
NGWEDI SUBSTATION AND ASSOCIATED 400KV TRANSMISSION POWER LINE TURN-INS

DEA Ref: 12/12/20/1556

ENVIRONMENTAL IMPACT ASSESSMENT

DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)

1. INTRODUCTION

Eskom has been under pressure to provide secure and reliable electricity supply to meet the growing demand, which Eskom has estimated will increase at an average of 4% per annum.² The Capital Expansion Programme is aimed at meeting the forecasted demand through the expansion of Eskom's generation, transmission and distribution capacity. This project forms part of the Mmamabula-Medupi Power Station (PS) Transmission Integration Project. This report concentrates on the proposed construction of the Ngwedi substation and associated turn-ins. The substation will also have a communication mast.

In accordance to the National Environmental Management Act (Act No. 107 of 1988), developments such as these, that involve the construction of power lines of a voltage higher than 132kV, are to be subjected to a rigorous Environmental Impact Assessment (EIA) process. Eskom has appointed an independent Environmental Assessment Practitioner (EAP); Margen Industrial Services (Margen) to conduct the EIA study for this project. Margen will work with PBAI (PBAI) to deliver this study.

This document presents the outcomes of the technical environmental impact phase activities, thereby providing background information about the proposed project, baseline conditions of the receiving environment and potential project related environmental issues. This report is to be released for public comment thereafter the Final Environmental Impact Report (FEIR) will be submitted to the mandated authorities for consideration and decision-making.

1.1. PROJECT OVERVIEW

As indicated, this project forms part of the Medupi Integration Project and will be supplied by two of the Delta - Epsilon (Masa - Selomo) transmission lines. The proposed Ngwedi Substation will also utilise the power generated at the Matimba Power Station which is to be constructed in Lephalale. The power to the substation will be tapped through Matimba – Midas, Matimba - Marang and from the proposed Delta (Masa) – Epsilon (Selomo) transmission lines (see Figure 1).

Eskom has identified the need for additional energy capacity for the greater Rustenburg/ Brits area in the North West province with the main load centre concentrated within the vicinity of Sun City and around the Pilanesburg. The proposed substation should ideally be situated in this area; the associated turn-ins will traverse through land under the jurisdiction of all three local municipalities of Kgetlengrivier, Rustenburg and Moses Kotane. The substation sites under consideration are located in the latter two municipalities.

² www.eskom.co.za

1.2. ENVIRONMENTAL AUTHORITY INFORMATION

The lead authority is the national Department of Environmental Affairs (DEA), formerly Department of Environmental Affairs and Tourism (DEAT). The reference number allocated by DEA to the project is 12/12/20/1566. A copy of the application sent to DEA and the acknowledgment of receipt from DEA can be found in **Appendix 1** and **2** of this report. Table 6 reflects the listed activities that are applied for.

As the project falls within the North West Province, the North West Department of Agriculture, Conservation, Environment and Rural Development (NWDACERD) is the key stakeholder and has to be kept informed about the project. The FEIR will be sent to NWDACERD for their comment and to DEA for decision-making. Case officers for the project from both DEA and NWDACERD have actively participated in this project.

Table 6: List of Activities as per GN No R. 386 & 387

Act	National Environmental Management Act, No. 107 of 1998 (NEMA)
Regulations	GN No R 386 of 2006
Sections	Description
1m	The construction of facilities or infrastructure, including associated structures or infrastructure, for any purpose in the one in ten year flood line of a 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
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.
12	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).
14	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 lightening purposes (b) flagpoles; and (c) lightening conductor poles
15	Construction of a road 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.

Act	National Environmental Management Act, No. 107 of 1998 (NEMA)
Regulations	GN No R 386 of 2006
16 (b)	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.
Regulations	GN No R 387 of 2006
Sections	Description
1(l)	The construction of facilities or infrastructure, including associated structures or infrastructure, for: (l) The transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more.
2	Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.

