi Power Station) and the existing Witkop Substation (near Polokwane), as follows:
  - A new 765kV transmission power line between the Delta Substation and the new Mokopane Substation (a distance of approximately 150 km); and

  - a new 765kV transmission power line between the new Mokopane Substation and the Witkop Substation (a distance of approximately 60 km).
  - A new 765kV transmission power line between Delta Substation and the Witkop Substation (a distance of approximately 200 km).
- Associated infrastructure to integrate the new transmission power lines and substation into the Transmission grid (such as access roads, communication tower, etc) and accommodate the new lines at existing substations (such as the construction of new feeder bays within the existing Witkop substation site).

The background to the selection of reasonable and feasible alternatives for the **proposed 765kV transmission power lines** is discussed in a **separate Draft Scoping Report (Reference Number 12/12/20/1140)**.

This chapter of this report provides the background to the selection of reasonable and feasible alternatives for the **proposed substation and turn-in lines (Reference Number 12/12/20/1187)**.

2.1. The Need for the Proposed Substation and Turn-in Lines

Currently the existing Witkop substation close to Polokwane is the only nodal point within the broader Polokwane area that supports the Platinum group metals' load growth and the associated electricity demand. The load forecast for this group indicated a load shift towards the Mokopane area, which cannot be supplied from the Witkop substation alone as a result of thermal, voltage stability and spatial constraints.

2.2. Identification and Description of Alternative Substation Sites

In order to strengthen the power supply to the Mokopane and Polokwane areas, Eskom Transmission is proposing the construction of the following:

- A **new transmission substation** on a site near Mokopane.
- Integration of the new substation into the transmission system/grid by **looping in and out of one of the existing Matimba-Witkop 400kV transmission lines** (i.e. two lines running parallel for a distance of approximately 10 km).
- **Associated works** to integrate the new substation into the Transmission grid (such as access roads, communication tower, etc).

In addition, in order to accommodate the new 765kV transmission lines proposed to be constructed from the new Medupi Power Station in the Lephalale area,

Eskom Transmission is proposing the **construction of new feeder bays within the existing Witkop substation site**.

Four technically feasible alternative substation sites have been identified for investigation within the EIA process (refer to Figures 2.1 and 2.2). The four options are situated north of Mokopane on the farms Doornfontein 721 LS (Option 1), Aronsfontein 722 LS (Option 2), Zuidholland 773 LS (Option 3) and Noord Braband 774 LS (Option 4). The proposed sites are all located in close proximity to the Matimba-Witkop 400kV transmission lines in order to allow for turn-in line infrastructure from these lines into the new Mokopane Substation.

Options 1 and 2 are located approximately 1 km from each other north of the Wit Vinger Nature Reserve and approximately 3 km west of the Segoahleng settlement (refer to Figure 2.2).

Option 3 is located along the Matimba-Witkop 400kV transmission lines at a distance of approximately 3 km from the N11 national road (refer to Figure 2.2).

Option 4 is located approximately 4.5 km south-east of Option 3. It is approximately 6 km from the N11 and the closest major settlement, Sekuruwe, is approximately 5 km south-west of the proposed site (refer to Figure 2.2).

These alternative substation sites are evaluated within this Scoping Report (refer to Chapter 5).

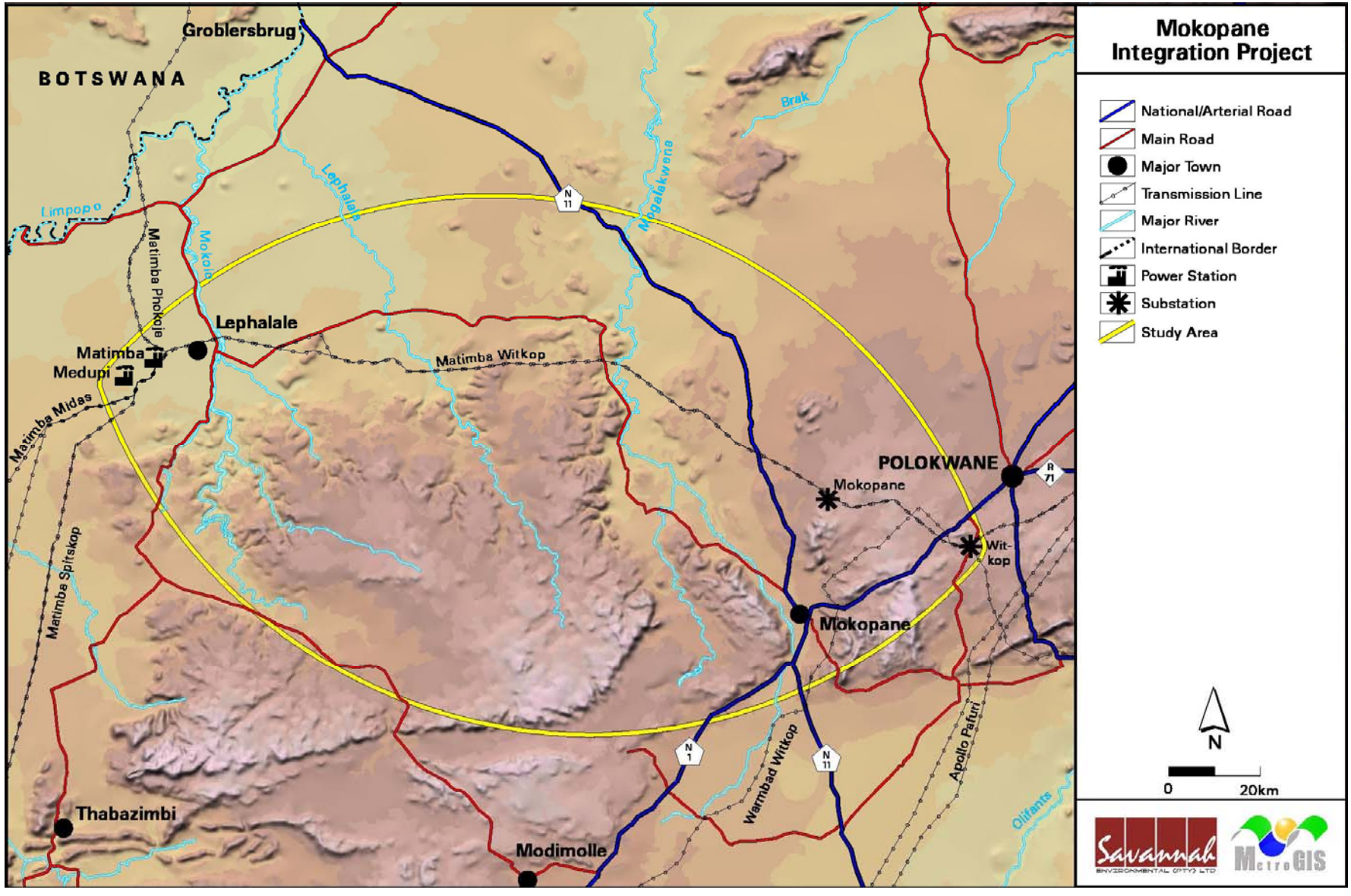

Figure 2.1: Map indicating the study area for the Mokopane Integration Project and the broader area for the proposed new Mokopane Substation

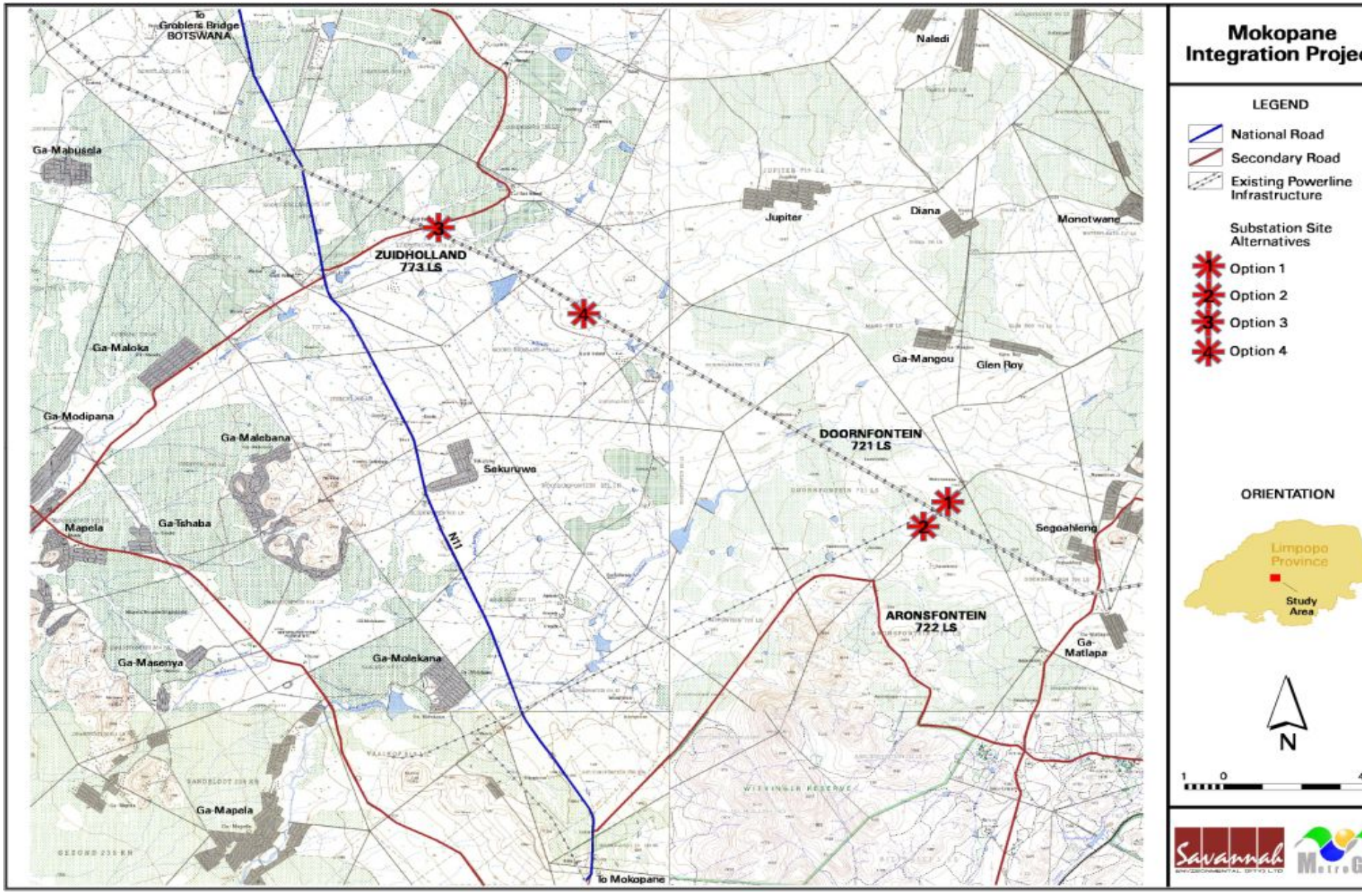

Figure 2.2: Map showing the alternate substation sites identified for consideration in the EIA process

2.2.1. Construction Phase

The proposed substation would be constructed in the following simplified sequence, and will take approximately 12 months to complete:

Step 1: Survey of the substation site (including a final survey by environmental specialists and the compilation of a site-specific Environmental Management Plan (EMP))

Step 2: Site clearing and levelling and construction of access road to substation site

Step 3: Construction of terrace and substation foundation, including the installation of stormwater drainage on the surface to dispose of such stormwater on the terrace

Step 4: Assembly, erection and installation of equipment (including transformers and control building)

Step 5: Connection of conductors to substation infrastructure

Step 6: Rehabilitation of any disturbed areas and protection of erosion sensitive areas.

A number of fences will be installed to secure the substation and the substation site. These fences include a 2.4 m high security fence to enclose all assets, a 1.8 m high fence around the yards, and a 1.2 m high boundary fence on the property-line.

Construction crews for construction of the substation will constitute mainly skilled and semi-skilled workers. No construction workers will reside on site. It is most likely that construction workers will be accommodated within formal housing within towns surrounding the study area.

It is expected that construction of the substation would begin late 2010 or early 2011 and would take 3 years to complete.

2.2.2. Servitude Negotiation and the EIA Process

Transmission power lines are constructed and operated within a servitude (55 m wide for 400kV lines as would be the case for the turn-in lines) that is established along the entire length of the power line. Within this servitude, Eskom Transmission has certain rights and controls that support the safe and effective operation of the power line. The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or simply just the negotiation process. The following important points relating to the negotiation process should be noted:

» Servitude negotiation is a private matter between Eskom and the appropriate landowner.
» The negotiation process involves a number of stages (see below), and culminates in the 'signing' of a servitude. Here Eskom enters into a legal agreement with the landowner.
» The servitude is registered as a 'right of way', and Eskom do not purchase the servitude from the landowner. Compensation measures are agreed in each case.
» The agreements will detail such aspects as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities, as well as any specific landowner requirements.
» The negotiation process may take place at any time in the planning of a new power line.
» This process must be completed (i.e. the agreement must be signed) with the relevant landowner before construction starts on that property.
» The negotiation process is undertaken directly by Eskom and is independent of the EIA process. It is important that the aims of the two processes are seen as separate.

The EIA process has become important in the initial planning and route selection of new transmission lines. For this reason, it is usually preferable that the negotiation process begins after the EIA has been completed. At this stage there is greater confidence in the route to be adopted, and it would be supported by environmental authorisation. However, it may be required that the negotiation process begins earlier, and may begin before, or run in parallel with the EIA process. This may be due to urgent timeframes for the commissioning of the new power line, knowledge of local conditions and constraints, etc. Eskom Transmission has a right to engage with any landowner at any time, though they do so at risk if environmental authorisation has not been awarded.

2.2.3. The Negotiation Process

Eskom Transmission is responsible for the negotiation process for all new transmission power lines. It is critical that the process is correctly programmed and incorporated into the planning of a new line. The negotiation process involves the following steps:

i. Initial meeting with the landowner.
ii. The signing of an 'option' to secure a servitude (this indicates that the owner will accept that the power line will traverse his property, subject to conditions to be finalised in the negotiation of the servitude agreement). An option is valid for one year.
iii. Once the route is confirmed (i.e. options are signed with the upstream and downstream landowners), the servitude agreement will be finalised with

the individual landowners. This agreement will set out the conditions for the establishment, rehabilitation and maintenance of the servitude, and will be site-specific (as different landowners may have different requirements). Compensation payments would be made when the servitude is registered at the Deeds Office[2].

iv. Once construction is complete and the land rehabilitated to the landowner's satisfaction (and as agreed prior to construction), the landowner signs a 'Final Release' certificate. Until the 'Final Release' certificate has been signed, Eskom Transmission remains liable for the condition of the land.

v. Once the clearance certificate is signed, the responsibility for the power line and servitude is handed over to the regional Eskom Transmission office.

2.2.4. Technical Details of the Proposed Substation

The main aspects of the proposed substation include:

- An area of land approximately 1 km x 1 km is required for the construction of the substation site. Approximately 40% of this area will be used for the High Voltage Yard, which will be fenced off for security purposes.
- Installation of new equipment (transformers, reactors, etc.) for operation up to 765 kV capacity. This equipment will not contain hazardous substances (PCBs, etc.), but will contain cooling oils and similar potential pollutants necessary for the operation of the equipment. The equipment will be designed according to Eskom specifications.
- The maximum height of the substation development will be 45 m.

2.3. Project Operation Phase

The expected lifespan of the proposed substation is between 35 and 40 years, depending on the maintenance undertaken on the substation structures.

During the life-span of the substation, on-going maintenance is performed. Substation inspections are undertaken on an average of 1 – 2 times per year, depending on the area. During this maintenance period, components may require replacement in order to significantly extend the lifespan of the substation. Maintenance of the substation is required to be undertaken in accordance with the

[2] Compensation will be based on present day property valuations for all properties obtained from registered evaluators. Eskom only pays compensation for the strip of land that is affected at 100% of present day property value. In cases where properties are significantly affected, Eskom may consider purchasing the whole property at present day market value. All improvements will be valued. Sentimental value is not considered in any valuations as it is not measurable. Valuations are done according to the Expropriation Act.

specifications of the Environmental Management Plan (EMP) which is to form part of the EIA Report as well as any appointed contractor's contract documentation.

The creation of additional employment opportunities during the operational phase of the substation will be limited, and will be restricted to skilled maintenance personnel employed by Eskom.

APPROACH TO UNDERTAKING THE ENVIRONMENTAL SCOPING STUDY CHAPTER 3

An Environmental Impact Assessment (EIA) process refers to that process (as per the EIA Regulations) which involves the identification of and assessment of direct, indirect and cumulative environmental impacts associated with the proposed project. The EIA process comprises two phases: **Scoping Phase** and **EIA Phase**. The Scoping process culminates in the submission of a Scoping Report to the competent authority (DEAT in this case) for review and acceptance before proceeding onto the next phase of the process. The EIA culminates in the submission of an EIA Report (including an Environmental Management Plan (EMP)) to the competent authority for decision-making.

The phases of the EIA process are as follows:

The Environmental Scoping Study for the proposed Mokopane Integration Project has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA; No 107 of 1998). This Environmental Scoping Study aimed at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project, involving the project proponent, specialists with experience in EIAs for similar projects, and a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs). This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

3.1. Objectives of the Scoping Process

This Scoping process aimed to:

» identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design,

construction, operation and decommissioning) through a desk-top review of existing baseline data and specialist studies, and

» to provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

The objectives of the Scoping process were to:

» Clarify the scope and nature of the proposed activities and the reasonable and feasible alternatives to be considered within the EIA process;
» Ensure due consideration of alternative options in regard to the proposed development, including the 'do nothing' option.
» Identify and evaluate key issues associated with the proposed project and identify issues to be addressed in the Environmental Impact Assessment Phase of the EIA, through a process of broad-based consultation with stakeholders and desk-top specialist studies; and
» Conduct an open, participatory and transparent public participation process and facilitate the inclusion of stakeholders' concerns regarding the proposed project in the decision-making process.

3.2. Overview of the Environmental Scoping Process undertaken for the Proposed Mokopane Integration Project

Key tasks undertaken within the environmental scoping process included:

» Consultation with relevant decision-making and regulating authorities.
» Submission of a completed application form for authorisation in terms of Government Notice No. R.385 of 2006 to the competent authority
» Undertaking of a public participation process throughout the Scoping process in accordance with the EIA Regulations in order to identify issues and concerns associated with the proposed project.
» Preparation of a Draft Scoping Report and Plan of Study for EIA in accordance with the requirements of the EIA Regulations.
» Preparation of an Issues and Responses Report detailing key issues raised by I&APs as part of the EIA Process.

These tasks are discussed in detail below.

3.2.1. Authority Consultation and Application for Authorisation in terms of GN No R385 of 2006

As Eskom is a Statutory body (i.e. an Organ of State), the National Department of Environmental Affairs and Tourism (DEAT) will act as the relevant competent

authority for this proposed project. As the project falls within the Limpopo Province, the Limpopo Department of Economic Development, Environment and Tourism (DEDET) will act as a commenting authority for the project. Consultation with these authorities has been undertaken throughout the Scoping process. This consultation has included the following:

» Pre-application consultation regarding the proposed project and the EIA process to be undertaken.
» Submission of an application for authorisation to DEAT, with a copy submitted to DEDET. This application was approved and the reference numbers 12/12/20/1187 (substation and turn-in lines) and 12/12/20/1140 (transmission lines). Authorisation was thus granted to continue with the Scoping Phase of the project.
» A consultation meeting with DEAT and DEDET once the final scoping report has been submitted to DEAT in order to discuss the proposed project, alternatives identified, public consultation process undertaken and the issues identified for consideration in the EIA process.

A record of all authority consultation undertaken within the Scoping Phase is included within Appendix B.

3.2.2. Notification of the EIA Process

Application for exemption from complying with Regulation 56 (b) (i) and (ii), Chapter 6 of the GN R385 in Government Gazette No 28753 of 21 April 2006 (Regulations published in terms of Chapter 5 of the National Environmental Management Act (NEMA), Act No 107 of 1998) has been requested from DEAT (refer to Appendix B). This regulation requires that (i) written notice is to be given to owners and occupiers of land adjacent to the site where the activity is or is to be undertaken and (ii) the owners and occupiers of land within 100 metres of the boundary of the site or alternative site who are or may be directly affected by the activity.

In terms of notification of landowners and occupiers on the proposed power line routes, the following activities have been undertaken in order to provide them the opportunity to become involved in the proposed project and the EIA being conducted:

» Advertisements were placed in local and regional newspapers in the area announcing the commencement of the EIA process and inviting interested and affected parties to become involved in the project (as detailed below).
» Notice boards were placed in the area of concern during the announcement of the project (as detailed below).