1.3. OVERVIEW OF THE EIA PROCESS

The EIA study for this project is guided by the provisions of the National Environmental Management Act (NEMA) 107 of 1998 (as amended) and the schedule of activities in listing notice no. R 387. This is essentially a two-tiered process, that comprises namely of the Scoping Phase followed by the detailed Environmental Impact Assessment investigations.

The EIA process as depicted below has two phases, namely Scoping and the detailed technical assessment both of which will inform the decision phase (Figure 4). The intent of the Scoping exercise is to define the scope and extent of the EIA investigations and the level of stakeholder engagement required for the EIA phase. It includes gathering sufficient preliminary information forming the basis from which critical issues that warrant further investigation are determined. The Draft Scoping Report (DSR) was compiled and submitted for public review and on finalisation of the report; the Final Scoping Report (FSR) was submitted to the provincial authority for commenting and the DEA for decision making. The EIA phase commenced upon the approved of the FSR.

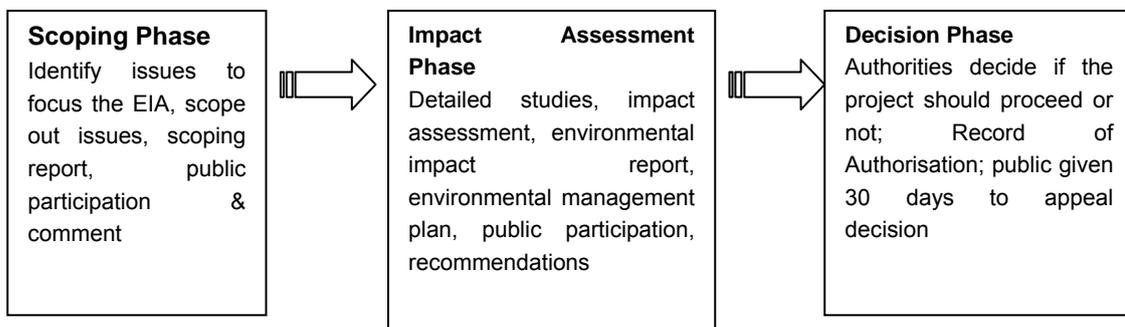


Figure 4: EIA Process Flow Chart

The EIA phase entailed detailed socio-economic and environmental studies, and comprehensive public participation process. A Draft Environmental Impact Report (DEIR) will be compiled and submitted to I&APs for comment. These comments will then be consolidated and will inform the FEIR.

1.4. APPLICANT

Eskom Holdings, specifically the Transmission Division is the project proponent for this project. Transmission is responsible for the operation and maintenance of high voltage transmission lines and all other equipment that form part of the transmission systems, known as the national grid.

As the operator of the proposed Ngwedi substation and associated power line turn-ins, Eskom will remain the responsible legal entity and will carry environmental liability for the proposed project.

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1.5. ENVIRONMENTAL ASSESSMENT PRACTITIONER

Eskom Transmission as per the legislative requirement has appointed Margen Industrial Services (Margen), as an independent EAP to undertake the EIA study for the proposed project. In turn, Margen appointed PBA International (PBAI) to assist with the technical assessment whilst it concentrated on undertaking the public participation process.

Lead Consultant & Public Participation

Margen Industrial Services

P.O Box 12822, Leraatsfontein, 1038.

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Technical Assessment & Project Managers

PBA International (SA)

P.O Box 3300, Houghton, 2041.

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Neither Margen nor PBAI have any vested interest in this project and were appointed on the basis of their experience in environmental management and assessment, familiarity with the EIA requirements and experience in undertaking of similar work. They undertook several transmission power line related projects including Zeus-Mercury and Zeus-Perseus 765kV project, Matimba – Marang – Dinaledi 400kV transmission power line project and Braamhoek transmission integration power line project.

M. Mahlangu is the Project director for the Public Participation Process (PPP). He holds BSc in Botany and Plant Ecology. He has more than ten years experience in undertaking Environmental Impact Assessment (EIA) studies, specialising in PPP. Projects that he has been involved in for example include:

- EIA for Matimba B Eskom Transmission Lines Integration and Associated Substations Upgrade Project.
- EIA for Mmamabula power station– Delta (Masa)substation 400kV Transmission Power Lines Project.