» Written notices and Background Information Documents (BIDs) were distributed and placed at public places, send to the relevant municipal officials and councillors, several community organisations as well as the Tribal Authority councillors of the area as part of the public participation process for the project (as detailed in Section 3.2.4 below).
» Focus group and Public meetings were held in the scoping phase (as detailed below), and will be held in the EIA phase of the project at appropriate locations within the study area. Public meetings were advertised in local and regional newspapers and registered parties were invited to attend these meetings by letter (as detailed in section 3.2.4 below).

This approach was agreed with DEAT at the outset of the process. Formal written approval of the application for exemption is, however, still awaited.

In order to notify and inform the public of the proposed project and invite members of the public to register as interested and affected parties (I&APs), the project and EIA process was advertised in a number of local publications, as follows:

» Agri Spectrum on 31 July 2008
» Northern Review Midweek on 20 May 2008
» Mogol Post on 16 May 2008
» Polokwane Observer on 22 May 2008
» Seipone on 28 May 2008

In addition, site adverts were placed at various locations throughout the study area, i.e.:

» Crossway Shopping Mall in Mokopane (2 notices).
» Township at Substation 1 – Liquor Restaurant (Mashashane/Rietfontein).
» Polokwane – Library (Hans van Rensburg road).
» Polokwane – Department of Environmental Affairs and Department of Land Affairs.
» Marken – Farmers Hall
» Lephalale – Agri Lephalale Offices.

In addition to the above advertisements and notices, key stakeholders were notified of the commencement of the EIA process, including:

» *Municipalities*
  * Lephalale Local Municipality
  * Waterberg District Municipality
  * Polokwane Local Municipality
  * Mokopane Local Municipality

- Mogalakwena Local Municipality

» *Organs of State*
- Department of Education
- Department of Health
- Department of Environmental Health
- Department of Minerals and Energy (DME)
- Department of Transport and Roads
- Department Traditional and Government Affairs
- Department of Public Works (DPW)
- Department of Water Affairs and Forestry (DWAF)
- Roads Agency Limpopo
- South African Heritage Resource Agency (SAHRA)
- Limpopo Heritage Resources Agency (LIHRA)

In addition to the above advertisements and notices, detailed maps (at a scale of 1:50 000 and 1:250 000) showing the proposed substation sites and alternative transmission power line routes were forwarded to key parties (such as representatives of the agricultural unions) in the following areas:

» Lephalale
» Marken
» Vaalwater
» Mokopane
» Polokwane

These parties made these maps available for public review at easily accessible venues in these areas. In addition, these maps were made available on the Savannah Environmental webpage. Stakeholders were notified of the availability of these maps by letter.

Copies of the advertisements placed and notifications distributed are contained in Appendix C of this report.

3.2.3. I&AP identification, Registration and the Creation of an Electronic Database

The first step in the public participation process was to identify key stakeholders and interested and/or affected parties (I&APs). This process was undertaken through existing contacts and databases, responses to site notices and newspaper advertisements, and networking with local agricultural unions and affected parties. Stakeholder groups identified include:

» Provincial and local government departments (including DEAT, DEDET, SAHRA, DWAF, LIHRA, District and Local Municipalities etc)
» Government Structures (including the Provincial Roads Authority, municipal planning departments, etc)
» Potentially affected and neighbouring landowners on all proposed alternative routes
» Traditional authorities
» Industry and mining

All I&AP information (including contact details), together with dates and details of consultations and a record of all issues raised have been recorded within a comprehensive database of affected parties (refer to Appendix D). While I&APs have been encouraged to register their interest in the project from the start of the process, following the public announcements, the identification and registration of I&APs will be ongoing for the duration of the EIA process. The project database will, therefore, be updated on an on-going basis throughout the project process, and will act as a record of the communication and involvement process.

3.2.4. Public Involvement and Consultation

The public involvement and consultation process during the scoping process was undertaken by **ILISO Consulting** who are specialist public participation consultants. This process was designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

» raise issues of concern and suggestions for enhanced benefits and alternatives;
» assist the environmental specialist in identifying issues that needs to be assessed during the scoping phase; and
» verify that their issues have been captured.

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to Appendix C).

Eskom initially planned to construct 400kV power lines between Medupi Power Station and the Mokopane and Lephalale areas. However, the scope of the project was amended to include 75kV power lines rather than 400kV power lines before these documents were distributed to the public (i.e. at the outset of the process), but after the BID had been prepared. An insertion to the BID was therefore prepared indicating this amendment in scope.

The BID was distributed to all identified stakeholders and I&APs together with a map and a comment sheet inviting I&APs to register for the proposed project and submit details of any issues and concerns.

Through consultation with key stakeholders and I&APs, issues for inclusion within the issues-based scoping study were identified and confirmed. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities were provided for I&APs to have their issues noted prior to the release of the Draft Scoping Report for public review, as follows:

» Focus group meetings
» One-on-one consultation meetings
» Telephonic consultation sessions
» Written, faxed or email correspondence

Networking with I&APs will continue through-out the duration of the EIA process.

Table 3.1 below provides details of the meetings held during the scoping phase of the public consultation process.

Table 3.1: Details of the meetings held during the scoping phase of the public consultation process

Date	Parties present	Venue
10 June 2008	Batlokwa T/A, Bakone T/A, Lebelo T/A	Bakone Traditional Council Office
11 June 2008	Nkidikitlane T/A, Babirwa T/A	Babirwa Traditional Council Office
12 June 2008	Dikgale T/A[3], Bakone T/A, Maraba T/A, Mashashane T/A	Capricorn DM Office
12 June 2008	Lekalakala T/A	Lekalakala Traditional Council Office
13 June 2008	Langa (Bekenburg) T/A, Langa (Mapela) T/A, Mokopane T/A	Mapela Traditional Council Office
17 June 2008	Public meeting	The Golden, Pillow Hotel Polokwane
18 June 2008	Public meeting	The Protea Park Hotel, Mokopane
19 June 2008	Public meeting	Marken Primary School Hall, Marken
20 June 2008	Public meeting	The Mogol Club, Lephalale
29 July 2008	Seleka Traditional Authority	Seleka Traditional Authority's

[3] Moletsi T/A were invited to attend this meeting, but sent an apology

Date	Parties present	Venue
		Office
29 July 2008	Laka Traditional Authority	Laka Traditional Authority's Office
30 July 2008	Shongoane Traditional Council	Shongoane Traditional Council's Office
4 August 2008	Lephalale Focus Group Meeting	Lephalale College
4 August 2008	Lephalale Municipality	Lephalale Municipality- Civic Centre (social services)
5 August 2008	Vaalwater Focus Group Meeting (including representatives of the Waterberg Biosphere Reserve)	Vaalwater Farmers Hall
5 August 2008	Polokwane Municipality	Polokwane- Environmental Management Office
6 August 2008	Marken Focus Group Meeting	Marken Farmers Hall
6 August 2008	Mokopane Focus Group Meeting	Potgietersrus- DLU Chamber of Business
7 August 2008	Waterberg District Municipality	Waterberg DM municipal office

Public meetings were advertised in the Northern Review Midweek, Mogol Post, Polokwane Observer and Seipone (refer to Appendix C). Registered parties were invited to attend these meetings by letter. Stakeholders were invited to attend Focus Group Meetings by letter and through the local Tribal Authority structures and Farmer's Associations.

A landowner consultation map indicating the landowners identified and contacted during the public participation process for the project was compiled (refer to Appendix E). This map indicates the landowners in the study area identified and consulted.

3.2.5. Identification and Recording of Issues and Concerns

Issues and concerns raised by I&APs during the scoping process have been synthesised into the Comments and Responses Report (refer to Appendix F). The Comments and Responses Report includes responses from members of the EIA project team and the project proponent where possible. In general, the responses indicate how the issues will be addressed in the EIA process. In some cases, immediate responses and clarification are provided. Where issues are raised that the EIA team considers beyond the scope and purpose of this EIA process, clear reasoning for this view is provided.

3.2.6. Evaluation of Issues Identified through the Scoping Process

Potential direct, indirect and cumulative impacts associated with the proposed project identified within the scoping process have been evaluated through desk-top studies. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist team members:

Specialist	Area of Expertise	Qualifications & experience
Riaan Robbeson of Bathusi Environmental Consulting	Biodiversity	MSc (Plant Ecology) 8 years experience South African Council of Natural Scientific Professions (SACNASP) (Ecological Scientist & Botanical Scientist, Reg no: 400005/03)
Megan Diamond of Endangered Wildlife Trust	Avifauna	BSc (Environmental Management) 2 years experience
Jon Smallie of Endangered Wildlife Trust	Avifauna	BSC – Agriculture (Hons) 8 years experience
Julius Pistorius	Heritage sites	D Phil Archaeology Member of the Association of Southern African Professional Archaeologists (ASAPA) Member of the South African Archaeological Society 28 years experience
Lourens du Plessis of MetroGIS	Visual Impact Assessment & GIS	BA (Geography and Anthropology) 11 years experience in GIS and visual impact assessments
Anita Bron of MasterQ	Social Impact Assessment, land use & tourism potential assessment	MA (Research Psychology), MA (Social Impact Assessment – in process), BA Hons (Psychology), BA (Psychology, Criminology and Penology) member of the South African Monitoring and Evaluation Association and the IAIA 7 years experience
Nonka Byker of MasterQ	Social Impact Assessment, land use & tourism potential assessment	B. Psych NQF Assessor (Institute for People Development, 2005) Member of the Health Professions Council of South Africa (PRC 0000396) 3 years experience

In order to evaluate issues and assign an order of priority, it was necessary to identify the characteristics of each potential issue/impact:

» *the nature,* which includes a description of what causes the effect, what will be affected and how it will be affected;
» *the extent,* wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional

The evaluation of the issues resulted in a statement regarding the potential significance of the identified issues, as well as recommendations regarding further studies required within an EIA.

Specialist Scoping Reports are contained within Appendices G – K.

3.2.7. Public Review of Draft Scoping Report and Feedback Meeting

This is the **current stage** of the scoping process. The draft Environmental Scoping Report has been made available for review from **15 September 2008 to 15 October 2008** at the following locations:

Lephalale Library – corner of Joe Slovo and Douwater Street	Agri Lephalale Offices – 6A Jacobus Street
Marken Farmers Hall	Vaalwater Agric Association – NTK Building, Meule Street
Waterberg District Municipality Offices, Modimolle	Potgietersrus DLU, Mokopane
Polokwane Municipality – Environmental Management Office	Polokwane Library – Hans van Rensburg Street
www.eskom.co.za/eia	www.savannahSA.com

Copies of the draft report will also be made available to the Lephalale Local Municipality and the Mogalakwena Municipality. Affected parties and stakeholders will also receive CDs containing the report, on request. The Executive Summary has been translated into Sepedi and Afrikaans, and is available on request. The Sepedi Executive Summary has been distributed to the Traditional Authority leaders, as requested by them.

The availability and duration of the public review process were advertised in the Mogol Post, Northern Review Midweek, Polokwane Observer, Seipone, Agri Spectrum, Die Bosvelde, Beeld and The Star. Stakeholders requested that the adverts be placed in the Noordlike Nuus. However, this publication has been discontinued. In addition, all registered I&APs were notified of the availability of the report by e-mail or letter (refer to Appendix C).

3.2.8. Final Scoping Report

The final stage in the Scoping Study process will entail the capturing of responses from I&APs on the draft Scoping Report in order to refine this report. It is this final report upon which the decision-making Environmental Authorities provide comment, recommendations and acceptance to undertake the EIA phase of the process.

3.3. Legislation and guidelines that have informed the preparation of this report

The scope and content of this Draft Scoping Report has primarily been informed by the following legislation and guidelines:

» National Environmental Management Act (NEMA; Act No 107 of 1998)
» EIA Regulations, published under Chapter 5 of the NEMA (GN R385, GN R 386 and GN R387 in Government Gazette 28753 of 21 April 2006)
» Guidelines published in terms of the NEMA EIA Regulations, in particular:
  * Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006);
  * Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006 (DEAT, May 2006); and
  * Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006).

Several other Acts, standards or guidelines have also informed the scope of issues to be addressed in the EIA (particularly in terms of the scope and methodology of specialist studies). An initial listing of such legislation is provided in Table 3.1. A more detailed review and assessment of legislative requirements applicable to the proposed project, the specialist studies and this EIA process will be undertaken in the EIA phase.

Table 3.1: Initial review of relevant policies, legislation, guidelines and standards applicable to the Mokopane Integration Project EIA

Legislation	Applicable Sections
Constitution of the Republic of South Africa (Act No 108 of 1996)	» Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32) » Right to just administrative action (S33)

Legislation	Applicable Sections
National Environmental Management Act (Act No 107 of 1998)	» Strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment (S2) » NEMA EIA Regulations (GN R385, 386 & 387 of 21 April 2006) (Chapter 5) » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment » Procedures to be followed in the event of an emergency incident which may impact on the environment (S30)
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7) » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35) » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36) » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) » Requirement to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048)
National Water Act (Act No 36 of 1998)	» Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20)

Legislation	Applicable Sections
	» Water use license (S21), if required for construction purposes
National Forest Act (Act No 84 of 1998)	» Protected tree species – Part 3 (S12 – S16)
Conservation of Agricultural Resources Act (No 43 of 1983)	» GN R1048 of 1984 - Regulations relating to weeds and invaders » Gen Notice 2485 of 1999 – Categories of weeds and invaders
National Environmental Management: Biodiversity Act (No 10 of 2004)	» Chapter 4 - threatened or protected ecosystems and species » Chapter 5 - species and organisms posing potential threats to biodiversity » Chapter 7 – permits relating to listed threatened or protected species in terms of section 57(1); alien species in terms of section 65(1); or listed invasive species in terms of section 71(1) » No R 151 in Government Gazette 29657 of 23 February 2007 – lists of critically endangered, endangered, vulnerable and protected species.

DESCRIPTION OF THE AFFECTED ENVIRONMENT CHAPTER 4

This section of the Scoping Report provides a description of the environment that may be affected by the proposed Mokopane Integration Project Substation and Turn-in lines. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be affected by, or could affect, the proposed development have been described. This information aims to provide the overall context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within Appendices.

4.1. Location and Overview of the Study Area and Property Description

The proposed substation sites are located within the Mogalakwena Local Municipal area (LIM367), which in turn is located within the Waterberg District Municipality (DC36) of the Limpopo Province. The following subsections provide a regional overview of the study area on a broad based provincial and district level.

Figure 4.1: Delineation of Mogalakwena the Local Municipality within the Waterberg District Municipality

Four sites have been identified as potential locations for the construction of the Mokopane transmission line substation. The four options are situated north of Mokopane and include the farms Doornfontein 721 LS (Option 1), Aronsfontein 722 LS (Option 2), Zuidholland 773 LS (Option 3) and Noord Braband 774 LS (Option 4). These properties are all State-owned and are currently admininstered by the Department of Land Affairs.

The proposed substation site alternatives are situated within landform types ranging from lowlands with mountains in the west to low mountains in the east. None of the substation sites are situated within areas of known botanical or faunal importance; several such sites are however present in close vicinity to the sites and are therefore likely to be affected by the turn-in lines.

4.2. Social Characteristics of the Study Area

The Waterberg District Municipality (WDM) is made up of six (6) separate local municipalities, including the Mogalakwena and Lephalale Local Municipalities (see Figure 4.1). The WDM is the largest of the six districts and lies to the west of the LP. The district is mostly rural in nature and, according to the Community Survey 2007, has a total population of approximately 596 092 people living in 160 720 households (at an average of 12 people per km^2, much lower than the average provincial density of 40 people per $km^{2)}$.

In a 2007 Community Survey, the unemployment rate within the district was estimated at around 29.0%, which was much lower than that of the province. Furthermore, approximately a third (33.0%) of the district's population was under the age of 14 years, which would make any job opportunities vital to the future development of the district.

The WDM is characterised by discrepancies in wealth and skills. The majority of households earned an annual income below R18 001 in 2001. Households' production levels are declining leading to a situation where the majority of the population are financially dependent on state pension and social welfare grants as their primary source of income and subsistence. This is linked to the low educational levels, and lack of skills.

4.2.1. Demographic Profile

Figure 4.2 provides an overview of the formal settlements in the study area. At the time of the study, information was not available on the planned future development of these settlements.

» *Option 1*: The closest human settlement to this site is Segoahleng, which is located some 3km east of the proposed site. Other human settlement in fairly

close proximity to the proposed site includes Ga-Matlapa (approximately 4.7 km southeast), Glen Roy (approximately 4.3 km north), and Ga-Mangou (approximately 4.1 km north-northeast).

» *Option 2*: The closest human settlements are Segoahleng (approximately 3.8 km east), Ga-Mangou (approximately 4.8 km north), Glen Roy (approximately 5.2km north-northeast), and Ga-Matlapa (approximately 4.9 km southeast).

» *Option 3*: The closest human settlements to this option is Dorsland, which is located approximately 2.8 km southeast and Suid-Holland, which is located approximately 3.3 km southwest of the proposed site. Other human settlement in the vicinity of the proposed site includes Sakuruwa (approximately 6 km south), Ga-Maloka (approximately 7 km west-southwest), Ga-Malebana (approximately 7.5 km southwest), and Ga-Mabusela (approximately 9.1 km west).

» *Option 4*: The closest human settlement is Sukuruwe, which is located approximately 4.9 km southwest of the proposed site. Other formal settlements in fairly close proximity to this option include Jupiter (approximately 5.4 km northeast), Suid-Holland (approximately 6.2 km west), Ga-Mangou (approximately 8.8km east) and Phetole (approximately 8.9 km north).

4.2.2. Economic Profile

The Waterberg District Municipality Integrated Development Plan (2008/09) states that the key economic sectors within the WDM are mining, electricity/water, services, trade/catering and agriculture, with mining making the biggest contribution to the Gross Geographical Product (GGP). The land use pattern is fairly natural within the district, with most of the mining operations concentrated on the periphery, whereas the central area is mostly characterised by the tourism and game industry. The tourism industry is also a significant contributor to the Gross Domestic Product. Similar to the province as a whole, a trend in the area is the conversion of agricultural land into game farms resulting in a rapid expansion of game farming and tourism in the area. The WDM is malaria free and has a rather mild climate that adds to the district's appeal as a tourist destination. The area is also in fairly close proximity to the Gauteng Province which makes it not only an appealing destination, but also a prime location to develop game farms.

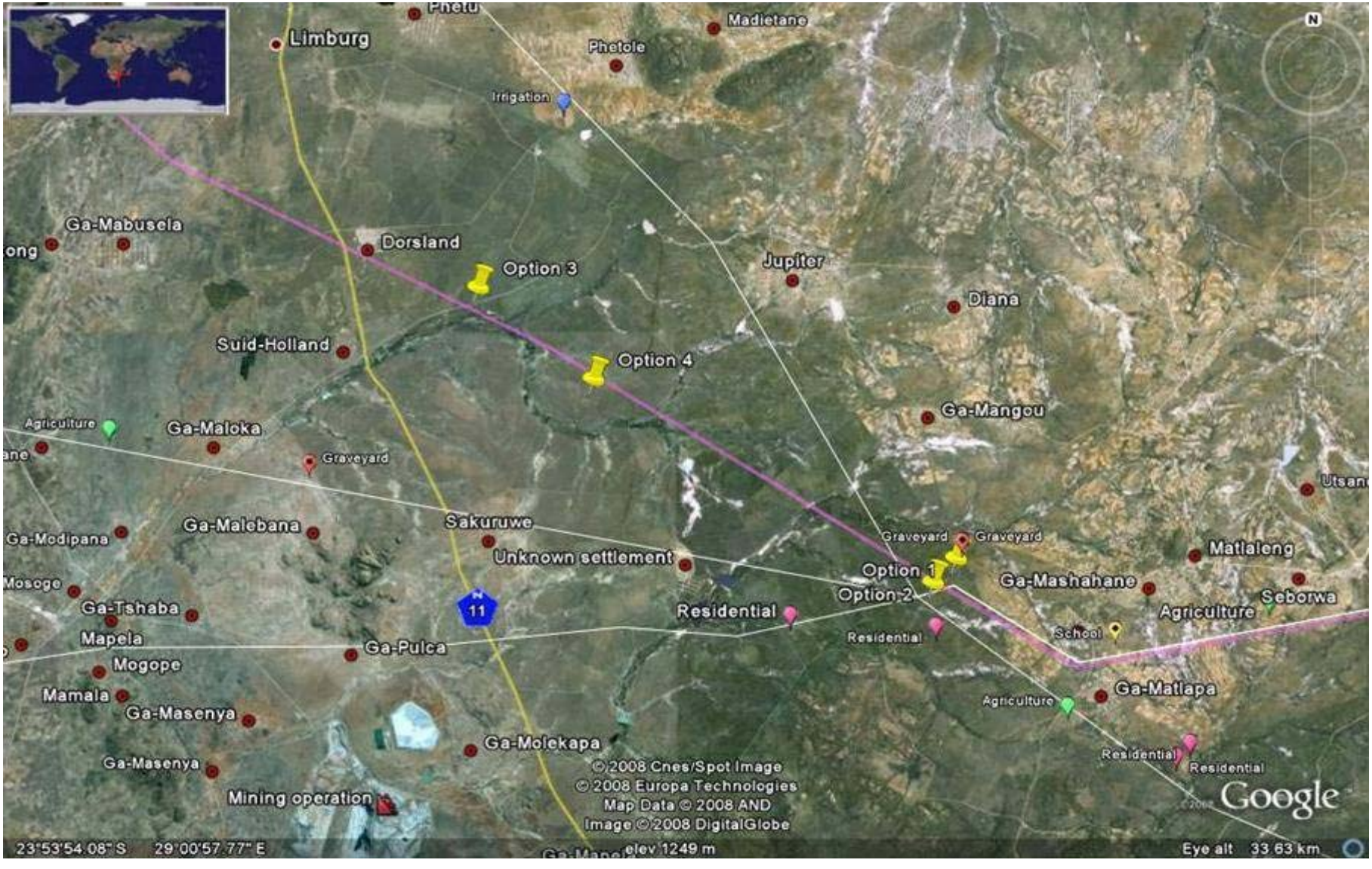

Figure 4.2: Formal settlements within the study area

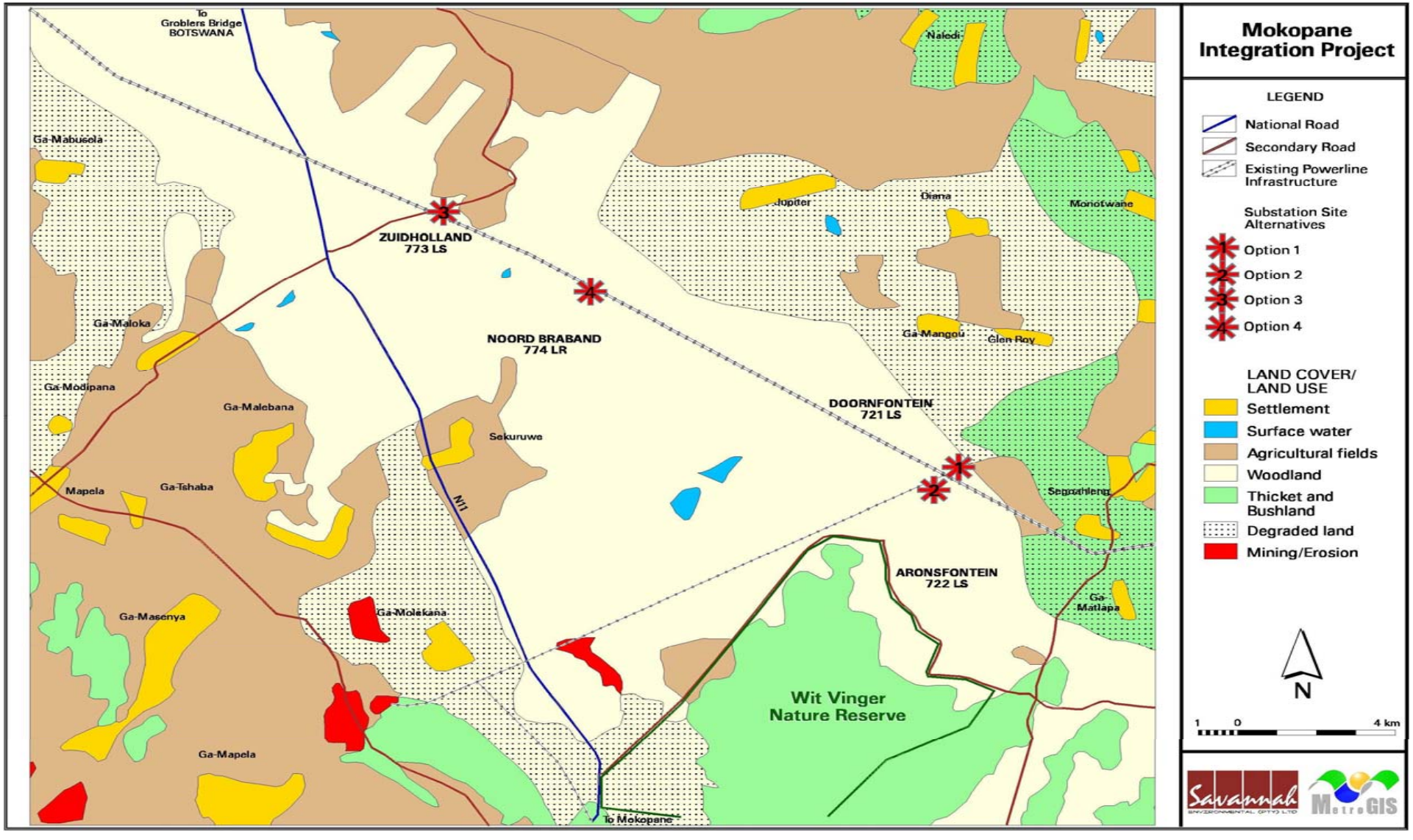

Figure 4.3 Land cover/land use map.

Although the WDM is one of the biggest contributors towards provincial agricultural activities with proportionally the largest grazing field, the agricultural sector is considered to be an under developed sector. This sector only contributed approximately 3.6% towards the economy of the district (year not mentioned). Field crop commodities include tobacco, cotton, sunflower, sorghum, and maize (WDM IDP 2008/09).

Evidence could be found of a cultivated piece of land in close proximity to site Option 1. It would appear as if all the proposed sites are currently used for grazing. As these farms are not privately owned, it is assumed that the area is used for grazing by community members from the surrounding settlements.

4.2.3. Socio-Cultural Profile

The study area includes the Tribal Authorities: Laka, Shongoane, Seleka, Lekalakala, Bekenburg, Mapela, Mokopane,Dikgale, Moletsi, Bakone, Maraba and Mashashane Traditional Councils. There was a lack of information about the culture of these parties and the cultural value of the landscape.

At least one archaeological (heritage) zone can be distinguished in the study area. This cultural landscape comprises the plains to the west of Polokwane which are dotted with scattered mountains, kopjes and knolls across a vast plain.

The plains towards the west of Polokwane and Mokopane are characterised by a number of large mountains and smaller kopjes and knolls. Some of these mountains, further towards the west, near the Potgietersrust Platinum Mine, bear historical names such as Mapela, Masenya, Tshaba and the historically well-known Fonthane. These mountains serve as historical beacons outlining the spheres of influence of the Langa-Ndebele, a Nguni group who settled in this area during the sixteenth and seventeenth centuries.

The Ledwaba/Maune Ndebele clans, who are related to the Langa-Ndebele, live in the Bergzicht-Kalkspruit and Mašašane townships near the proposed new Mokopane Substation. The proposed substation sites and the turn-in lines for the are situated in this historical Ndebele sphere of influence.

Mokopane and Polokwane near the Mokopane Integration Project study area represent two of the oldest colonial (Voortrekker/Boer) towns in the former Transvaal Province.

4.3. Biophysical Characteristics of the Study Area

4.3.1. Geographical Profile

Situated on a plateau approximately 1 300 m above sea level, the Limpopo Province has warm to hot summers with moderate winters. It has an average annual rainfall of between 577 and 1 000 m. Average summer temperatures rise to 28.1°C and drop to 17°C. Average winter temperatures range from 19°C to 4.7°C. There is also a lowveld area with a higher average rainfall and warmer temperatures.

The proposed substation options are situated within landform types ranging from lowlands with mountains in the west to low mountains in the east (Figure 4.4). The proposed substation sites will be situated within areas described as woodland, regardless of the option selected. The proposed turn-in lines will traverse degraded woodland and cultivated areas that are generally regarded to have a moderate to low sensitivity.

4.3.2. Ecological Profile

The dominant vegetation type found within the study area is woodland of one type or another, i.e. Arid or Moist woodland. The majority of this study area is, however, in a state of transformation, with a number of settlements dotted throughout the immediate surrounds intermingled with mining areas and both commercial and subsistence forms of cultivation. As a result, a great deal of the vegetation within the study area has and is being transformed. The habitat in the area has been subjected to severe pressure from the neighbouring communities and the various land use types.

The following VEGMAP[6] vegetation units are present within the study area:

» Makhado Sweet Bushveld;
» Mamabolo Mountain Bushveld;
» Polokwane Plateau Bushveld;

[6] Refer to Ecological Specialist Report in Appendix G

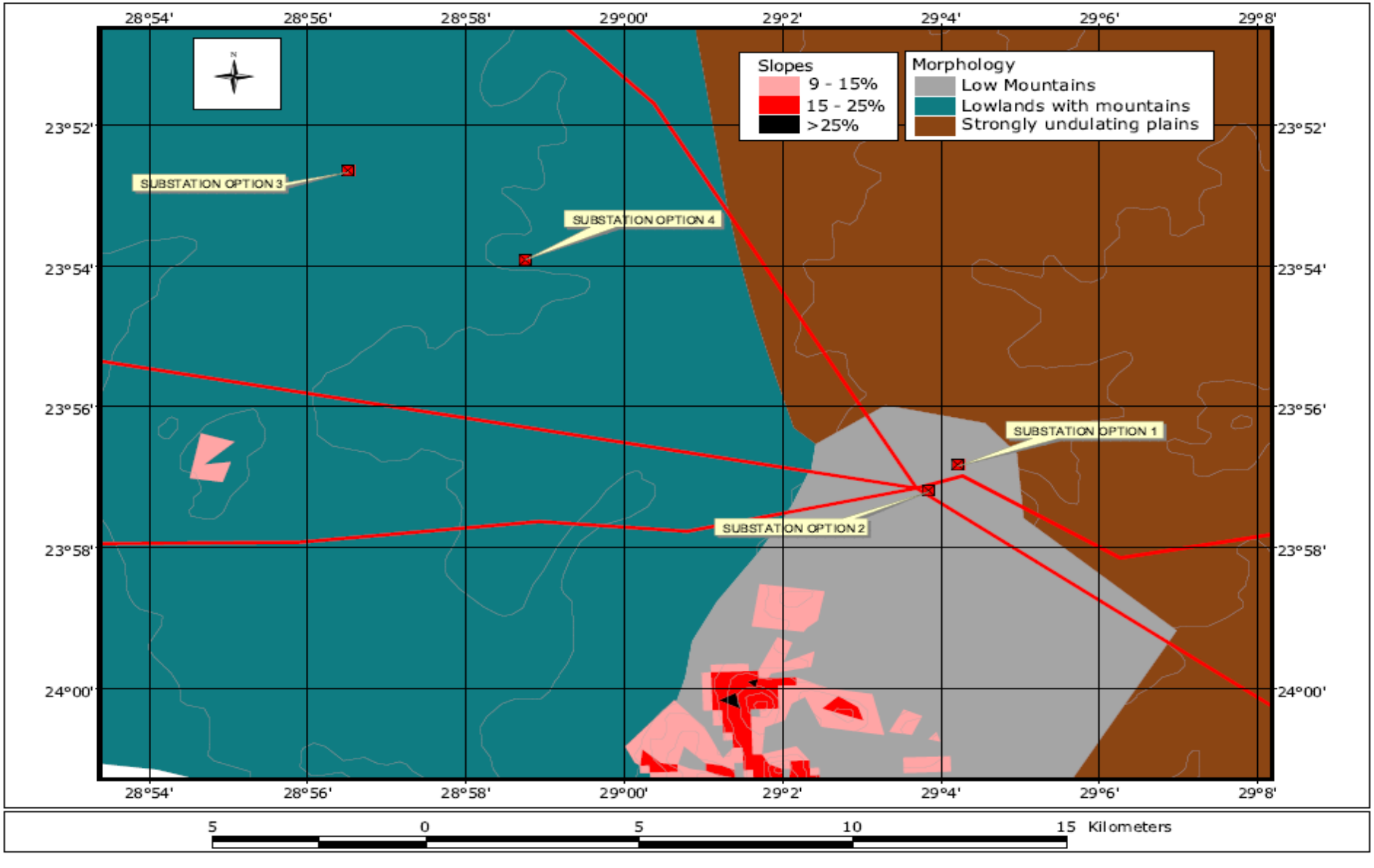

Figure 4.4: Topography & Slope analysis of the study area, highlighting areas with slopes exceeding 9%

The conservation status of the different vegetation types occurring in the study area is listed below in Table 4.1.

Table 4.1: Vegetation Conservation Status

VEGMAP Unit	% Conserved	% Transformed	Target	Status
Makhado Sweet Bushveld	1%	27%	19%	Vulnerable
Mamabolo Mountain Bushveld	8%	6%	24%	Least Threatened
Polokwane Plateau Bushveld	2%	17%	19%	Least Threatened

Although none of the substation sites are situated within areas of known botanical importance, several such sites are present in close vicinity to the sites and are likely to be affected by the turn-in lines. These areas frequently exhibit characteristics of a pristine nature, the presence of Red Data flora species, a high diversity or atypical or threatened vegetation types (Figure 4.5).

Wit Vinger Nature Reserve is situated approximately 2 km to the south-west of the Substation Option 2. Biodiversity attributes within these areas are not likely to be influenced by the turn-in lines.

No biosphere reserves are present within the immediate vicinity of the proposed development. Biodiversity attributes within these areas are not likely to be influenced by the turn-in lines.

The four substation sites that are earmarked for the proposed substation development consist predominantly of degraded woodland with some pockets of riparian vegetation still remaining, particularly near Options 3 and 4. The Southern African Bird Atlas Project (Harrison *et al*, 1997) recorded a total of 194 and 206 bird species in the respective quarter degree squares during the atlas development period. Four of these species are classified as 'vulnerable' and six as 'near threatened'. In addition, the White Stork and Abdim's Stork (Protected internationally under the Bonn Convention on Migratory Species) are considered as threatened species for the purpose of this study.

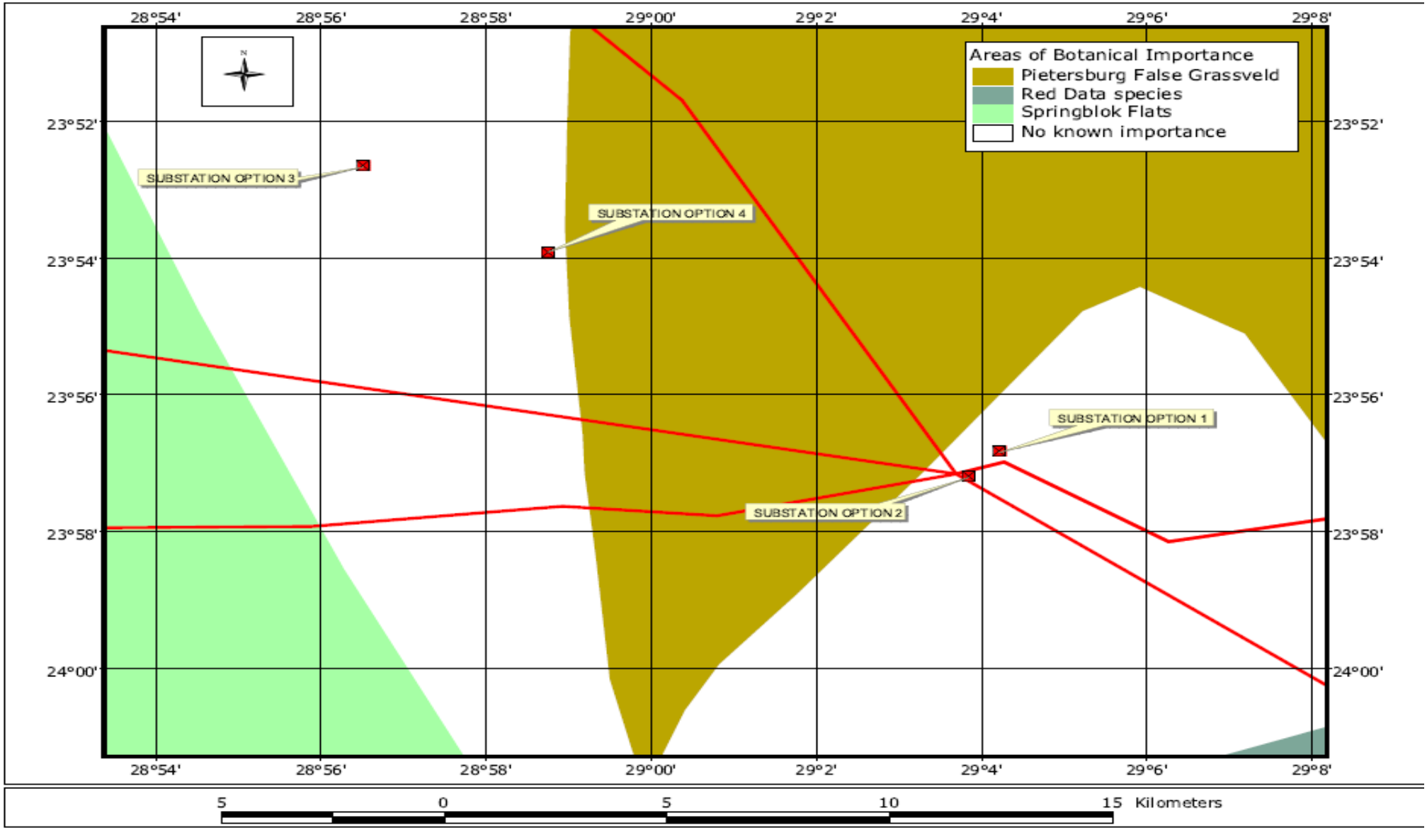

Figure 4.5: Areas of Botanical Importance in the study area

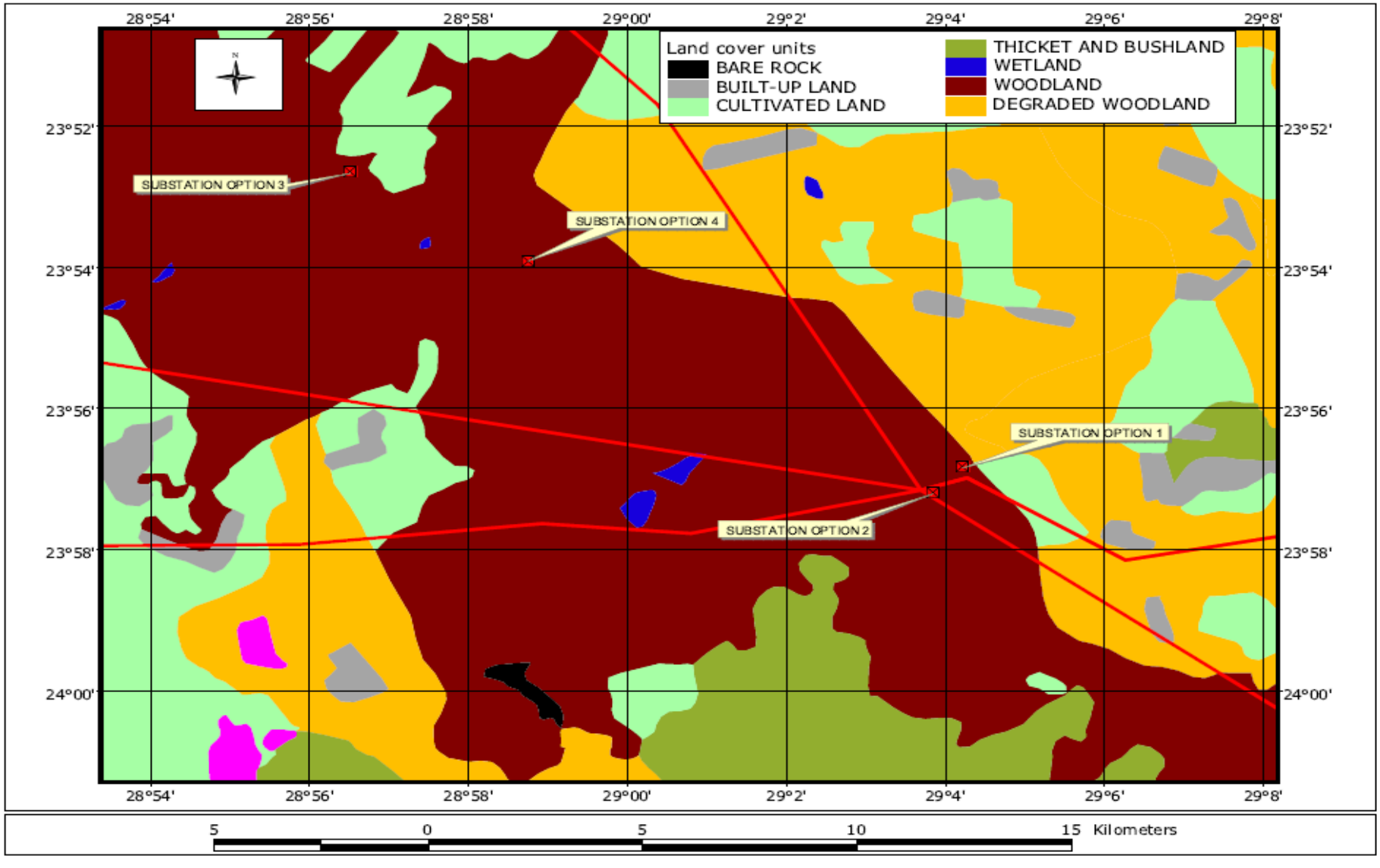

Figure 4.6: Landcover units in the study area

SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED OF MOKOPANE SUBSTATION AND TURN-IN LINES CHAPTER 5

This Environmental Scoping Study identifies the potential positive and negative environmental (biophysical and social) impacts associated with the proposed Mokopane Substation and turn-in power lines. A number of issues for consideration were identified through an evaluation of the proposed project, involving the project proponent, specialists with experience in EIAs for similar projects and in the study area, and a consultation process with key stakeholders that includes both government authorities and interested and affected parties (I&APs). In order to evaluate issues and assign an order of priority, it was necessary to identify the characteristics of each potential issue/impact:

» *the nature,* which includes a description of what causes the effect, what will be affected and how it will be affected;
» *the extent,* wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional

The evaluation of the issues resulted in a statement regarding the potential significance of the identified issues, as well as recommendations regarding further studies required within an EIA.