Mr. S. Mohlala is the PPP Manager for this project. He has over four years experience in managing and facilitating the PPP for numerous EIA studies. Previous transmissions projects he has been involved include:

- Zeus – Perseus Eskom project involving four provinces, viz Mpumalanga, Free State, North West and Gauteng.
- Medupi Power Station and Mmamabula Power Station Integration Projects.

Mr T. Lepono is the Project director for the technical assessment and project management of the study. He has a Post Graduate Diploma in Land and Agrarian Studies and has more than 10 years experience in the environmental management field, having been involved in undertaking Environmental Impact Assessments (EIAs) studies, State of Environment (SoER) Reports, Community Based Natural Resources Plans as well as Conservation Plans. He has been involved with the following EIA projects:

- EIA for Epsilon (Selomo) Substation and Associated Turn-ins.
- EIA for Letšeng-la-Letsie – Lesotho.

Ms J. Beater is a qualified Heritage Specialist and has been involved in Environmental Impact Assessment work for the past 5 years, as a Project Manager for numerous electricity transmission and distribution projects. Jean was the project manager for the following EIA studies:

- EIA for Delta - Epsilon (Masa- Selomo) 6 X 765kV transmission Power Lines.
- EIA for a 1 X 765kV transmission power line between Zeus substation near Secunda and Mercury substation near Stilfontein in the Free State Province.

Ms C. Lo-Liyong is the GIS specialists for this project and was responsible for producing the maps. She has a Bachelors degree in Environmental Management. She had undertaken a similar role for the following projects:

- EIA for Zamokuhle Substation and 132kV Distribution Power line Project.
- Saber Gas Pipeline and Associated Infrastructure from the Coal Bed Methane Exploration Area to Mmamabula Power Plant Project.

The CVs of the EAP can be found in **Appendix 3A**.

1.6. SPECIALISTS

The study involved avifauna (birds), terrestrial biodiversity, heritage, social and visual specialists. Some of the specialists have worked on the EIAs for the other related projects that make up the Medupi Integration project, namely Delta - Epsilon (Masa - Selomo) 6 X 765kV transmission Power Line EIA. Their qualifications and experiences are presented in Table 7 below.

Table 7: Summary of Specialists' Qualifications and Experience

Specialist Field	Company	Principal Specialist/s	Qualifications/Experience
Avifauna	Endangered Wildlife Trust (EWT)	Luke Strugnell & Jon Smallie	Jon Smallie: registered member of SA Council for Natural Scientific Professions; Has undertaken many avifaunal impact assessments for Eskom projects. <i>CV in Appendix 4A</i> <i>TORs in Appendix 4B</i>
Biodiversity	Bathusi Environmental Consulting	Riaan Robbeson	M.Sc (Plant Ecology) Has worked on the associated EIAs for Medupi Integration projects including Delta-Epsilon (Masa - Selomo) power line project. <i>CV in Appendix 5A</i> <i>TORs in Appendix 5B</i>
Heritage	Francois P. Coetzee	Francois Coetzee	Member of ASAPA (Association of South African Professional Archaeologists); MA (Archaeology) focus was on the Pilanesberg area. <i>CV in Appendix 6A</i>

Specialist Field	Company	Principal Specialist/s	Qualifications/Experience
			<i>TORs in Appendix 6B</i>
Social	Nonyana Hoohlo & Associates	Nozipho Hoohlo-Nonyana	M.Sc Environmental Biotechnology; International Certificate in Public Participation; 5 years experience in environmental management work. <i>CV in Appendix 7A</i> <i>TORs in Appendix 7B</i>
Visual	Newtown Landscape Architects	Yolanda Martin	M.Sc Ecological Remediation & Sustainable Development; Has undertaken several EIAs and visual impact assessments and assisted with the visual impact study for Delta-Epsilon (Masa -Selomo) project. <i>CV in Appendix 8A</i> <i>TORs in Appendix 8B</i>
Floodlines	PBA International (SA) (Pty) Ltd	Stuart Dunsmore	MSc Eng CEng. (Chartered Engineer, Engineering Council UK). Has undertaken River engineering projects and flood alleviation schemes. Distributed catchment hydrological modelling for development control and urban planning. Full flood hydrograph analysis of the River Thames. <i>CV in Appendix 9A</i> <i>TORs in Appendix 9B</i>

2. STATUTORY FRAMEWORK

The EIA study is subject to numerous pieces of legislation that govern the use and management of environmental resources and the applicability of these is dependent on the nature of the project and more importantly by the various facets of the environment likely to interface with or be affected by the proposed project. Disussed below is not an exhaustive list of applicable legislation but rather a synopsis of key ones.

Additionally, integrated development plans and spatial development frameworks relevant of the study that were reviewed are also listed. The consideration of these informs the planning of the proposed corridors and route alignments and the placement of the substation sites.

2.1. CONVENTION ON BIOLOGICAL DIVERSITY (CBD)

In terms of the Convention on Biological Diversity, which South Africa is a party to, the State has a duty to conserve and rehabilitate biological resources considered important for the conservation of biological diversity.³

Article 8 provides that:

“Each Contracting Party shall, as far as possible and as appropriate:

- Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensuring their conservation and sustainable use;
- Rehabilitate and restore degraded ecosystems and promote the recovery of threatened species, inter alia, through the development and implementation of plans or other management strategies.
- Develop or maintain necessary legislation and/or regulatory provisions for the protection of threatened species or populations.

2.2. CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA ACT, ACT NO. 108 OF 1996

The Constitution provides that everyone has a right to an environment that is not harmful to their health and wellbeing.⁴ Eskom should conduct its business in a manner that does not pose safety and health risks through environmental pollution and degradation but rather which contributes to the conservation of natural and cultural heritage, to the national economic and social development.

2.3. NATIONAL ENVIRONMENTAL MANAGEMENT ACT, NO. 107 OF 1998 (NEMA)

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 is an activity identified in terms of section 24(2)(a) and (d) of the National Environmental Management Act (Act No. 107 of 1998) which cannot commence without environmental authorisation from the competent authority. As per the requirements, this project must be subjected to a process that will identify, predict and evaluate impacts on the environment with the view to recommend controls for the management and monitoring of identified impacts, whilst also providing a platform for public participation. In terms of Section 24C(2)(c) of NEMA the competent authority for the project is DEA in consultation with NWDACERD.⁵

³ www.cbd.int

⁴ Republic of South Africa, Constitution Act (108 of 1996).

⁵ Republic of South Africa, National Environmental Management Act (107 of 1998).

2.4. ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS

In line with the requirements of Section 24(5) and Section 44 of NEMA, the EIA regulations (Government Notice N of R385, 386 and 387 of 2006) were promulgated. The regulations set out to achieve the following:

- *Government Notice R385*: regulates procedure and criteria used for the processing, submission, consideration and decision – making of the application for environmental authorisation.⁶
- *Regulations GN R386*: sets out a list of identified activities which must follow the basic assessment procedure as provided for in regulations 22 to 26 of NEMA EIA Regulations.⁷
- *Regulations GN R387*: outlines a list of identified activities, which may not proceed without environmental authorization that must follow the scoping and EIA procedure as, provided for in regulations 27 to 36 of NEMA EIA Regulations.⁸

Projects that entail “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” are required to follow the Scoping and EIA procedure. This is applicable to the proposed project.

2.5. EIA GUIDELINES

There are a number of guidelines developed which serve as a reference for this study. These are namely:

- Guideline 3: General Guideline to the Environmental Impact Assessment Regulations (DEAT, 2006).⁹
- Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations (DEAT, 2006).¹⁰
- Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations (DEAT, 2006).¹¹

2.6. NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, No. 59 OF 2008 (NEM:WA)

The NEM:WA provides for reform of the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. This act imposes a general duty on the holder of waste to take all reasonable measures to avoid the generation of waste, and where such generation cannot be avoided to minimise the toxicity and amounts of waste generated; to reduce, reuse, recycle and recover waste and where waste must be disposed of to ensure that the waste is treated and disposed of in an environmentally sound manner. The Act will also ensure that remediation of contaminated land as a result of construction, operation and decommissioning of power line infrastructure is undertaken.¹²

⁶ Republic of South Africa, NEMA EIA Regulations, no R385, (2006).