Potential Impacts of the Environment on the proposed Project Infrastructure

5.1. Potential Impacts on Transmission Infrastructure associated with Climate and Atmospheric Conditions

The local climate is anticipated to have very little impact on substation and turn-in power line components, but may cause small variations in the transmission of electricity. Extreme phenomena are unlikely to pose a threat to the substation, although secondary effects such as flood conditions associated with high rainfall may present problems to the operation of the substation and transmission power lines. Such events are, however, rare within the study area and, therefore, the risk associated with this potential impact is anticipated to be of low significance.

With the adoption of mitigating measures to alleviate the threat posed by lightning to the transmission of electricity, no negative impacts are anticipated from this phenomenon.

Levels of pollution within the atmosphere may present operational problems to the substation. Pollution levels may be elevated as a result of the extensive mining in the area and dust from gravel roads. Oxidation and subsequent

corrosion of metallic components associated with the substation may occur with time. This potential impact is dependent on the levels of pollution in the area, and may vary with time. There do not appear to be any impacts on the existing transmission infrastructure in the area as a result of pollution, and therefore the impacts on the proposed new infrastructure is expected to be of low significance. However, with the implementation of appropriate mitigation measures, this impact is expected to be of low significance but would need to be considered in terms of technical feasibility of the proposed substation site.

5.1.1. Conclusions and Recommendations

As the identified alternative substation sites are located in close proximity to each other, it is anticipated that the same climatic conditions would be experienced. Therefore, the impacts associated with climate would not differ between the sites. There is **no preferred site** in terms of this aspect.

An assessment of the potential impacts of climate and atmospheric conditions (e.g. potential impacts associated with lightening, precipitation and pollution levels) on the proposed transmission infrastructure should be undertaken by Eskom during the design phase. This is to provide an indication of what conditions are required to be accounted for by the design team to extend the life and reliability of the new infrastructure.

As the potential impacts associated with climate and atmospheric conditions are anticipated to be of low significance, no additional environmental studies are required to be undertaken in this regard.

5.2. Potential Impacts Associated with Geology and Soils

The construction of the substation and turn-in lines requires foundations to be constructed in order to increase the stability of the structures. The depth of the foundations will be determined by the underlying geology of an area.

The greatest impact on the geology and soil associated with the construction of any structures is the potential for soil erosion. This impact depends on the soil erosion potential of the overlying soils. Erosion potential is anticipated to increase during the site clearance and construction activities of the proposed substation and turn-in lines. The predicted impact is anticipated to be short-term construction impact on site, and may be of moderate to high significance unless appropriate mitigation measures are implemented.

5.2.1. Conclusions and Recommendations

Impacts on geology and soils are expected to be similar for all identified alternative sites. There is **no preferred site** in terms of this aspect. With the implementation of appropriate mitigation measures, the impacts on geology and soils associated with establishment of the proposed substation and turn-in lines at any of the identified alternatives sites are expected to be of low significance.

A detailed geotechnical survey of the proposed substation site and turn-in power line tower positions should be undertaken by Eskom during the design phase of the project in order to fully understand the soils in terms of founding conditions and erosion potential. This information is required to be used as part of the planning and design phase of the Mokopane Substation.

Detailed mitigation measures should be developed for the proposed site as part of the EIA phase of this project for inclusion in the draft Environmental Management Plan (EMP).

Potential Impacts of the proposed Project Infrastructure on the Environment

5.3. Potential Impacts on Topography

An analysis of the topography and landform revealed that the proposed substation options are situated within landform types ranging from lowlands with mountains in the west to low mountains in the east.

The proposed substation site options are generally flat, with slight slopes of less than 9°. Potential impacts on topography associated with the establishment of the proposed substation are anticipated to be localised and restricted to foundation areas associated with the proposed substation. Substation sites are required to be on level terrain and, therefore, these sites typically have minimal impact on the local topography, apart from the substation foundations.

Potential impacts on topography associated with the construction of the turn-in power lines are anticipated to be localised and restricted to foundation areas associated with the transmission power line towers. The potential impact associated with towers is anticipated to be negligible as technical constraints require Eskom to select transmission power line corridors which avoid areas which are impassable, thus minimising the need to disrupt the local topography.

Potential impacts on topography as a result of the construction of the substation and turn-in lines are, therefore, anticipated to be limited to the construction phase and construction areas and of low significance as no major changes on the landscape are required.

5.3.1. Conclusions and Recommendations

Impacts on topography as a result of the construction of the substation and turn-in power lines are expected to be restricted to the foundations and of low significance. Impacts are expected to be similar for all alternative sites identified, and therefore there is **no preferred site** in terms of this aspect. No additional studies are required to be undertaken within the EIA with regards to potential impacts on topography as primary impacts associated with substation and transmission power line construction are associated with the disruption of the soil surface. However, appropriate mitigation and management measures should be developed within the EIA phase for inclusion in the project EMP.

5.4. Potential Impacts on Agricultural Activities

At the time of the study it was believed that the land on which all of the options were located is State-owned. Evidence could be found on Google Earth of a cultivated piece of land in close proximity to Option 1. It would appear as if all sites are currently used for grazing. As these farms are not privately owned, it is assumed that the area is used for grazing by community members from the surrounding settlements.

To accommodate the substation, land will be permanently lost for agricultural activities. The loss of land will potentially impact on the livelihoods of those parties currently using the site for grazing. It will still be possible to use the land surrounding the site for agricultural activities. However, the presence of power lines entering and exiting the site (i.e. the turn-in lines and Delta-Mokopane lines) will potentially affect agricultural activities, specifically the cultivation of land. Although it is possible to cultivate land in a servitude, the presence of power lines complicates the process.

Temporary loss of cultivated and grazing land will occur due to construction activities around the site and access roads. It may happen that construction teams leave gates open, do not follow access roads, cut through fences and steal cattle. The effect could be that less land is available for cultivation and grazing, the cross breeding of cattle could occur, game/cattle may be lost, and erosion is hastened.

5.4.1. Comparison of the Proposed Substation Site Options

Between impacts on grazing land for cattle and cultivated land, grazing land is generally the preferred option for development. Substation sites that allow for power lines to follow existing infrastructure, such as roads and power lines, should be given preference as the impacts on agricultural activities will be

localised in one corridor. However, potential cumulative impacts of a number of power lines running together should be considered.

Considering the potential effect of the site and the proposed two 765kV transmission power lines between the Delta Substation and the new Mokopane Substation[5] on agricultural activities, construction of the substation on Options 2, 3 and 4 are preferred. The construction of the substation at site option 1 is more likely to affect cultivation activities on land immediately surrounding the site, and is least preferred. The proposed two 765kV transmission power lines will follow a longer length of the existing Matimba-Witkop transmission power lines should Options 3 and 4 be selected, and may localise impacts on agricultural activities. Options 3 and 4 are therefore preferred.

5.4.2. Conclusions and Recommendations

Substation Options 3 and 4 are nominated as being preferred from an agricultural perspective.

To fully assess the potential impacts as a result of geographical change processes, more information is needed on the following aspects:

» The size and number of expected construction and operational vehicles and machinery as well as which route(s) will be used to gain access to the various sites.
» Construction activities on site.
» Planned developments for the area in terms of tourism, mining and agriculture.
» Confirm land use of impacted and affected farm portions.
» Confirm location of dwellings/structures surrounding the sites.
» Agricultural potential of the proposed substation sites.

The following studies are recommended for the Impact Assessment Phase:

» Undertake an agricultural potential specialist study.
» Obtain and analyse information from the project proponent on the size and number of the construction and operational vehicles.
» Further scrutinise the Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the affected District and Local municipality in terms of future developments and tourism. If additional information is required other than that contained in the IDP/SDF, conduct interview(s) with relevant town planners and tourism bodies.
» Interview impacted and affected landowner(s).

[5] Refer to separate Scoping Report

5.5. Potential Impacts on Surface Water Resources

The construction of structures close to rivers can potentially impact on water resources through sedimentation and pollution during the construction phase. These potential impacts can be minimised through the implementation of appropriate mitigation and management measures.

Substation Option 1 is not situated within immediate proximity of areas of surface water. There are furthermore not any major rivers that will be crossed by the turn-in lines from the existing Matimba-Witkop 400kV lines. However, small non-perennial streams might be affected by the potential turn-in lines at this site. Substation Options 2, 3 and 4 are situated within relative close distance of drainage lines and the construction and operation of a substation at one of these potential sites might adversely affect the biodiversity status and sensitive biological attributes contained within these rivers and surrounding areas. Many of these potential impacts can however be mitigated.

5.5.1. Conclusions and Recommendations

Potential impacts associated with the construction and operation of the substation can be significantly minimised through the implementation of appropriate management measures. Although the construction of a substation on Option 1 would potentially have a lower impact on surface water, all of the proposed options are considered to be acceptable as impacts on surface water resources can be relatively easily mitigated. In order to reduce potential impacts on surface and groundwater during the construction and operational phases, detailed mitigation measures should be developed for the proposed site as part of the detailed EIA phase of the process.

5.6. Potential Impacts on Biodiversity

Taking the nature of the development into consideration, no impacts were identified that could potentially be beneficial to the biological environment of the study area. The following impacts were identified as being potentially deleterious to the environment:

» Loss of Biodiversity - Destruction of threatened species and habitat
» Loss of Biodiversity - Destruction of Protected Tree Species
» Loss of Biodiversity - Changes to the local/ regional biodiversity
» Habitat Degradation - Destruction of pristine/ sensitive habitat types
» Habitat Degradation - Impacts on species and habitat in the immediate surrounds
» Effects on Biological Systems – Changes to biological and ecosystem processes

Available data indicate few protected tree species within the study area. This is, however, regarded by the ecological specialists as a reflection of the poor knowledge of the flora of the region and not necessarily as a result of the absence of these species. Several species are expected to be identified during the EIA investigations, based on previous investigations in similar, nearby areas as well as visual observations made during the scoping and field investigations. However, these trees are generally widespread and occur extensively and the proposed development does not represent a threat to the status of these species, mainly as a result of the localised nature of the disturbance expected to be associated with the construction and operation of a substation of this nature. The likelihood of this impact occurring is regarded as being definite. Obtaining relevant permits will therefore be required and transplanting of some vegetation may need to be considered in selected areas.

The loss of threatened species or areas that are suitable for these species is considered to be a significant impact on the biodiversity on a local and regional scale. Threatened species, in most cases, do not contribute significantly to the biodiversity of an area in terms of sheer numbers since these generally occur at low abundance values. However, they are extremely important in terms of the biodiversity of an area and high ecological value is placed on the presence of such species in an area. Threatened species are particularly sensitive to changes in their environment, having adapted to specific habitat requirements. Habitat changes, mostly as a result of human interferences and activities, are one of the greatest reasons for these species having a threatened status. The likelihood of Red Data flora or fauna species occurring within the study area is regarded as being medium. Therefore, this impact is regarded as being moderately significant. The highest probability of occurrence of such species is associated with atypical habitat types such as rocky outcrops and riparian environments as well as pristine habitat types, which are abundantly present in the study area.

In order to avoid impacts on communities of Threatened species it is important to:

» Identify communities/ assemblages of Red Data species;
» Take cognisance of areas where Red Data species are known to occur; and
» Identify habitat that is particularly suitable for the occurrence of Red Data species, taking habitat preferences and requirements of these species into consideration.

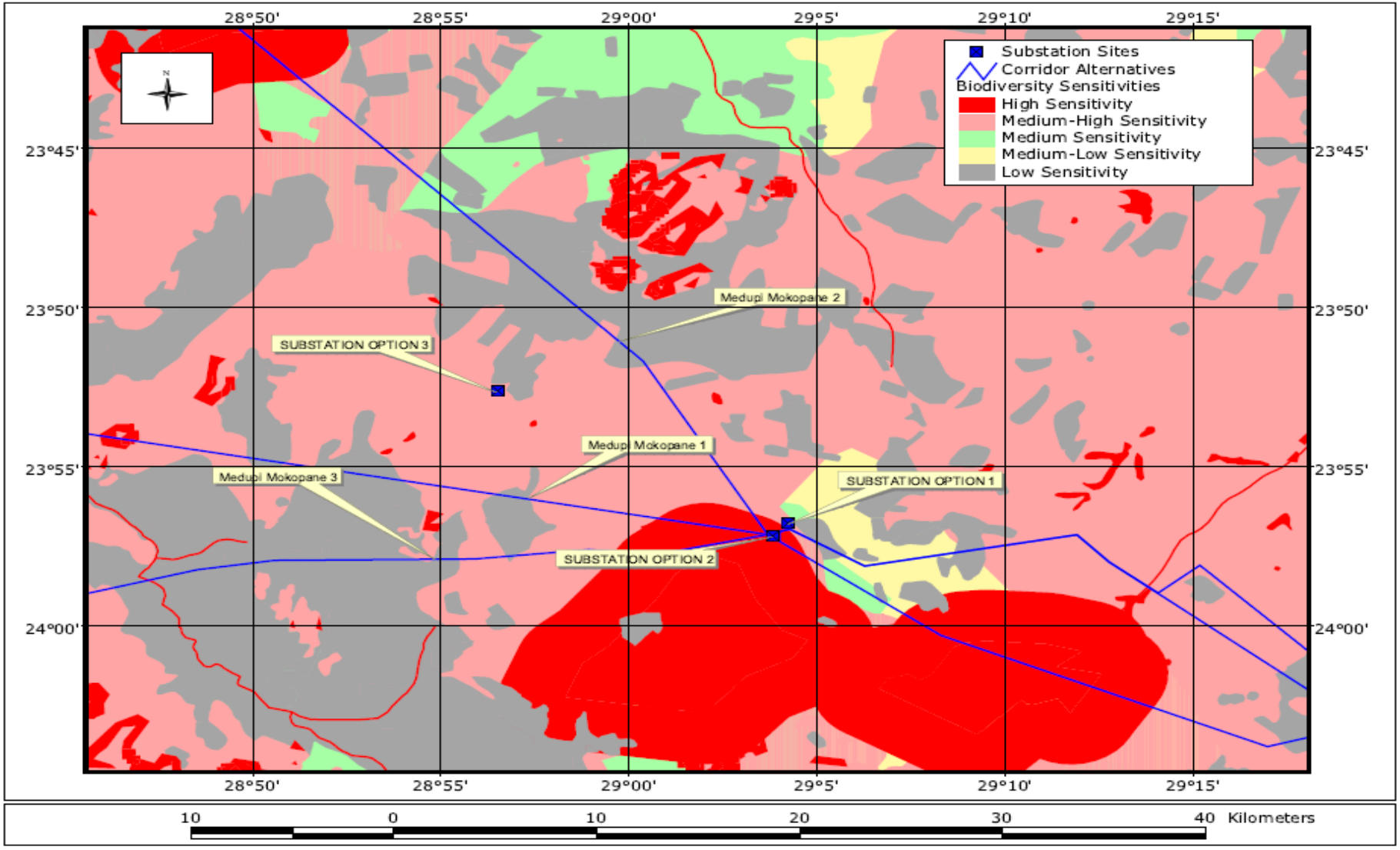

Figure 5.1: Biodiversity Sensitivities in the study area

The transformation of natural habitat during construction will inevitably result in the establishment of habitat types that are not considered representative of the region. As a result of the severity of transformation, surrounding areas are frequently invaded by species not normally associated with the region, while species that occurred abundantly in an area might be affected to a larger or smaller extent. It is expected that the local status of species might therefore be affected, while the regional status of species is not generally impacted on by a development of this nature, unless the area of impact is directly within an extremely limited distribution range and the species has a threatened status.

Furthermore, as a result of decreased habitat, increased competition and lower numbers of endemic biota, the genetic pool of species might eventually be influenced by the introduction of non-endemic species or the disappearance or change in abundance of other species. Different communities and assemblages have developed separate gene structures as a result of habitat selection and geographical separation and the introduction of animals of the same species that might be genetically dissimilar to the endemic species might lead to different genetic selection structures, eventually affecting the genetic structure of current populations.

Impacts resulting from construction and operational activities associated with the proposed substation could potentially affect surrounding areas and species in the direct vicinity of the development. These impacts could include all of the above impacts, depending on the sensitivity and status of surrounding habitat and species, as well as the extent of impact activities. While impacts from construction and operational activities can in most cases not be prevented entirely, the severity of the impacts can be mitigated against.

5.6.1. Comparison of the Proposed Substation Site Options

» *Substation Site Option 1*
Although situated within areas of relatively low biodiversity sensitivity, the proximity to areas of high biodiversity sensitivity renders this option less suitable for the proposed development, particularly when turn-in lines from the existing Matimba-Witkop lines and potential lines from the Delta Substation are considered[6]. This site is considered the third preferred alternative from a biodiversity perspective.

» *Substation Site Option 2*
This particular site is situated within an area of high biodiversity sensitivity and is regarded the least preferable of the four substation site options.

[6] The proposed 765kV lines are considered within a separate report Mokopane Draft Scoping Report: Transmission Lines

» *Substation Site Option 3*
This site is regarded the most preferable of the four options and, although situated within an area of medium-high biodiversity sensitivity, the turn-in lines from the existing Matimba-Witkop lines and proposed lines from the Delta Substation are expected to result in the low impact on biodiversity attributes of the region.

» *Substation Site Option 4*
This site is regarded the second most preferable of the four options and, although situated within an area of medium-high biodiversity sensitivity, the turn-in lines from the existing Matimba-Witkop lines and potential lines from Delta Substation are expected to result in a low impact on biodiversity attributes of the region.

5.6.2. Conclusions and Recommendations

Impacts in sensitive areas are not expected to occur as a result of the establishment of the proposed substation. It is largely possible to mitigate significant impacts and limit the extent of ecological degradation by means of site selection, localised realignments and site-specific mitigation measures. The status of habitat types associated with the proposed substation site and turn-in lines will be determined during the EIA on a local as well as regional scale.

Substation Site Option 3 is regarded as the one with least impacts/most preferable of the four options from an ecological perspective.

In order to determine the impact of the proposed development on the biological environment, it is necessary to compile baseline information of the area as follows:

» Survey environmentally sensitive areas in order to verify results of the GIS modelling and scoping assessment, preferably in the summer period.
» Survey representative areas in order to obtain a clear understanding of the nature of sensitivity in specific sites.
» Survey the area for general floristic and faunal diversity (common species, Red Data flora and fauna species, alien and invasive plant species).
» Assess the potential presence of Red List flora and fauna species.
» Describe the status and importance of any primary vegetation.
» Provide descriptions of ecological habitat types, plant communities and faunal assemblages.
» Compile an ecological impact evaluation, taking the following aspects into consideration:
  * the relationship of potential impacts to temporal scales;

- the relationship of potential impacts to spatial scales as well as biological systems and processes;
- the severity of potential impacts;
- the risk or likelihood of potential impacts occurring; and
- the degree of confidence placed in the assessment of potential impacts.

» Map all relevant aspects.

» Recommend a preferred substation site and route variants based on results of the ecological impact evaluation.

5.7. Potential Impacts on Avifauna

Table 5.1 shows the historical vegetation composition of the quarter degree squares within the study area (Harrison *et al,* 1997). It is widely accepted within the ornithological community that vegetation structure, rather than the actual plant species, influences bird species distribution and abundance (in Harrison *et al,* 1997). The description of vegetation presented in this study therefore concentrates on factors relevant to the bird species present, and is not an exhaustive list of plant species present.

Table 5.1: Vegetation composition of the study area (Harrison et al, 1997)

Biome	Vegetation type	2328DD	2329CC
Woodland	Arid Woodland	31%	68%
Woodland	Moist Woodland	69%	32%

It is evident from the table above that the dominant vegetation type found within the study area is woodland of one type or another, i.e. Arid or Moist woodland. It must however be noted that the majority of this study area is in a state of transformation, with a number of settlements dotted throughout the immediate surrounds intermingled with mining areas and both commercial and subsistence forms of cultivation. As a result, a great deal of the vegetation within the study area has and is being transformed. The habitat in the area has been subjected to severe pressure from the neighbouring communities and the various land use types.