⁷ Republic of South Africa, NEMA EIA Regulations, no R386, (2006).

⁸ Republic of South Africa, NEMA EIA Regulations, no R387, (2006).

⁹ Republic of South Africa, Guideline 3: General Guidelines to the Environmental Impact Assessment Regulation, (2006).

¹⁰ Republic of South Africa, Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, (2006).

¹¹ Republic of South Africa, Guideline 5: Assessment of alternatives and impacts in support of the Environmental Impact Assessment Regulations, (2006).

¹² Republic of South Africa, National Environmental Management; Waste Management Act (59 of 2008).

2.7. NATIONAL ENVIRONMENT MANAGEMENT: BIODIVERSITY ACT, ACT NO. 10 OF 2004 (NEM:BA)

NEM:BA provides for the protection of ecosystems that are threatened or in need of protection in order to facilitate the maintenance of their ecological integrity and for the protection of species that are threatened or in need of protection for their survival through the use of published list of threatened and protected ecosystems and species and of threatening processes developed by the Minister and an MEC at provincial level.¹³ This project has to be implemented in manner that avoids unnecessary ecological damage by restricting destructive activities within the ecological footprint of the project.

2.8. NATIONAL WATER ACT, ACT NO. 36 OF 1998 (NWA)

The NWA requires sustainable use and protection of aquatic and associated ecosystems and their biodiversity.¹⁴ According to Section 19 of the NWA, Eskom is responsible for ensuring that the activities relating to the construction and operation of the power lines and the substation and any other associated infrastructure do not result in the pollution of water resource and in instance where such an act has occurred Eskom has to put in measures to remedy the damage. Water resources as per the Act's definition include wetlands, aquifers, water surfaces and estuaries.

2.9. NATIONAL HERITAGE RESOURCES ACT, ACT NO 25 OF 1999 (NHRA)

According to Section 38 of the National Heritage Resources Act, Act No 25 of 1999, a Phase I Heritage Impact Assessment (HIA) study has to be undertaken to determine the possible presence of any heritage resources in the Project Area. The Phase I HIA study will consist of a scoping study supplemented with a Phase II HIA survey. According to Section 36(6) construction activities are to be halted if archaeological artefacts or skeletal material are encountered.¹⁵ In the event that archaeological finds are encountered especially during the construction of this project, approval to remove or to destroy these finds will have to be obtained by Eskom from the South African Heritage Resources Agency (SAHRA) and therefore the approval has to be obtained.

2.10. INTERNATIONAL FINANCE CORPORATION (IFC) GUIDELINES

This EIA study, where possible, will employ the IFC guidelines, which establish the importance of:

- Integrated assessment to identify the social and environmental impacts, risks, and opportunities of projects.
- Effective community engagement through disclosure of project-related information and consultation with landowners on matters that directly affect them.
- The client's management of social and environmental performance throughout the life of the project.

Establish requirements to avoid, reduce, mitigate or compensate for impacts on people and the environment, and to improve conditions where appropriate. While all relevant social and environmental risks and potential impacts should be considered as part of the assessment.¹⁶

¹³ Republic of South Africa, National Environmental Management Act (107 of 1998).

¹⁴ Republic of South Africa, National Water Act (36 of 1998).

¹⁵ Republic of South Africa, National Heritage Resources Act, Act No 25 of 1999.

¹⁶ World Bank. International Finance Corporation Sustainability, Environment, Health and Safety Guidelines.

2.11. INTEGRATED DEVELOPMENT PLANS AND SPATIAL DEVELOPMENT FRAMEWORKS

- Rustenburg Local Municipality: Spatial Development Framework.¹⁷
- Rustenburg Local Municipality: Draft Revised Integrated Development Plan 2008/09.¹⁸
- North West Province: Spatial Development Framework.¹⁹
- Moses Kotane Local Municipality: Reviewed Integrated Development Plan 2009/2010.²⁰
- Moses Kotane Local Municipality: Spatial Development Framework.²¹
- Bojanala Platinum District Municipality (DM): 2009/10 Reviewed Integrated Development Plan.²²

2.12. OCCUPATIONAL HEALTH AND SAFETY ACT, ACT NO 85. OF 1993

The Act governs all matters relating to the health and safety of employees. It aims to protect persons who are at work and those that are not at work but are at risk due to the work activities. The Employer is required to put in place measures to ensure a healthy and safe working environment. The Act also places responsibility on the employees to adhere to established health and safety practices.²³

2.13. ELECTRICITY REGULATIONS ACT, 2006 (ACT NO 4 OF 2006)

The Act, governs the generation and supply of electricity through the establishment of the national regulatory framework for the electricity supply sector. It also establishes and outlines the functions of the National Energy Regulator. The Regulator is the custodian and enforcer of the national electricity regulatory framework, responsible for granting licenses and registrations for the generation, transmission, distribution, trading, importation and exportation of electricity.²⁴

2.14. WHITE PAPER ON THE ENERGY POLICY OF THE REPUBLIC OF SOUTH AFRICA, 1998

Governs the developments within the energy sector. It prescribes for increased accessibility to affordable energy services, improved energy sector governance, stimulation of economic development whilst also managing energy related environmental impacts and securing supply through the implementation of innovative, efficient and diversified forms of technologies. It also identifies the need for Integrated Energy Planning and for the National Integrated Resource Planning.²⁵

2.15. INTEGRATED ENERGY PLAN (IEP), 2003

The Integrated Energy Plan (IEP) is a framework that will guide the planning of the energy sector by a process that allows for the review of the current status of the energy sector, (demand for energy by various sectors and available resources), the application of various strategies that promote efficiency in the usage of energy, cost effectiveness and the

¹⁷ Rustenburg Local Municipality. 2005. Spatial Development Framework.

¹⁸ Rustenburg Local Municipality. 2008. Draft Revised Integrated Development Plan 2008/09.

¹⁹ North West Province. 2005. Spatial Development Framework.

²⁰ Moses Kotane Local Municipality. 2009. Reviewed Integrated Development Plan 2009/2010.

²¹ Moses Kotane Local Municipality. 2008. Spatial Development Framework.

²² Bojanala Platinum District Municipality. 2009. 2009/10 Reviewed Integrated Development Plan.

²³ Republic of South Africa, Occupational Health and Safety Act, Act no 85 of 1993

²⁴ Republic of South Africa, Electricity Regulations Act, 2006 (Act No 4 of 2006)

²⁵ Republic of South Africa, White Paper on the Energy Policy of the Republic of South Africa, 1998

introduction of new technologies whilst taking cognisance of environmental considerations and brings social benefits.²⁶

2.16. NATIONAL INTEGRATED RESOURCE PLAN (NIRP), 2003/2004

The National Integrated resource Plan (NIRP) is a long term planning tool commissioned by the National Electricity Regulator for South Africa. It serves to ensuring adequate, reliable and cost effective electricity supply. The NIRP is essentially an information source that is use to evaluate the security of supply, to identify least cost supply options for the country and to determine opportunities for investment into new power generating projects.²⁷

2.17. INTEGRATED STRATEGIC ELECTRICITY PLANNING (ISEP)

The Integrated Strategic Electricity Planning (ISEP) is a planning tool used by Eskom to determine how much electricity will be required in the future and to plan for how the demand will be met, based on forecasted average load growth of 4% in demand for electricity over a 20-year period. The process is carried out at a project – specific level from technical, economic and environmental perspectives.²⁸ Eskom's decision to expand the transmission network is based on the White Paper on Energy Policy and is informed by the IEP undertaken by the Department of Minerals and Energy and the NIRP by the National Energy Regulator and based on the studies carried out as per the ISEP.

2.18. MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2008 (ACT 28 OF 2008)

Controls land use and infrastructural development on mining and prospecting areas. It also controls environmental matters in areas in which the Act applies.²⁹ E.g. clearing of vegetations. Some of the proposed route alignments run through mining area and as such the process has to take cognisance of the requirements of this Act.