Two common problems in southern Africa (with respect to bird – power line interactions) are electrocution of birds (and other animals) and birds colliding with power lines. Other problems are electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure, (Van Rooyen and Taylor 1999) and disturbance and habitat destruction during construction and maintenance activities. A number of Red Data species which are sensitive to interactions with power line infrastructure could potentially occur within the broader study area.

A number of mechanisms exist through which birds are able to cause electrical faults on transmission lines. Frequent faulting affects the quality of electrical supply to the end customers. Power utilities aim to maximise the quality of supply to customers at all times. In the case of a bird streamer induced fault, the fault is caused by the bird releasing a "streamer" of faeces which can constitute an air gap intrusion between the conductor and the earthed structure. Bird species capable of producing large or long streamers are more likely to cause streamer faults. Bird pollution is a form of pre-deposit pollution. A flashover occurs when an insulator string gets coated with pollutant, which compromises the insulation properties of the string. When the pollutant is wetted, the coating becomes conductive, insulation breakdown occurs and a flashover results. Larger birds and congregations of many birds are likely to result in heavy pollution of insulator strings. Bird nests may also cause faults through nest material protruding and constituting an air gap intrusion. This impact is only possible on the self support towers along the proposed power line, as the cross rope suspension tower does not provide suitable space in the relevant positions.

Potential ecological impacts associated with the construction of the proposed transmission infrastructure include the following:

» **Electrocutions:** Electrocution of birds on overhead lines refers to the scenario where 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). Due to the large size of the clearances on most overhead lines of above 132kV, electrocutions are not a major issue. Therefore, electrocutions are not envisaged as an impact on these proposed lines.

» **Collisions:** Collisions are the biggest single threat posed by transmission lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001). The Red Data species vulnerable to power line collisions are generally long-lived, slow reproducing species under natural conditions. Some require very specific conditions for breeding, resulting in very few successful breeding attempts, or breeding might be restricted to very small areas. Therefore, power lines can be a major cause of avian mortality among power line sensitive species, especially Red Data species.

» **Habitat destruction and disturbance:** During the construction and maintenance substations and turn-in lines, habitat destruction and transformation inevitably takes place. In general, much of the proposed study area for Substation Option 1 is disturbed and degraded to some extent

already. In this context, habitat destruction associated with construction of the proposed turn-in lines and Substation at this particular site is not anticipated to be significant. The same applies to Substation Options 2 and 3 and 4, with the exception being the riparian vegetation within close proximity of these proposed Substation sites.

Whilst much of the bird species distribution in the study area can be explained in terms of the broad vegetation description (refer to Table 5.1), there are many differences in bird species distribution and density that correspond to differences in habitat at the micro-level. These "bird micro-habitats" are evident at a much smaller spatial scale than the broader vegetation types or biomes, and can largely only be identified through a combination of field investigation and experience. The habitat that is relevant to the birds may also be broader than merely the vegetation type and structure and may include abiotic elements such as man-made infrastructure. It was therefore important to visit the study area and examine these characteristics first hand.

The following bird micro-habitats were identified within the immediate surrounds of the substation sites:

» **Dams:** There are several small man-made impoundments within the study area. Whilst dams have altered flow patterns of streams and rivers, and affected many bird species detrimentally, a number of species have benefited from their construction. The construction of these dams has probably resulted in a range expansion for many water bird species that were formerly restricted to areas of higher rainfall.

» **Arable land:** Arable or cultivated land represents a significant feeding area for many bird species in any landscape for the following reasons: through opening up the soil surface, land preparation makes many insects, seeds, bulbs and other food sources suddenly accessible to birds and other predators; the crop or pasture plants cultivated are often eaten themselves by birds, or attract insects which are in turn eaten by birds; during the dry season arable lands often represent the only green or attractive food sources in an otherwise dry landscape. In this study area, there are significant arable lands, both commercial and subsistence varieties.

» **Rivers, pans and wetlands:** Substation Options 2 and 3 are located a short distance (0.3 km) from the Groot-Sandsloot River and Witrivier respectively. Although sections of the river were dry at the time of the field visit, the tall fringing riparian forest and well developed woodland could support diverse and distinct woodland avifauna (Taylor et.al., 1999). These areas are of particular importance for birds, with riparian vegetation being extremely important to threatened riverine bird species and waterbird communities.

Relevant to this study, Yellow-billed Stork, Greater and Lesser flamingos will frequent this river system.

Rivers are extremely important sources of water for most bird species and will be regularly utilised not only as a source of drinking water and food, but also for bathing.

Table 5.2: Summarised evaluation of the impacts of the proposed development on the avifauna of the area

Nature of the impact	Extent of potential impact	Significance			
		Option 1	Option 2	Option 3	Option 4
Habitat destruction through construction & maintenance of the substation and power line	Local	Low	Medium Note: Riparian vegetation occurs within close proximity to the proposed site	Medium Note: Riparian vegetation does occur within close proximity to the proposed site	Medium Note: Riparian vegetation does occur within close proximity to the proposed site
Disturbance during construction & maintenance of the substation and power line	Local	Low	Low	Medium	Medium
Collision of birds with earth wires of the 400kV loop-in and loop-out power lines Particularly Red Data species such as White-bellied Korhaan, White Stork, Yellow-billed Stork, Abdim's Stork, Secretarybird and Southern Bald Ibis	Local	Medium	Medium	Medium	Medium
Electrocution of birds on power lines	N/A	No Impact	No Impact	No Impact	No Impact
Electrocution of birds within the substation (operational phase)	N/A	Low	Low	Low	Low
Impact of birds on quality of supply	Local	Low - *cross rope suspension towers* Medium - *self support towers*	Low - *cross rope suspension towers* Medium - *self support towers*	Low - *cross rope suspension towers* Medium - *self support towers*	Low - *cross rope suspension towers* Medium - *self support towers*
Nesting of birds on towers	Local	Low	Low	Low	Low

5.7.1. Comparison of the Proposed Substation Site Options

The majority of the Red Data species likely to occur in the area are physically large species, meaning that they are capable of interacting directly with electrical infrastructure through collision, nesting, and electrical faulting. All bird species, including even the smaller ones are vulnerable to indirect impact by the proposed development through factors such as disturbance and habitat destruction.

» *Substation Site Option 1 (Doornfontein):*
The area earmarked for the proposed development is comprised entirely of degraded woodland. A large portion of land adjacent to the site is under cultivation and therefore already transformed. The area is bordered by a secondary road.

» *Substation Site Option 2 (Aaronsfontein):*
The majority of the vegetation is degraded. It is located approximately 0.3km from a tributary of the Groot-Sandsloot River. The area is bordered by a secondary road.

» *Substation Site Option 3 (Zuid Holland):*
The vegetation is comprised largely of fallow fields. It is located approximately 0.3 km from the Witrivier. A large dam is located within 0.25 km to this proposed site. However, it does appear that the proposed substation site is located on the opposite side of the road – the presence of the dam should therefore not have a significant impact on the construction of the substation at this site. The area is bordered by a secondary road.

» *Substation Site Option 4 (Noord Braband):*
The majority of the vegetation is degraded. It is located approximately 1 km from the Witrivier. Four dams occur within 2 km of the proposed site and the area is bordered by a secondary road.

In order to demonstrate the relative preference of the four options from an avifaunal perspective, a score of 1 to 10 was assigned to each option. A score of 10 would mean that the substation site is highly preferred, whilst a score of 1 would mean that the corridor is a 'no go' from an avifaunal point of view.

Table 5.3: Preference scores for the four alternative substation sites

Option	Preference Score
Option 1	7
Option 2	5
Option 3	5
Option 4	5

From the information provided above coupled with the knowledge and experience of bird interactions with electrical infrastructure it can be concluded that Substation Option 2 (Aaronsfontein), Option 3 (Zuid Holland) and Option 4 (Noord Braband) are not favoured because of their proximity to water sources (dams and river systems). Although Option 1 is bordered by cultivated fields, a draw card for various species, the area is already in a state of transformation through a change in land use and is also comprised almost entirely of degraded woodland, limiting the number and diversity of bird species. All four sites are bordered by secondary roads making them all readily accessible for construction and maintenance purposes, preventing further vegetation and possible habitat loss as a result of the construction of an additional road. Option 1 (Doornfontein) presents itself as the preferred substation site from an avifauna perspective due to the absence of water sources and riparian vegetation within the greater area.

It must be borne in mind that through the establishment of the Mokopane Substation, future electrical infrastructure in the form of distribution power lines will undoubtedly be added to the network in and around this substation site. Although the proposed loop-in lines may not necessarily cross any of the afore-mentioned river systems at present, there is the potential that additional power lines to be developed in the future may do so, increasing the likelihood of collisions occurring in these sensitive areas. It is therefore recommended that development be restricted to a minimum around these water sources.

5.7.2. Conclusions and Recommendations

Substation Site **Option 1** (Doornfontein) presents itself as the preferred substation site from an avifauna perspective, largely due to the potential future impacts associated with power lines associated with the other substation site options. Should the construction of the substation be undertaken on any of the other substation options identified, extensive mitigation will be required on power lines into and out of the substation site would be required to be implemented in order to minimise these potential impacts.

During the EIA Phase, the above identified impacts will be assessed in more detail for the overall preferred substation site after integration of all specialist input. Particular emphasis will be placed on habitat destruction and disturbance associated with the construction of Mokopane Substation and its associated 400kV loop-in and loop-out power lines, as this has been identified as potentially being of medium significance. Mitigation measures for the alleviation of the identified significant impacts will also be recommended and explained. Once the final corridor for the proposed 400kV loop-in and loop-out power lines has been determined, the collision impacts associated with the power lines will be discussed in detail. In this respect special attention will given to Red Data species, particularly the White-bellied Korhaan, Southern Bald Ibis, Secretarybird and the

various stork species. Potential high risk areas will be identified and suitable mitigation measures to reduce the collision risk will be proposed.

5.8. Potential Impacts on Visual/Aesthetic Aspects

Initial viewshed analyses of the four proposed substation sites, based on a 20m contour interval digital terrain model (DTM) of the study area, indicate the potential visual exposure of each substation site and its associated turn-in line infrastructure (refer to Figures 5.2 to 5.5). The object offsets for the viewshed analyses were taken at 20m above average ground level (i.e. the approximate height of the substation structures) and the visibility was calculated for a radius of 5km from each site. The viewshed analyses do not include the potential visual absorption effect of the natural vegetation and represent the 'theoretical visibility' of the proposed substation from the alternative sites.

5.8.1. Comparison of the Proposed Substation Site Options

» *Substation Site Option 1 (Doornfontein)*
Option 1 has a relatively scattered pattern of visual exposure due to the undulating nature of the topography and will potentially be visible from Segoahleng, Ga-Mangou and Glen Roy (refer to Figure 5.2).

» *Substation Site Option 2 (Aaronsfontein)*
Option 2 has, due to its relatively close proximity to Option 1, a very similar pattern of visual exposure. Its location slightly lower down the slope makes it slightly less visible from settlements to the north (Ga-Mangou and Glen Roy) but it would still potentially be visible from Segoahleng (refer to Figure 5.3).

» *Substation Site Option 3 (Zuid Holland)*
The core area of visual exposure of Site Option 3 is indicated on Figure 5.4. This option is not expected to be visible from any major villages or settlements but it will potentially be visible from the N11 national road at a distance of 3 km at the closest.

» *Substation Site Option 4 (Noord Braband)*
Substation site Option 4 is not expected to be visible, or have a significant visual influence on observers travelling along the N11 (located beyond 5 km from the proposed site) (refer to Figure 5.5). It is also not in close proximity to any major settlements within the core area of visual exposure.

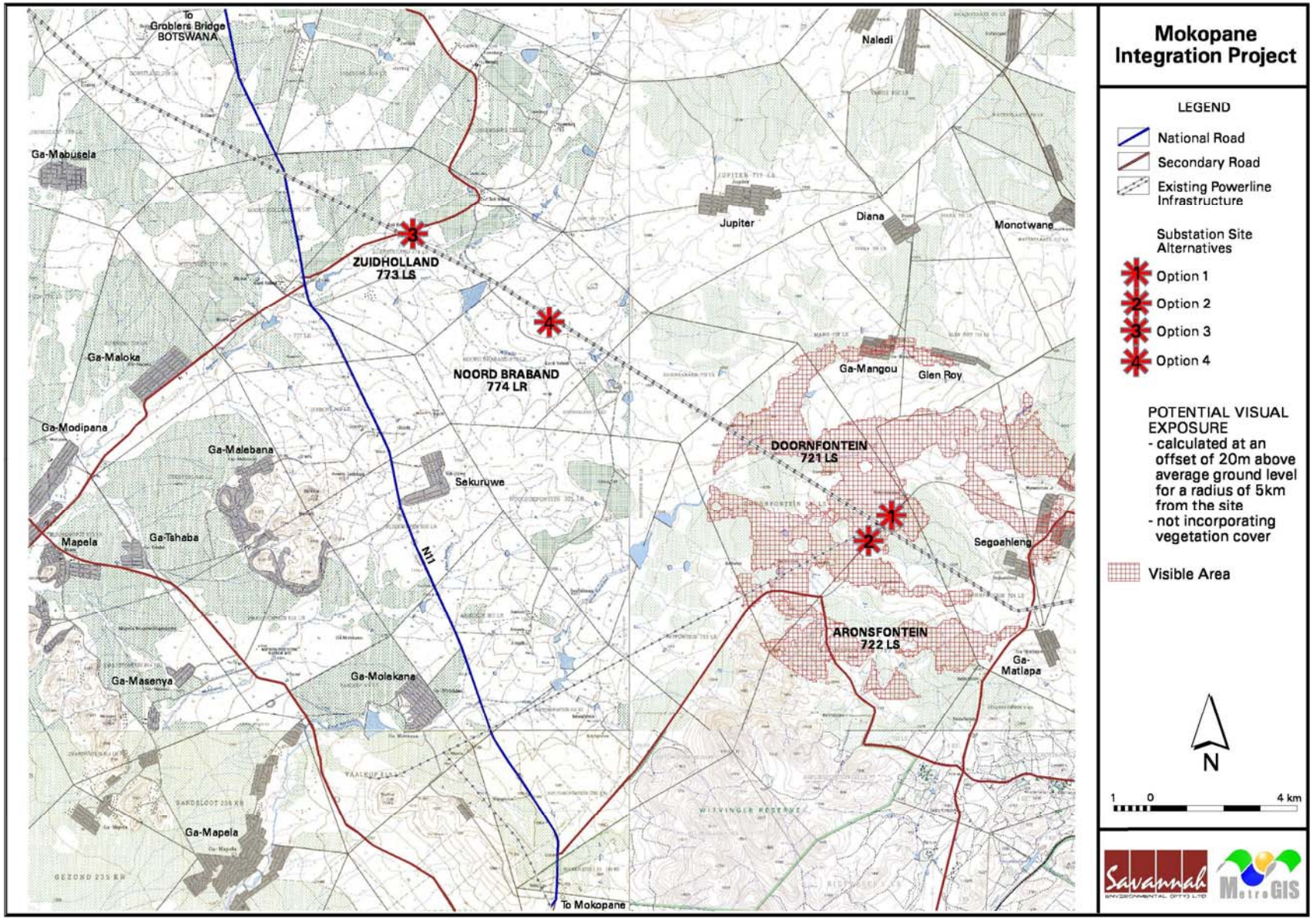

Figure 5.2: Potential visual exposure - substation Option 1

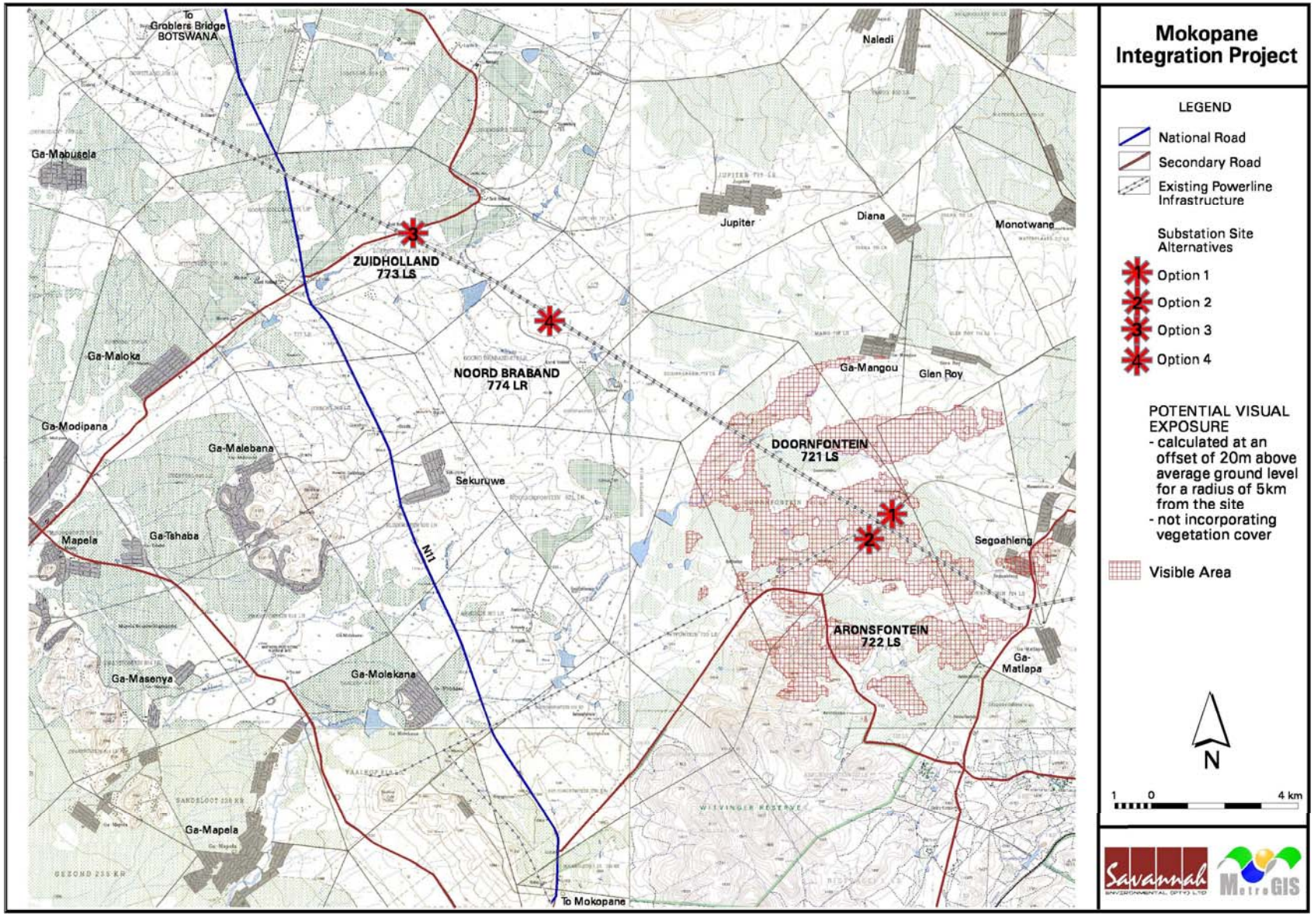

Figure 5.3: Potential visual exposure - substation Option 2

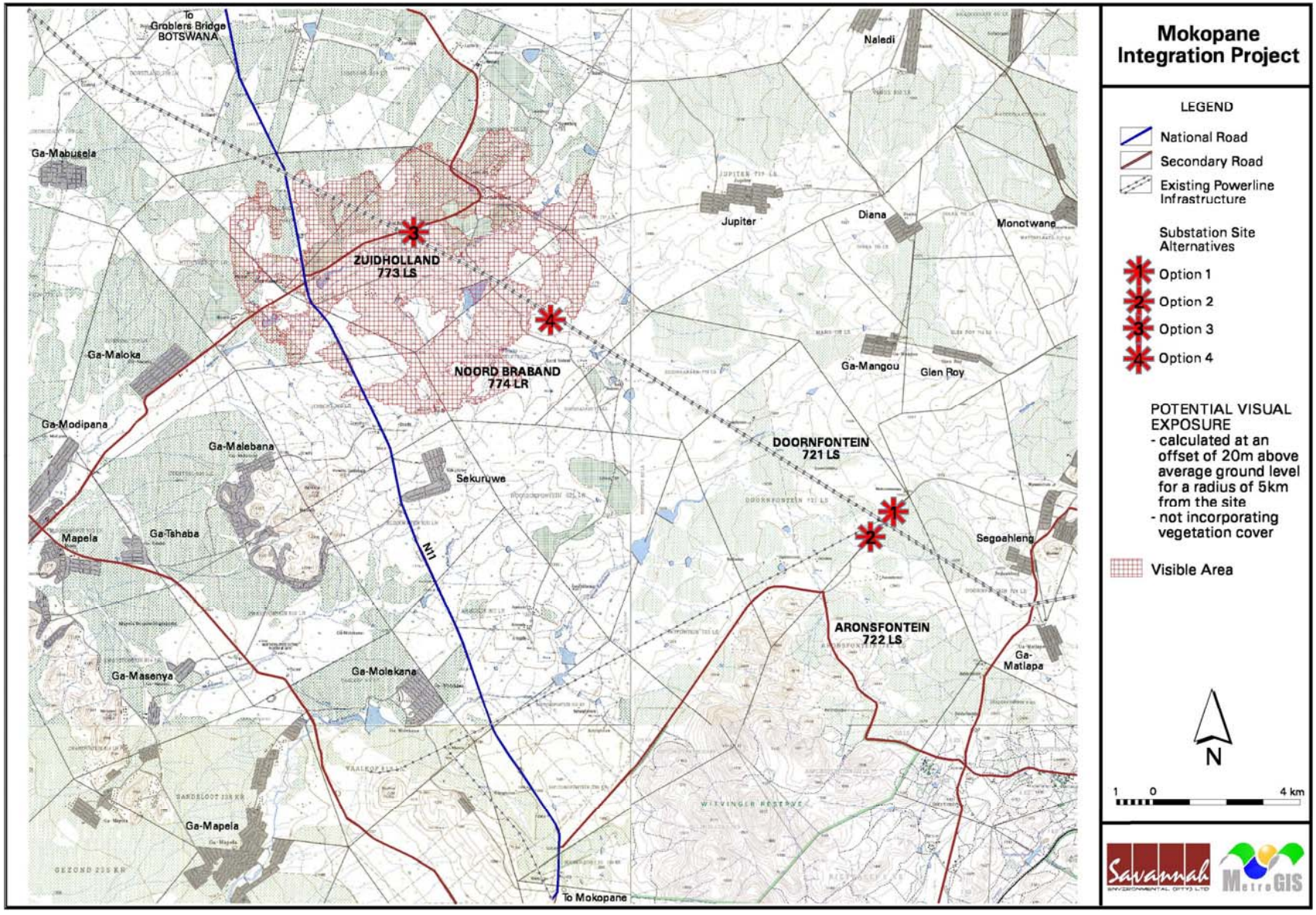

Figure 5.4: Potential visual exposure - substation Option 3

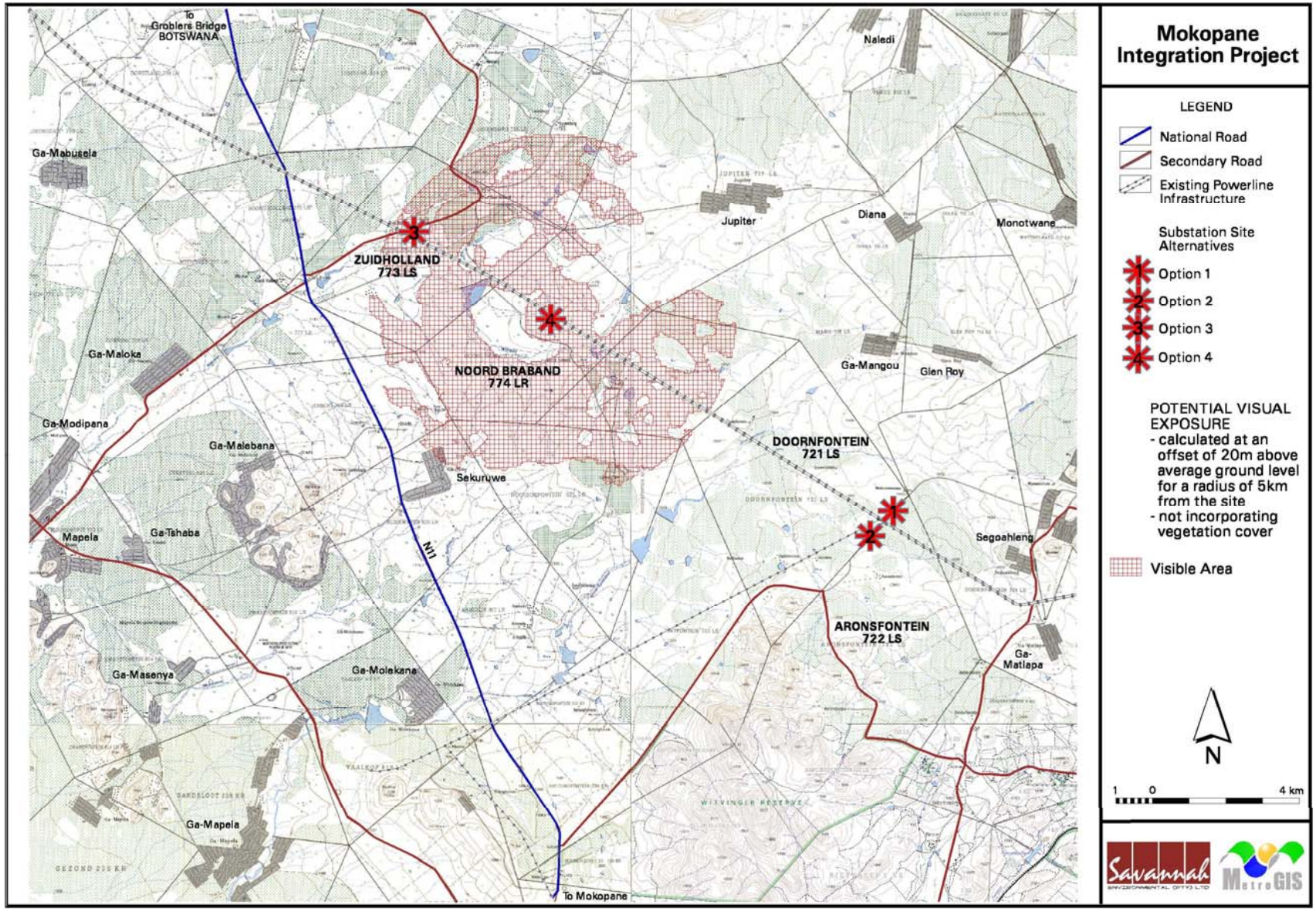

Figure 5.5: Potential visual exposure - substation Option 4

The proposed Mokopane substation should ideally not be visible from major settlements or major roads where it could potentially have a visual impact on observers residing in the area or travelling along these roads. It should also ideally not be located within the sphere of visual influence of areas with potentially conflicting land uses (i.e. nature reserves). Substation site Options 1, 2 and 3 have the potential to visually impact on either settlements and major roads or the Wit Vinger Nature Reserve. From a visual perspective, the preferred option for the construction of the Mokopane substation is Option 4, due to its relatively remote location.

5.8.2. Conclusions and Recommendations

The proposed substation sites have the potential to be visually exposed to fairly large areas. This is based on the theoretical visibility as indicated by the preliminary viewshed analyses undertaken from each of these sites. The fact that these areas are exposed does not imply that it constitutes a significant visual impact, at least not for all of the exposed areas. Further investigation is necessary in order to determine the specific visual impact within these exposed areas (i.e. the potential occurrence of sensitive visual receptors). The preferred option for the construction of the Mokopane substation, due to its relatively remote location, is **Option 4**.

The visual impact assessment within the EIA will address these and other crucial issues related to the visibility of the proposed Mokopane Integration Project. These issues or criteria will aim to quantify the actual visual impact and to identify areas of perceived visual impact.

Other issues/criteria to be addressed by the visual impact assessment include:

» Visual distance/observer proximity to the proposed infrastructure (apply the principle of reduced impact over distance)
» Viewer incidence/viewer perception (identify areas with high viewer incidence and negative viewer perception)
» Landscape character/land use character (identify conflict areas in terms of existing and proposed land use)
» Visually sensitive features (scenic features or attractions)
» General visual quality of the affected area
» Visual absorption capacity of the natural vegetation
» Potential visual impact of lighting (after hours operations and security) of the proposed substation
» Potential mitigation measures

An initial scanning level assessment of the above issues did not reveal any fatal flaws to be associated with the preferred substation option as suggested in this

report. These issues should however still be investigated in greater detail in order to scientifically motivate and/or identify any other mitigating/aggravating circumstances.

An initial scanning level assessment of the above issues did not reveal any fatal flaws to be associated with the *preferred* options. These issues should however still be investigated in greater detail in order to scientifically motivate and/or identify any other mitigating/aggravating circumstances.

5.9. Potential Impacts on Heritage Sites

At least one archaeological (heritage) zone can be distinguished in the study area considered from an ecological, historical and pre-historical perspective. This cultural landscape comprises the plains to the west of Polokwane which are dotted with scattered mountains, kopjes and knolls across a vast plain.

When considering the pre-historical and historical context for the broader study area it is clear that some of the following types and ranges of heritage resources as outlined in Section 3 of the National Heritage Resources Act (No 25 of 1999) may occur in the project area, namely:

» Stone Age sites or scatters of stone tools near pans, in eroded areas or dongas, near small outcrops and along older beds and floodplains of the Mogol, Lephalale and Mogalakwena Rivers as well as tributaries running into these rivers.
» Early Iron Age farming settlements near main rivers or where tributaries join these major rivers. Small numbers of potsherds and evidence for occupation may be associated with outcrops in the area.
» Late Iron Age remains in the Langa-Ndebele, Seleka-Ndebele and the Shongwane spheres of influence.
» Farm homesteads with associated infrastructure such as sheds and outbuildings, family graveyards or informal graveyards which date from the historical period. (If historical farm homesteads with associated infrastructure and activity areas have remained unaltered such complexes may constitute cultural landscapes).
» Graveyards and informal graves which occur together with dilapidated homesteads on farms, townships and informal villages which scattered across the project area.
» Individual buildings such as farm houses which are older than sixty years which therefore qualify as heritage resources.

Impact analysis of cultural resources under threat of the proposed development, are based on the present understanding of the development. The significance of a heritage site and artefacts is determined by its historical, social, aesthetic, technological and scientific value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various

aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Based on current knowledge and understanding of the area, the heritage sites in the area are evaluated as follows:

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted can be written into the management plan, whence they can be avoided or cared for in the future.

Heritage sites regarded as having low significance are viewed as being recorded in full after identification and would require no further mitigation. Impact from the development would therefore be judged to be low. Sites with a medium to high significance would require mitigation. Mitigation of heritage sites implies first of all total avoidance, or, secondly, the recovery of sufficient data from the site in order that it can be studied and understood at a later stage. This latter scenario is not necessarily negative as science stands to benefit from such actions, but does require the excavation of a site, which is in essence destructive therefore resulting in an impact which can be viewed as high and as permanent.

Potential risks to heritage sites as a result of the construction and operation of the proposed substation and transmission power line are outlined in Table 5.5 below.

Table 5.5: Potential risks to heritage sites as a result of the construction and operation of the proposed substation

Possible Risks	Source of the risk
Construction phase	
Damage to sites	Construction work
Looting of sites	Curio seekers
Operation phase	
Damage to sites	Non-compliance with management plans and/or unplanned construction/developments

5.9.1. Comparison of the Proposed Substation Site Options

No preferred substation site options exist at this stage from a heritage perspective.

5.9.2. Conclusions and Recommendations

Further studies are required during the EIA phase of the project to fully identify heritage resources and mitigation measures. However, there do not seem to be any fatal flaws or red flags associated with heritage resources in the project area. The Phase I Heritage Impact Assessment study will provide a synthesis of the results achieved by the scoping study and the Phase I survey and will describe the status quo of the study area with regard to its pre-historical (archaeological), historical and cultural context. Depending on the types and ranges of heritage resources that may be discovered and the level of significance of these remains certain mitigation and management measures have to be applied to these resources, particularly if they are to be affected (destroyed, altered, removed) during the construction, operation or maintenance of the Mokopane Integration Project.

Phase II studies will be undertaken in the EIA phase and include in-depth heritage studies and vary according to the types and ranges of heritage resources that may be affected. These studies include the documentation of sites dating from the Stone Age, Iron Age and the Historical Period by means of mapping, excavating, photographing and describing archaeological sites. Excavations of archaeological sites could be followed by laboratory work when archaeological collections have to be studied and analysed. Phase II work may also include the documenting of rock art, engravings or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavations of archaeological sites; the exhumation and relocation of graves and graveyards; the collection or excavation of paleontological samples, etc. and may require the input of different types of specialists.

5.10. Potential Impacts on the Social Environment

Potential change processes and impacts on the social environment associated with the establishment of the proposed transmission lines include the following:

» Demographic processes (the number and composition of people)
» Economic processes (the way in which people make a living and the economic activities in society)
» Empowerment, institutional and legal processes (the ability of people to get involved in and influence decision making processes, the role, efficiency and operation of governments and other organisations)
» Socio-cultural processes (the way in which humans behave, interact and relate to each other and their environment and the belief and value systems which guide these interactions)
» Land use processes (land use patterns)

5.10.1. Demographic Change Processes

The Mogalakwena Local Municipality in its IDP (2008/09) states that the many people within the municipal area live in remote farming areas. The population size further changes seasonally as a result of migratory workers either entering or leaving the area. The population size was estimated to be 298 440 in 2007 (IDP 2008/09). The annual population growth rate within the municipal area is estimated at approximately 1.4%, which is more or less on par with the provincial population growth rate.

According to the Polokwane Local Municipality's IDP (2008-2011), the area is home to approximately 561 770 people (2007). This means that this local municipal area houses more than 10% of the province's total population, even though the area only accounts for approximately 3% of the province's total land surface. The IDP further states that the outskirts of the municipal area is characterised by less formal settlement and that these areas experience enormous influx of people as a result of urbanisation trends. This has resulted in the fact that these areas are in dire need of upgraded services and as such, are struggling to cope with the ever increasing influx of more people expecting an improved quality and standard of living.

The construction and maintenance of the proposed substation and associated infrastructure could lead to a change in the number and composition of the population within the affected local areas, which in turn could negatively impact on health and safety and community cohesion and positively impact on the economy. These potential impacts are discussed in more detail under economic and socio-cultural change processes.

The most significant demographic changes will occur during construction, when an influx of job seekers and workers may be expected. Changes are also expected during operation, as the current maintenance team from the Polokwane based office will operate in areas they have not operated in previously.

Table 5.6: Overview of expected demographic change processes and potential impacts

Change Process Variable	Potential Impacts	Project Phase	Status
Influx of construction workers	Influx of construction workers may lead to a change in the number and composition of the local population, and impact on economy, health, safety and social well-being.	Construction	Negative to neutral

Change Process Variable	Potential Impacts	Project Phase	Status
Influx of job seekers	Influx of job seekers may lead to a change in the number and composition of the local population, and impact on economy, health, safety and social well-being.	Pre-construction and construction	Negative
Influx of maintenance workers	Physical presence of maintenance workers in areas they have not previously worked in may impact on economy, health, safety and social well-being.	Operation	Negative to neutral

5.10.2. Economic Change Processes

Economic change processes relate to the way in which people make a living and the economic activities within a society. Job opportunities are created as a result of the construction and maintenance of transmission power lines. However Eskom appoints specialised contractors and even international companies due to the fact that local contractors do not have the capacity or skills to handle the workload. Therefore, only a limited number of local individuals within the study area could be employed during construction. Local labourers are usually engaged in work that does not require a substantial amount of skill, such as bush clearance, digging of foundations, erection of gates and acting as security guards.

During construction, direct and indirect employment opportunities will be created. Indirect opportunities include provision of building materials and/or equipment. Other economic opportunities as a result of construction workers transpires through construction workers' use of local enterprises (shops and shebeens) and in formal and informal work opportunities created at the construction camp.

When a construction camp is put up money is also paid towards the land owner. This is seen to hugely benefit the community. On tribal or municipal land, negotiations are done with community leaders who consult with the community regarding the issue. Another opportunity for financial gain is the rental of land for the accommodation of the construction workers and storage of equipment. This will have a positive impact on the community that benefits from it.

The accommodation of construction workers in the communities should be considered as it increases the economic benefits of the project to the affected communities. The economic opportunity for the local community is positive, and potential impacts such as pregnancies because of sexual relationships could be

prevented to some extent by implementing mitigation measures. The payment to households will vary according to the nature of the accommodation.

Job opportunities associated with the substation and turn-in lines are mainly during construction. Job opportunities during construction would, however, be limited to semi-skilled and unskilled tasks. For operation, the job opportunities could be a permanent job for a skilled worker or a contract for bush clearance. Bush clearance will happen in intervals. Bush clearance opportunities might also be limited because the landowner or Eskom might undertake this activity.

Land for agricultural activities will be permanently lost within the footprint of the substation, which will have an economic impact. Broadly, the economic impact is considered similar for the four sites, as grazing seems to occur on all four sites. Grazing would not be severely affected during operation, as the cattle are still able to move around freely under the turn-in lines as well as around the pylons.

On a regional level, the increase in electricity could boost the economy.

The potential impacts derived from the economic change process could lead to an improvement in the health of people, their education, and their living conditions due to the fact that money is now available to buy food, pay fees, etc. The impact might be significant in light of the level of poverty experienced in these communities. It is not only the individual that gains from these changes, but also the said individual's family. Although economic change processes can lead to positive impacts, most of these impacts are only temporary in nature as these will only last during the construction period.

As the land on which the substation sites are located are all State-owned, it was assumed that none of these land portions were used for commercial cattle and crop farming and therefore any such activities that take place were assumed to be subsistence farming. The location of substation site Option 1 relevant to the cultivated land makes it unlikely that the turn-in lines would cross this area. No tourism facilities were identified in close vicinity of any of the proposed sites.

Although no tourism facilities were identified in close vicinity of the sites, the visual impact on tourism facilities further away from the site will have to be considered. The presence of a substation site and related power lines may change tourism numbers negatively, which in-turn may have an impact on economy. The potential economic impacts on tourism are assessed within the context of "sense of place". The concept of sense of place is applicable to tourist areas because people go on holiday for various and different reasons, e.g. to escape, to be entertained, to enjoy nature, to socialise, etc. In choosing a destination the image of the place is being considered, e.g. its authenticity, its

offering, its status. Limpopo is marketed as "The Preferred Eco-Tourism Destination", which raises expectations of an unspoilt natural environment.

Research on the psychological experience of sense of place suggests that people rapidly discount a landscape as soon as the first scar occurs, rather like a stain ruining a favourite garment (Petrich 1993). Thereafter, any additional impacts on the landscape have a correspondingly smaller effect. Therefore, the aesthetic impact of placing a transmission line or substation in a landscape that already bears the marks of development would be less than that of placing it in a relatively unspoilt environment. People overwhelmingly prefer "nature scenes" to urban and built environments, according to research. Zadik (1985) explains *"people seem to respond to environments as natural if the areas are predominantly vegetation and do not contain human artefacts such as roads or buildings (Relf 1992)."*

The presence of the substation might not only impact on tourism numbers, but also on property values of tourism destinations as well as land used for other purposes.

Table 5.7: Overview of expected economic change processes and potential impacts

Change Process Variable	Potential Impacts	Project Phase	Status
Direct formal employment opportunities to local individuals	Direct formal job opportunities for individuals and/or contractors (economic impact).	Pre-construction, construction and operation	Positive (limited to semi-skilled and unskilled workers)
Indirect formal and/or informal employment opportunities to local individuals	Indirect formal and/or informal job opportunities for individuals and/or contractors income (economic impact).	Pre-construction and construction	Positive
Job loss/gain	Economic impact on as a result of the project.	Construction and operation	Negative
Loss of income and output	Economic impact as a result of the project.	Construction and operation	Negative
Reduction in property values	Economic impact as a result of the presence of the site.	Construction and operation	Negative
Benefits (regional and/or national)	Economic impact as a result of the construction and operation of the substation – benefits economic growth.	Construction and operation	Positive

5.10.3. Empowerment and Institutional Change Processes

Institutional processes relate to the role, efficiency and operation of government sectors and other organisations within the area in terms of service delivery during construction. As was previously mentioned, the presence of construction workers may put additional strain on municipalities, which might impact on health. Empowerment processes investigates the ability of people to engage in decision-making processes to such an extent that they have an impact on the way in which decisions are made that would concern them.

In terms of institutional change processes, the disadvantages of locating the site far from existing settlements would appear that it would increase the distance that would have to be traversed by services infrastructure such as electricity supply and sanitation to the site and construction village, notably during construction. Therefore, it would increase the burden on local authorities that are required to provide that infrastructure.

Negotiation for land is a change process on legal and empowerment level. The same applies to the stakeholders that will be involved in the public participation process. The EIA process is an opportunity for these stakeholders to give input into the process and project. However, stakeholders would have to offer up their time to become actively involved in the process and they should clearly understand their rights in terms of the process to enable them to use these rights. Attitude formation may start during the EIA process. Attitude formation is a change process, and not an impact. Attitude formation might result in delays in project implementation, which might result in secondary impacts such as economic impacts.

A number of issues and concerns were raised with regards to the negotiation process, and these should be addressed to prevent a breakdown in the negotiation process. A breakdown in the negotiation process in terms of land acquisition could severely delay the project and result in an economic impact on both the landowner as well as on Eskom.

Considering institutional processes and the potential burden on the municipality for the construction village, Option 3 is preferred because of its shorter distance from settlements and the N11, followed by Option 2.

Table 5.8: Overview of expected empowerment and institutional change processes and potential impacts

Change Process Variable	Potential Impacts	Project Phase	Status
Attitude formation against the proposed project	Attitude formation against the project could have economic impacts and could impact on social well-being.	Pre-construction and construction	Negative
Negotiation process	A breakdown in the negotiation process in terms of land acquisition could severely delay the project and result in an economic impact on both the landowner as well as on Eskom.	Pre-construction	Negative to neutral
Additional demand on municipal services	Additional demand on municipal services could impact on the availability of these services. A lack of services could impact on health and have an economic impact.	Pre-construction and construction	Negative

5.10.4. Socio-Cultural Change Processes

Socio-cultural processes relate to the way in which humans behave, interact and relate to each other and their environment, as well as the belief and value systems which guide these interactions.

» *Change processes and potential impacts during construction:*
Construction workers form part of a significant section of the South African population known as migratory workers. Due to their unique situation, construction workers engage in behaviour that makes them vulnerable, such as risky sexual behaviour (e.g. unprotected sex) and destructive behaviour (e.g. alcohol abuse, damaging the environment), which could be explained by their migratory status. When they are separated from their homes, they are also distanced from traditional norms, prevailing cultural traditions and support systems that normally regulate behaviour within a stable community. In addition, it might also be that construction workers who are faced with dangerous working conditions and the risk of physical injury might be more preoccupied by immediate (direct) risks and therefore tend to disregard salient (more indirect) risks, such as HIV infection.

Not only do health issues impact on communities, but the physical safety of communities can also be endangered as a result of the influx of job seekers and construction workers (e.g. potential increase in crime). This has a mental health impact, such as fear. The construction activities, construction vehicles and movement patterns of these vehicles and equipment could also impact on the health and safety of communities. However, this only becomes a real concern if such activities occur in close proximity to roads and settlements.

» *Change Process and Potential Impacts during operation:*
Physical and mental health in the context of substations and power lines are related to Electro Magnetic Fields (EMFs), electrocution, fire and collapse of structures. The reason why mental health is mentioned in relation to physical health is because the physical effect or the knowledge of the potential physical effect that transmission power lines have on people could, in turn, have an effect on the mental state of members of the community.

» *Change process and potential impacts related to sense of place:*
Much of what is valuable in a culture is embedded in place, which cannot be measured in monetary terms. It is because of a sense of place and belonging that some people loath to be moved from their dwelling place, despite the fact that they will be compensated for the inconvenience and impact on their lives.

The potential impact on socio-cultural behaviour and the related perception of environmental changes could either have a positive or a negative impact on sense of place (i.e. peace of mind or frustration/anger). It could be viewed as a positive impact if people perceive the project as a means of job creation, free/less expensive electricity, and infrastructural and/or economic development, which is not intrusive on their lives and do not cause them immediate danger. Potential negative impacts include the visual impact and the resultant intrusion on sense of place.

Table 5.9: Overview of expected socio-cultural change processes and potential impacts

Change Process Variable	Potential Impacts	Project Phase	Status
Mental health	Presence of construction workers and job seekers on surrounding landowners' sense of safety and security and being in control.	Construction	Negative
Behavioural changes – sexual relations and alcohol abuse	Presence of construction workers and job seekers my impact on local people's health and safety	Construction	Negative
Integration of construction workers	Socially acceptable integration, including the risk of spreading	Pre-construction	Negative

Change Process Variable	Potential Impacts	Project Phase	Status
into local areas	STIs and HIV/AIDS with an impact on health.	and construction	
Cultural landscape	Psycho-social impact of construction activities and the presence of the line (nuisance, socio-cultural)).	Construction and operation	Negative

5.10.5. Geographical Change Processes

Geographical change processes refer to land use change as a result of the actual or perceived changes in land use, whether it be on a temporary or permanent basis.

» *Substation site Option 1 (Doornfontein):* The closest human settlement to this site is Segoahleng, which is located some 3 km east of the proposed site. Other human settlement in fairly close proximity to the proposed site includes Ga-Matlapa (approximately 4.7 km southeast), Glen Roy (approximately 4.3 km north), and Ga-Mangou (approximately 4.1 km north-northeast).

» *Substation site Option 2 (Aaronsfontein):* The closest human settlements are Segoahleng (approximately 3.8 km east), Ga-Mangou (approximately 4.8 km north), Glen Roy (approximately 5.2 km north-northeast), and Ga-Matlapa (approximately 4.9 km southeast).

» *Substation site Option 3 (Zuid Holland):* The closest human settlements to this option is Dorsland, which is located approximately 2.8 km southeast and Suid-Holland, which is located approximately 3.3 km southwest of the proposed site. Other human settlement in the vicinity of the proposed site includes Sakuruwa (approximately 6km south), Ga-Maloka (approximately 7 km west-southwest), Ga-Malebana (approximately 7.5 km southwest), and Ga-Mabusela (approximately 9.1 km west).

» *Substation site Option 4 (Noord Braband):* The closest human settlement is Sukuruwe, which is located approximately 4.9 km southwest of the proposed site. Other formal settlements in fairly close proximity to this option include Jupiter (approximately 5.4 km northeast), Suid-Holland (approximately 6.2 km west), Ga-Mangou (approximately 8.8km east) and Phetole (approximately 8.9 km north).

The existing Matimba-Witkop 400kV Transmission power lines located in the vicinity of the substation site options already prohibit development towards the servitude. Development is likely to occur to the north and south of the existing

power lines. In terms of scattered dwellings on farm portions, no dwellings will be directly impacted by the proposed substation or turn-in lines at any of the proposed sites.

The main social concerns which arise when considering the presence of a substation and related power lines close to human settlement are health and safety aspects. The intention is that the footprint of the substation and the servitudes of the power lines mitigate these potential health and safety related impacts. Development will therefore have to avoid the servitudes of power lines that enter and exit the proposed substation.

Risks are related to Electro-Magnetic Fields (EMF), electrocution, fire and collapse of the substation and related power lines. A malfunctioning substation could cause fatal/traumatic accidents because of mechanical failure or fire. Fire can be caused by electrical malfunction or human error.

Utilities in South Africa involved in the generation and distribution of electrical energy, are bound by the Occupational Health and Safety Act to provide such services in a safe manner. There are currently no regulations (under the Hazardous Substances Act) in terms of exposure to power frequency EMF in South Africa and the International Commission for Non-Ionising Radiation Protection (ICNIRP) guidelines are used for assessing human exposure to these fields. The guidelines for electric and magnetic field exposure set by the ICNIRP, an organisation linked to the World Health Organisation (WHO), receive world-wide support (Pretorius, 2006).

The results of a study commissioned by Eskom Holdings Limited on the possible health effects of EMF noted the following (Pretorius, 2006):

» The main focus of research has been on a possible association between long-term exposure to magnetic fields and childhood leukaemia.
» Based on the epidemiological findings, the risk of EMF being a health hazard is small.
» Based on current understanding of the topic, EMF is regarded a possible but not proven cause of cancer.
» The suggestion for this health outcome stems mainly from a fairly consistent pattern of the increased but small risk observed from some epidemiological studies. This finding has not been confirmed by (notably all) controlled laboratory studies.
» No evidence of a causal relationship between magnetic field exposure and childhood leukaemia has been found and no dose-response relationship has been shown to exist between EMF exposure and biological effects.
» A possible explanation for the epidemiological findings may be confounding (a factor other than EMF) or bias (subjects studied are not representative of the

target population for which conclusions are drawn) which render the data inconclusive and prevent resolution of the inconsistencies in the epidemiologic data.

It would seem preferable to select a site that is as remote as possible from existing settlements. However, in order to obtain a complete view, it is also necessary to consider activities and structures that are associated with any substation site. It is necessary to take into consideration the need for access roads for construction and maintenance activities. If a substation is remote from existing settlements, it is also likely to be far removed from existing infrastructure. Longer access roads could increase the probability that:

» Relocation of populations will be necessary;
» Access roads might interfere with people's daily movement patterns and impact on their safety;
  * Access roads might cut across private property, thereby increasing the number of landowners to be affected by construction and maintenance activities; and
  * Access roads could interfere with tourism and recreational activities.

All four substation sites are placed along/in close vicinity of the existing Matimba-Witkop transmission power line, as well as relatively close to existing local gravel roads. The assumption is therefore that existing roads (be these local gravel roads or power line maintenance roads) will be used to access the preferred site.

Table 5.10: Overview of expected geographical change processes and potential impacts

Change Process Variable	Potential Impact	Project Phase	Status
Cultivated and grazing land	Temporary loss of cultivated and grazing land due to construction activities, decreased area for cultivation and grazing has an economic impact. Also permanent loss of cultivated and grazing land through the land acquisition process during operation.	Construction and Operation	Negative
Spatial development (future land use)	Developments may encroach upon the substation which may impact on health and safety. People who move into the servitudes of the	Operation	Negative

Change Process Variable	Potential Impact	Project Phase	Status
	power lines or the substation will have to be moved.		

5.10.6. Comparison of the Proposed Substation Site Options

This section intends to provide a preliminary comparison between the different substation options in order to determine which of them is likely to have the least significant negative impacts on the change processes of the social environment.

» *Demographic Change Processes*
It is not expected that the changes and potential impacts will differ significantly between the alternative sites, and a preferred site is therefore not selected considering demographic change processes.

» *Economic Change Processes*
Considering the potential economic impact of the substation sites, more detail about the livelihood activities on the sites is needed. In terms of proximity to settlements to provide a boost to the informal economic sector, substation site Option 4 is not preferred. However, the economic boost will occur during construction, which is a short term activity. Considering potential long-term economic impacts as a result of visual impacts, substation site Option 4 is preferred. According to the visual scoping assessment, only site 3 could impact tourists, as this site is located in the vicinity of the N11. According to the visual scoping assessment, the preferred site is site Option 4.

» *Empowerment, Institutional and Legal Change Processes*
Considering institutional processes and the potential burden on the municipality for the construction village, Option 3 is preferred because of its shorter distance from settlements and the N11, followed by Option 2.

» *Socio-Cultural Change Processes*
Considering the potential socio-cultural impacts, Option 3 is closest to settlements, followed by Options 1 and 2. Option 4 is the preferred site, not taking into account potential impacts on cultural landscape during operation.

» *Geographical Change Processes*
Considering the potential affect on settlement patterns & development (current and future) as well as agriculture, the following emerges:

* *Settlement Patterns:*
  - In terms of access roads, there is no preferred site.

- Option 3 is closest to settlements, followed by Options 1 and 2. In terms of potential health and safety impacts, Option 4 is preferred.
- Transmission power line corridors not following the existing Matimba-Witkop transmission power lines and entering and exiting Options 1 and 2 will potentially affect more settlements.
- Considering proposed transmission power lines going to Options 3 and 4, it is possible to avoid settlements and not affect their development.

To avoid potential negative impacts on health and safety and settlements developments, the preferred site is Option 4.

* *Agricultural Activities*

Considering the potential effect of the site and the proposed two 765kV transmission power lines on agricultural activities in the vicinity of the substation, Options 2, 3 and 4 are preferred. Option 1 is more likely to affect cultivation activities on land immediately surrounding the site, and is least preferred. The proposed two 765kV transmission power lines will follow a longer length of the existing Matimba-Witkop transmission power lines should Options 3 and 4 be selected, and may localise impacts on agricultural activities in the vicinity of the substation. Options 3 and 4 are therefore preferred.

5.10.7. Summary of Social Scoping

» To avoid potential negative impacts on health and safety and of displacement of people as a result of changes in current and future settlement patterns that may be affected by the proposed sites, the preferred site is identified as Option 4.
» To avoid potential negative impacts on agricultural activities as a result of the proposed transmission power line, the preferred sites were Options 3 and 4.
» It is not expected that the changes and potential impacts due to the influx of job seekers and workers would differ significantly between the alternative proposed sites, and a preferred site was therefore not be selected considering demographic change processes.
» Considering the potential economic impact of the site, Option 4 is preferred. This recommendation was based on the potential visual impact.
» Considering institutional processes and the potential burden on the municipality, Option 3 was preferred because of its shorter distance from settlements and the N11, followed by Option 2.
» Considering the potential socio-cultural impacts, Option 3 is closest to settlements, followed by Options 1 and 2. Option 4 was the preferred site.

Overall Option 4 (Noord Braband) closely followed by Option 3 (Zuid Holland) are nominated as preferred options.

5.10.8. Conclusions and Recommendations

To fully assess the ***potential demographic impacts*** as a result of socio-cultural change processes, more information is needed on the following aspects:

» Statistical demographic data on the various settlements, towns, landowners and workers adjacent to the site(s);
» Current crime rate and nature of crimes committed in the area;
» An understanding of local residents' viewpoint on the proposed project and the potential risk for conflict and other forms of active and passive social mobilisation;
» The construction processes and associated timeframes;
» The composition of the construction workforces in terms of size, skills levels, and origin;
» The composition of the maintenance workforce and their activities;
» The number of local employment opportunities;
» The skills level of local people;
» The expectations of the local communities in terms of employment opportunities;
» Other projects in the area, their timeframes and work force size as well as location of construction camps; and
» The nature and extent of social problems experienced in the municipalities as a result of an influx of job seekers and employees.

In order to address these information gaps, the following studies are recommended for the Impact Assessment Phase:

» Conduct a comparative desktop study between Census 2001 and Community Survey 2007 data;
» Access a skills audit of the local people, if available;
» Request construction and maintenance information from the project proponent;
» Review the Comments and Responses Report compiled by the public participation consultants and interview the public participation consultants if necessary;
» Interview the project proponent, other companies and the municipality; and
» Access crime statistics and interview members of the South African Police Service (SAPS) if necessary.
» Access crime statistics and interview members of the SAPS if necessary.

To fully assess the ***potential impacts as a result of economic change processes***, more information is needed on the following aspects:

» Study area's contribution to the GDP;
» The potential effect of the substation site on property values;
» The local employment opportunities that will be created, both directly and indirectly;
» The skills levels of people in the study area;
» Number of jobs available and skills levels of these;
» If available, an outline of a typical salary package for skilled and unskilled labour during the construction period, which is estimated to be over a period of around 2 years;
» The input and output cost of the project;
» Potential job losses as a result of the project;
» The size of farm portions and the economic activities on farms.

In order to address these information gaps, the following studies are recommended for the Impact Assessment Phase:

» Request the necessary information from the project proponent and interview them if necessary;
» Access other available data;
» Conduct a choice modelling study among hunters and/or tourists and/or potential buyers of property in the area;
» Use an input-output model to quantify economic impacts; and
» Execute an economic dependency model.

To fully assess the ***potential impacts as a result of institutional and empowerment change processes***, more information is needed on the following aspects:

» The risk for attitude formation against the project (social mobilisation);
» The settlements' ability to sustain an additional demand on municipal services and/or natural resources;
» The capacity of the affected local municipality to able to supply municipal services to both the construction site as well as the construction village; and
» Existing disaster management plans (if any) for substations.

In order to address these information gaps, the following studies are recommended for the Impact Assessment Phase:

» Obtain the issues register or issues report from the public participation consultants to determine the recurrent issues raised from the public's side and

how these issues were addressed throughout the process. An analysis of these issues would indicate the risk for social mobilisation;
» Obtain information from the local municipality on the existing capacity to deliver municipal services and to determine the capacity for an additional demand on municipal services;
» Discuss issues and concerns regarding the negotiation process and how these issues should be addressed with the project proponent; and
» Obtain and analyse information on any existing disaster management plans at similar installations. Also obtain information from the local municipality on any existing emergency and health care services (both governmental as well as private) and determine their capacity to handle potential disasters.

To fully assess the ***potential impacts as a result of socio-cultural change processes***, more information is needed on the following aspects:

» Request information from the project proponent on the construction process and the likely profile of a typical construction worker;
» Take into account the visual assessment report;
» Participant Rural Appraisal including interviews and/or focus group discussions with land owners and communities in the study area to gain an understanding of the cultural landscape;
» Conduct a desk top study to determine the health profile of the area, including typical indicators such as HIV prevalence, etc.; and
» Interviews with municipal officials and other authority figures (such as the South African Police Service) to determine the current extent of social problems in the area and initiatives to combat them.

In order to address these information gaps, the following studies are recommended for the EIA Phase:

» Assess the visual assessment report;
» Participant Rural Appraisal including interviews and/or focus group discussions with land owners and communities in the study area;
» Conduct a desk top study to determine the health profile of the area; and
» Interviews with municipal officials and other authority figures (such as the South African Police Service).

To fully assess the ***potential impacts as a result of geographical change processes***, more information is needed on the following aspects:

» The size and number of expected construction and operational vehicles and machinery as well as which route(s) will be used to gain access to the various sites;
» Construction activities on site;

» Planned developments for the area in terms of tourism, mining and agriculture;
» Confirm land use of impacted and affected farm portions;
» Confirm location of dwellings/structures surrounding the sites.

In order to address these information gaps, the following studies are recommended for the Impact Assessment Phase:

» Obtain and analyse information from the relevant specialist on the agricultural potential of the site(s);
» Obtain and analyse information from the project proponent on the size and number of the construction and operational vehicles;
» Further scrutinise the IDP and SDF of the affected District and Local municipality in terms of future developments and tourism. If additional information is required other than that contained in the IDP/SDF, conduct interview(s) with relevant town planners and tourism bodies; and
» Interview impacted and affected landowner(s).

5.9. Evaluation of Cumulative Impacts

Apart from the proposed Mokopane Substation and turn-in lines which is the subject of this scoping study, there are currently other development projects underway in or planned for the study area, including platinum and coal mining operations. In addition, the surrounding area is impacted by agricultural activities and residential developments. Infrastructure which is present in the area includes the existing Matimba-Witkop 400kV transmission power lines, as well as various major and minor roads. These developments will all impact in some way on the surrounding environment. There is, therefore, the potential for the proposed project to add to the cumulative impact on the environment in the area. Potential cumulative impacts include:

» Potential impacts on flora, fauna and ecological processes
» Potential impacts on heritage sites
» Potential impacts on aesthetics and the visual character of the area
» Potential impacts on the social environment, including impacts on tourism potential and land use

In order to determine the significance of cumulative impacts associated with the proposed Mokopane Substation and turn-in lines, these potential cumulative impacts will require further investigation within the EIA.

CONCLUSIONS AND RECOMMENDATIONS CHAPTER 6

The Scoping Study for the proposed Mokopane Substation and turn-in lines in the Limpopo Province has been undertaken in accordance with the EIA Regulations published in Government Notice 28753 of 21 April 2006, in terms of Section 24(5) of the National Environmental Management Act (NEMA; No 107 of 1998).

This Scoping Study aimed at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA phase. This was achieved through an evaluation of the proposed project, involving the project proponent, specialists with experience in EIAs for similar projects and within the study area, and a consultation process with key stakeholders that included both relevant government authorities and interested and affected parties (I&APs). In terms of the EIA Regulations, feasible alternatives have been considered within the Scoping Study (and discussed in detail in Chapters 2 and 5).

The conclusions and recommendations of this Scoping Study are the result of on-site inspections, desk-top evaluations of impacts identified by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

A summary of the conclusions of the evaluation of the proposed four alternative substation options and associated turn-in lines, as well as recommendations regarding investigations within the EIA are provided below.

6.1. Conclusions and Recommendations drawn from the Evaluation of the Proposed Substation Sites

Four sites have been identified as potential locations for the construction of the Mokopane transmission line substation. The four options are situated north of Mokopane and include the farms Doornfontein 721 LS (Option 1), Aronsfontein 722 LS (Option 2), Zuidholland 773 LS (Option 3) and Noord Braband 774 LS (Option 4).

The majority of potential impacts identified to be associated with the construction and operation of the proposed substation are anticipated to be localised and restricted to the proposed Mokopane Substation site. No environmental fatal flaws were identified to be associated with any if the substation options, although a number of issues (associated with the substation and associated infrastructure) requiring further study have been highlighted. In order to address these issues,

the following studies are required to be undertaken as part of the EIA phase of the process:

» A detailed ecological survey of the substation sites in order to establish the likelihood of any flora and/or fauna species of concern occurring on this site.
» A detailed survey of the proposed substation site in order to assess the potential impacts of the proposed project on avifauna and to recommend appropriate mitigation measures for significant impacts, where required.
» An agricultural potential survey of the site in order to determine the soil types and agricultural potential of the site.
» A visual impact assessment in order to determine the specific visual impact within identified exposed areas. The visual impact assessment within the EIA will address other crucial issues related to the visibility of the substation in order to quantify the actual visual impact and to identify areas of perceived impact.
» A Phase 1 archaeological survey in accordance with the requirements of Section 38(3) of the National Heritage Resources Act (Act No 25 of 1999).
» A Socio-Economic Impact Assessment in order to address identified information gaps and assess the significance of potential impacts on the socio-economic environment (including land use and tourism potential) as a result of the construction and operation of the proposed substation.
» Development of appropriate and practical mitigation and management measures for potentially significant environmental impacts for inclusion in the project EMP.

Studies and/or specialist processes which are required to be undertaken outside of the EIA process include:

» An assessment of the potential impacts of climate and atmospheric conditions (e.g. potential impacts associated with lightening, precipitation and pollution levels) on the proposed transmission infrastructure, in order to provide an indication of what conditions are required to be accounted for by the design team to extend the life and reliability of the new infrastructure.
» A detailed geotechnical survey of the proposed substation site and turn-in power line alignments (once determined) in order to fully understand the soils in terms of founding conditions and erosion potential. This information is required to be used as part of the planning and design phase of the Mokopane Substation and turn-in lines.

6.2. Nomination of Least Impact/Preferred Substation Site Options for Further Investigation

A specialist workshop was held on 1 August 2008, with a suite of specialists from Eskom and the EIA team[14] in attendance. The conclusions of each of the specialist studies that were conducted for the project were discussed and an overall recommendation made regarding the preferred substation sites for further investigation. In summary, the following conclusions can be drawn regarding preferred substation options for further investigation in the EIA phase:

- **Substation Site Option 3** is regarded the most preferable of the four options from an ecological perspective, **followed by Option 4**.
- From an avifauna perspective **Substation Site Option 1** is preferred. The other site alternatives are considered acceptable provided that appropriate mitigation is implemented on the turn-in lines.
- From a visual impact perspective the preferred option for the construction of the Mokopane substation, due to its relatively remote location, is **Option 4**.
- From a social perspective:
  - To avoid potential negative impacts on health and safety and of displacement of people as a result of changes in current and future settlement patterns that may be affected by the proposed sites, the preferred site is identified as **Site Option 4**.
  - To avoid potential negative impacts on agricultural activities as a result of the proposed transmission power line, the preferred sites are **site Options 3 and 4**.
  - It was not expected that the changes and potential impacts due to the influx of job seekers and workers would differ significantly between the alternative proposed sites, and a preferred site is therefore not be selected considering demographic change processes.
  - Considering the potential economic impact of the site, **site Option 4** is preferred. This recommendation was based on the potential visual impact.
  - Considering institutional processes and the potential burden on the municipality, **site Option 3** is preferred because of its shorter distance from settlements and the N11, followed by **site Options 2 and 3**.
  - Considering the potential socio-cultural impacts, site Option 3 is closest to settlements, followed by sites 1 and 2. **Site Option 4** is the preferred site.

[14] Workshop attendants included Jo-Anne Thomas, Karen Jodas, John von Mayer, Lourens du Plessis, Anita Bron, Megan Diamond, Julius Pistorius, Bhavani Daya and Karin Bowler of the EIA team.

Table 6.1: Summary of nominated most preferred substation site Options

	Option 1	Option 2	Option 3	Option 4
Ecology	Not preferred	Not preferred	Preferred	Not preferred
Avifauna	Preferred	Not preferred	Acceptable	Acceptable
Visual	Not preferred	Not preferred	Not preferred	Preferred
Social	Not preferred	Not preferred	Not preferred	Preferred
Heritage	No preferred sites nominated as yet			

It is clear from the above that Site Option 2 is not preferred in terms of most of the issues evaluated. From a technical perspective, substation site Option 2 is not considered as a preferred site due to a watercourse partly traversing the site, as well as the presence of a rock outcrop. This option is therefore ruled out as an option for further investigation.

From an integration of the findings of the specialist studies, as well as from the conclusions and recommendations of the specialist workshop, **Site Option 4 (Noord Braband) and Site Option 3 (Zuid Holland) are nominated as preferred alternatives**. These alternatives will be investigated in further detailed within the EIA phase of the EIA process.

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 7

A detailed description of the proposed Mokopane Substation and turn-in lines, the Scoping process, as well as the issues identified and evaluated through the Scoping phase (to date) have been included in the Draft Environmental Scoping Report and provide the context for this Plan of Study for Environmental Impact Assessment (EIA).

This Plan of Study describes how the EIA for the Mokopane Substation and turn-in lines will proceed during the EIA phase. The EIA phase of the study includes detailed specialist studies for those potential impacts evaluated to be of significance. The major findings of the Scoping process (which includes inputs from authorities, the public, the proponent and the EIA specialist team) are used to inform this Plan of Study for EIA, together with the requirements of the NEMA EIA Regulations and associated guidelines.

It should be noted that no specific information requirements for the Scoping Report have been specified by DEAT in terms of Regulation 29(1)(j) of the EIA Regulations, besides the general requirement to meet Regulations 29 and 30 of Government Notice No. R385 of 21 April 2006.

7.1. Aims of the EIA

The EIA will aim to achieve the following:

» Provide an overall assessment of the social and biophysical environments affected by the proposed project
» Assess potentially significant impacts associated with the nominated preferred alternative substation sites
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts
» Undertake a fully inclusive public involvement process to ensure that I&AP are afforded the opportunity to participate, and that their issues and concerns are recorded

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with all phases of the project including design, construction, operation and decommissioning, and will aim to provide the environmental authorities with sufficient information in order to make an informed decision regarding the project.

7.2. Authority Consultation

Consultation with the regulating authorities has been undertaken throughout the Scoping process and will continue throughout the EIA process. On-going consultation will include the following:

» Invitation to attend a site inspection and consultation meeting during the review period of the Draft Environmental Scoping Report.
» Submission of a Final Environmental Scoping Report following the 30-day public review period.
» Submission of a final EIA Report following the 30-day public review period.
» A consultation meeting with DEAT and DEDET in order to discuss the findings and conclusions of the EIA.

7.3. Nomination of Preferred Alternatives to be Assessed within the EIA

From the Scoping Study undertaken, the following substation site options have been nominated for further investigation within the EIA phase of the study:

» Substation Option 3 (Zuid Holland)
» Substation Option 4 (Noord Braband)

7.4. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

Based on the findings of the Draft Scoping Report, the following issues were identified as being of low significance, and therefore not requiring further investigation within the EIA:

» Potential impacts on topography
» Potential impacts on surface water
» Potential impacts on geology and soils

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess the significance of these potential impacts is provided within Table 7.1. The specialists involved in the EIA Phase are also reflected in Table 7.1.

A Peer Review of the EIA process will be undertaken by Jaana Maria Ball of Arcus GIBB.

Table 7.1: Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of these potential impacts

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Biodiversity (fauna and flora)	» Survey environmentally sensitive areas in order to verify results of the GIS modelling and scoping assessment, preferably in the summer period. » Survey representative areas in order to obtain a clear understanding of the nature of sensitivity in specific sites. » Survey the area for general floristic and faunal diversity (common species, Red Data flora and fauna species, alien and invasive plant species). » Assess the potential presence of Red Data List flora and fauna species. » Describe the status and importance of any primary vegetation. » Provide descriptions of ecological habitat types, plant communities and faunal assemblages. » Compile an ecological impact evaluation, taking the following aspects into consideration: * the relationship of potential impacts to temporal scales; * the relationship of potential impacts to spatial scales; * the relationship of potential impacts on biological processes; * the severity of potential impacts; * the risk or likelihood of potential impacts occurring; and * the degree of confidence placed in the assessment of potential impacts. » Map all relevant aspects. » Recommend a preferred substation site and route variants based on results of the ecological impact evaluation.	Riaan Robbeson of Bathusi Environmental Consulting
Avifauna	» Identified impacts will be assessed in more detail for the overall preferred substation site after integration of all specialist input. Particular emphasis will be placed on habitat destruction and disturbance associated with the construction of Mokopane Substation and its associated 400kV loop-in and loop-out power lines, as this has been identified as potentially being of medium significance. » Mitigation measures for the alleviation of the identified significant impacts will also be recommended and explained. » Once the final corridor for the proposed 400kV loop-in and loop-out power lines has been determined, the collision impacts associated with the power lines will be discussed in detail. In this respect special attention will given to Red Data species, particularly the White-bellied	Megan Diamond of EWT

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	Korhaan, Southern Bald Ibis, Secretarybird and the various stork species. Potential high risk areas will be identified and suitable mitigation measures to reduce the collision risk will be proposed.	
Agricultural Potential	» Desk-top determination of agricultural potential of the proposed substation site through access to existing soils information for South Africa » Evaluation of the proposed substation sites through field investigations in order to determine soil type and agricultural potential	Garry Paterson of the ISCW: ARC
Visual impacts	The visual impact assessment within the EIA will address crucial issues related to the visibility of the proposed Mokopane Integration Project. These issues or criteria will aim to quantify the actual visual impact and to identify areas of perceived visual impact. Other issues/criteria to be addressed by the visual impact assessment include: » Visual distance/observer proximity to the proposed infrastructure (apply the principle of reduced impact over distance) » Viewer incidence/viewer perception (identify areas with high viewer incidence and negative viewer perception) » Landscape character/land use character (identify conflict areas in terms of existing and proposed land use) » Visually sensitive features (scenic features or attractions) » General visual quality of the affected area » Visual absorption capacity of the natural vegetation » Potential visual impact of lighting (after hours operations and security) of the proposed substation » Potential mitigation measures	Lourens du Plessis of MetroGIS
Heritage sites / Archaeology	» Further studies are required during the EIA phase of the project to fully identify heritage resources and mitigation measures. However, there do not seem to be any fatal flaws or red flags associated with heritage resources in the project area. The Phase I Heritage Impact Assessment study will provide a synthesis of the results achieved by the scoping study and the Phase I survey and will describe the *status quo* of the study area with regard to its pre-historical (archaeological), historical and cultural context. Depending on the types and ranges of heritage resources that may be discovered and the level of significance of these remains certain mitigation and management measures have to be applied to these resources, particularly if they are to be affected (destroyed,	Julius Pistorius

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	altered, removed) during the construction, operation or maintenance of the Mokopane Integration Project. » Phase II studies include in-depth heritage studies and vary according to the types and ranges of heritage resources that may be affected. These studies include the documentation of sites dating from the Stone Age, Iron Age and the Historical Period by means of mapping, excavating, photographing and describing archaeological sites. Excavations of archaeological sites could be followed by laboratory work when archaeological collections have to be studied and analysed. Phase II work may also include the documenting of rock art, engravings or historical sites and dwellings; the sampling of archaeological sites or shipwrecks; extended excavations of archaeological sites; the exhumation and relocation of graves and graveyards; the collection or excavation of paleontological samples, etc. and may require the input of different types of specialists.	
Socio-economic Impacts (including impacts on land use and tourism potential)	To fully assess the ***potential demographic impacts*** as a result of socio-cultural change processes, more information is needed on the following aspects: » Statistical demographic data on the various settlements, towns, landowners and workers adjacent to the site(s); » Current crime rate and nature of crimes committed in the area; » An understanding of local residents' viewpoint on the proposed project and the potential risk for conflict and other forms of active and passive social mobilisation; » The construction processes and associated timeframes; » The composition of the construction workforces in terms of size, skills levels, and origin; » The composition of the maintenance workforce and their activities; » The number of local employment opportunities; » The skills level of local people; » The expectations of the local communities in terms of employment opportunities; » Other projects in the area, their timeframes and work force size as well as location of construction camps; and » The nature and extent of social problems experienced in the municipalities as a result of an influx of job seekers and employees. In order to address these information gaps, the following studies are recommended:	MasterQ Research

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist

» Conduct a comparative desktop study between Census 2001 and Community Survey 2007 data;
» Access a skills audit of the local people, if available;
» Request construction and maintenance information from the project proponent;
» Review the Comments and Responses Report compiled by the public participation consultants and interview the public participation consultants if necessary;
» Interview the project proponent, other companies and the municipality; and
» Access crime statistics and interview members of the SAPS if necessary.
» Access crime statistics and interview members of the SAPS if necessary.

To fully assess the ***potential impacts as a result of economic change processes***, more information is needed on the following aspects:

» Study area's contribution to the GDP;
» The potential effect of the substation site on property values;
» The local employment opportunities that will be created, both directly and indirectly;
» The skills levels of people in the study area;
» Number of jobs available and skills levels of these;
» If available, an outline of a typical salary package for skilled and unskilled labour during the construction period, which is estimated to be over a period of around 2 years;
» The input and output cost of the project;
» Potential job losses as a result of the project;
» The size of farm portions and the economic activities on farms.

In order to address these information gaps, the following studies are recommended:

» Request the necessary information from the project proponent and interview them if necessary;
» Access other data;
» Conduct a choice modelling study among hunters and/or tourists and/or potential buyers of property in the area;
» Use an input-output model to quantify economic impacts; and
» Execute an economic dependency model.

To fully assess the ***potential impacts as a result of institutional and empowerment change***

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist

processes, more information is needed on the following aspects:

» The risk for attitude formation against the project (social mobilisation);
» The settlements' ability to sustain an additional demand on municipal services and/or natural resources;
» The capacity of the affected local municipality to able to supply municipal services to both the construction site as well as the construction village; and
» Existing disaster management plans (if any) for substations.

In order to address these information gaps, the following studies are recommended:

» Obtain the issues register or issues report from the public participation consultants to determine the recurrent issues raised from the public's side and how these issues were addressed throughout the process. An analysis of these issues would indicate the risk for social mobilisation;
» Obtain information from the local municipality on the existing capacity to deliver municipal services and to determine the capacity for an additional demand on municipal services;
» Discuss issues and concerns regarding the negotiation process and how these issues should be addressed with the project proponent; and
» Obtain and analyse information on any existing disaster management plans at similar installations. Also obtain information from the local municipality on any existing emergency and health care services (both governmental as well as private) and determine their capacity to handle potential disasters.

To fully assess the ***potential impacts as a result of socio-cultural change processes***, more information is needed on the following aspects:

» Request information from the project proponent on the construction process and the likely profile of a typical construction worker;
» Assess the visual assessment report;
» Participant Rural Appraisal including interviews and/or focus group discussions with land owners and communities in the study area to gain an understanding of the cultural landscape;
» Conduct a desk top study to determine the health profile of the area, including typical indicators such as HIV prevalence, etc.; and
» Interviews with municipal officials and other authority figures (such as the South African Police

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist

Service) to determine the current extent of social problems in the area and initiatives to combat them.

In order to address these information gaps, the following studies are recommended:

» Request information from the project proponent;
» Assess the visual assessment report;
» Participant Rural Appraisal including interviews and/or focus group discussions with land owners and communities in the study area;
» Conduct a desk top study to determine the health profile of the area; and
» Interviews with municipal officials and other authority figures (such as the South African Police Service).

To fully assess the ***potential impacts as a result of geographical change processes***, more information is needed on the following aspects:

» The size and number of expected construction and operational vehicles and machinery as well as which route(s) will be used to gain access to the various sites;
» Construction activities on site;
» Planned developments for the area in terms of tourism, mining and agriculture;
» Confirm land use of impacted and affected farm portions;
» Confirm location of dwellings/structures surrounding the sites.

In order to address these information gaps, the following studies are recommended:

» Obtain and analyse information from the relevant specialist on the agricultural potential of the site(s);
» Obtain and analyse information from the project proponent on the size and number of the construction and operational vehicles;
» Further scrutinise the IDP and SDF of the affected District and Local municipality in terms of future developments and tourism. If additional information is required other than that contained in the IDP/SDF, conduct interview(s) with relevant town planners and tourism bodies; and
» Interview impacted and affected landowner(s).
» Identify and assess other relevant studies.

Studies and/or specialist processes which are required to be undertaken outside of the EIA process include:

» An assessment of the potential impacts of climate and atmospheric conditions (e.g. potential impacts associated with lightening, precipitation and pollution levels) on the proposed transmission infrastructure, in order to provide an indication of what conditions are required to be accounted for by the design team to extend the life and reliability of the new infrastructure.
» A detailed geotechnical survey of the proposed substation site and turn-in power line alignments (once determined) in order to fully understand the soils in terms of founding conditions and erosion potential. This information is required to be used as part of the planning and design phase of the Mokopane Substation and turn-in lines.

7.5. Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

» The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
» The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
» The **duration**, wherein it will be indicated whether:
  * the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  * the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  * medium-term (5–15 years) – assigned a score of 3;
  * long term (> 15 years) - assigned a score of 4; or
  * permanent - assigned a score of 5;
» The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
» The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly

probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

» the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
» the **status**, which will be described as either positive, negative or neutral.
» the degree to which the impact can be reversed.
» the degree to which the impact may cause irreplaceable loss of resources.
» the *degree* to which the impact can be *mitigated.*

The **significance** is calculated by combining the criteria in the following formula:

S=(E+D+M)P

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

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

7.6. Integration and Preparation of the EIA Report

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. An EIA report will be compiled, and will include:

» detailed description of the proposed activity
» a description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies)
» a description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity
» details of the public participation process conducted, including:
  * steps undertaken in accordance with the plan of study for EIA;

  - a list of persons, organisations and organs of state that were registered as I&APs;
  - copies of all public participation documents, adverts and site notices;
  - a summary of comments received from, and a summary of issues raised by registered I&APs, the date of receipt of these comments and the response to those comments; and
  - copies of any representations, objections and comments received from registered I&APs
- a description of the need and desirability of the proposed project and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity
- an indication of the methodology used in determining the significance of potential environmental impacts
- a description and comparative assessment of all alternatives identified during the environmental impact assessment process
- a summary of the findings and recommendations of specialist reports
- a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- an assessment of each identified potentially significant impact
- a description of any assumptions, uncertainties and gaps in knowledge
- an environmental impact statement which contains:
  - a summary of the key findings of the environmental impact assessment; and
  - a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives
- a draft environmental management plan
- copies of specialist reports

The draft EIA Report will be released for a 30-day public review period (refer to Section 7.5). The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the final EIA Report, for submission to the authorities for decision-making.

7.7. Public Participation Process

A public participation process will be undertaken by **ILISO Consulting**, public participation specialist consultants. The key objective of public participation during an EIA is to assist I&APs to identify issues of concern or highlight positive aspects of the project and to comment on the findings of the EIA process.

Through experience in social development facilitation and community education and organising, as well as from feedback obtained during the Scoping Phase a range of methods have been identified which will be used during the EIA phase to enable consultation, awareness raising, collaboration and empowerment. These are detailed in Table 7.2.

Table 7.2: Summary of the strategy on how the various groupings of I&APs would be engaged and communicated to:

Stakeholder Grouping	Communication and Involvement Strategy
Landowners / residents	• Advertisements • One-on-one consultation (where necessary) • Focused consultation sessions • Public meetings • Written reports
Governmental departments (National, Provincial, District and Local authorities)	• Focused consultation sessions • Stakeholder workshop • Written reports
General public (interested parties)	• Advertisements • Public meetings • Written reports
Organisations (e.g. SAHRA, NGOs, Agricultural Unions, etc.)	• Advertisements • Focused consultation sessions • Stakeholder workshop • Written reports

» *Focused communication and consultation sessions*

Focused consultation sessions will include telephonic interviews, one-on-one interviews, focus group meetings, stakeholder workshops and public meetings. The following provides a broad outline of what is envisaged with each focused consultation session during the EIA phase.

Table 7.3: Focused communication and consultation sessions to be undertaken in the EIA Phase of the process

Sessions	Aim of Communication	I&APs Involved
One-on-one consultations	• Interaction on a one-on-one basis • Provide detailed technical information and to discuss issues in detail • Clarify any misunderstandings • Assist I&APs to formulate their comments in a manner that will ensure that they can be afforded due attention in the EIA process • Follow up on issues raised • Obtain information as part of the research and assessment process	• Affected landowners • Targeted I&APs
Focus group meetings	• Assist I&APs to submit additional comments regarding the proposed project for	• Affected landowners

Sessions	Aim of Communication	I&APs Involved
	consideration within the EIA • Follow up on additional issues raised • Obtain information as part of the assessment process	• Groupings of I&APs with similar interests in project • Organised groupings e.g. NGOs
Stakeholder workshops	• Provide detailed information regarding the EIA • Clarify any misunderstandings • Provide I&APs the opportunity to comment further on the EIA	• Key stakeholders, e.g. government department, NGOs
Public meetings	• Provide detailed information of the findings of the EIA • Provide I&APs the opportunity to comment on the findings of the EIA Report	• All I&APs

The draft EIA report will be made available for public review for a 30-day period prior to finalisation and submission to DEAT for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, a public meeting and key stakeholder workshop will be held during this public review period.

7.8. Key Milestones of the programme for the EIA

The envisaged key milestones of the programme for the Environmental Impact Assessment (EIA) phase of the project are outlined in the Table 7.4 below.

Table 7.4: Key milestones for EIA phase

Key Milestone Activities	Proposed completion date[8]
Finalisation of Scoping Report	October 2008
Authority acceptance of the Scoping Report and Plan of Study to undertake the EIA	December 2008
Undertake detailed specialist studies and public participation process	December 2008 – April 2009
Public review of draft EIA Report and draft EMP	May 2009
Make draft EIA Report and draft EMP available to the public, stakeholders and authorities	June 2009

[8] Indicative dates only