²⁶ Republic of South Africa, Integrated Energy Plan, 2003

²⁷ Republic of South Africa, National Integrated Resource Plan, 2003/2004

²⁸ Republic of South Africa, Integrated Strategic Electricity Planning.

²⁹ Republic of South Africa, Mineral and Petroleum Resources Development Act, 2008 (Act 28 Of 2008)

3. APPROACH TO THE STUDY

As indicated above, the approach adopted for this study includes both Scoping and technical impact assessment phases. The study is undertaken in accordance to the provisions of the National Environmental Management Act (NEMA) 107 of 1998 (as amended) and guided by the EIA Regulations GN R 385, Section 27 to 36.

3.1. OBJECTIVES OF SCOPING

The overall goal for Scoping is to define the extent of the detailed technical assessment phase investigations by scoping out unfeasible options. The specific objectives are as follows:

- Profile the existing environmental baseline.
- Describe the proposed project.
- Identify suitable substation sites and power line corridors.
- Assess alternatives to the proposed project.
- Review and indicate relevant legislation.
- Consult with mandated authorities, Interested and Affected Parties (I & APs), and the general public about the proposed project.
- Outline important environmental issues and potential impacts.
- Prepare Scoping Report and Plan of Study for the detailed technical assessment phase.

3.2. OBJECTIVES OF EIA PHASE

The objectives of the EIA investigations are to:

- Provide an understanding of the receiving environment.
- Examine relevant statutory requirements applicable to the implementation and operation of this project.
- Identify and assess project related impacts.
- Assess project alternatives (substation sites and power line route alignments) and make a recommendation of the least impacting alternative.
- Identify suitable measures that are to address the project related impacts.
- Develop an Environmental Management Plan (EMP) that will be used to guide the implementation and maintenance process.
- Consult with interested and affected parties about all project related matters.
- Report to the mandated authorities about the process followed and the Study findings.

The EIA investigations involved the following specialists:

- Public Involvement Process Team
- Technical EIA and Project Management Team
- Avifauna
- Biodiversity
- Floodlines
- Geotechnical

- Heritage
- Social
- Visual

3.3. SCOPE OF WORK

During the scoping study the following activities occurred:

- Submission of an application to DEA to undertake an EIA for Ngwedi 400kV/132kV substation and associated turn-in power lines.
- Carried out ongoing stakeholder consultation process that involves the announcement of the proposed project and EIA study, identification, registration and consultation with relevant stakeholders, and documentation of proceedings.
- Utilise information gained from environmental baseline studies, integrated development plans, public consultation to identify suitable substation sites and power line corridors.
- Preliminary specialist investigations of general study area, proposed power line corridors and substation sites and presentation in compiled specialist reports.
- Preparation and compilation of the Scoping Report for public review.
- Advertisement of the Scoping Report's availability for public review.

This report was submitted to DEA on and to NWDACERD on 27 August 2010. The FSR and PoS were accepted and approved by DEA on 07 October 2010. The FSR and PoS for EIA were placed at the information points throughout the study area. Electronic version of the FSR was distributed to landowners on request. The study programme undertaken during the Scoping and EIA phases is set out below, in Table 8.

During the technical EIA Phase, the following activities were undertaken:

- Ongoing stakeholder consultation process that involves the announcement of the proposed project and EIA study, identification, registration and consultation with relevant stakeholders, and documentation of proceedings.
- Utilise information gained from environmental baseline studies, integrated development plans, public consultation to identify suitable substation sites and power line corridors.
- Specialist investigations of study area, proposed power line corridors and substation sites and presentation in compiled specialist reports.
- Preparation and compilation of the DEIR.
- Advertisement of the availability of the DEIR for public review.

This report will be submitted to DEA and NWDACERD. On the approval of the DEIR, I&APs will be informed of the decision made by DEA. The study programme undertaken during the Scoping and EIA phases is set out below, in Table 8.

Table 8: Scoping and EIA Phase Activity Summary Table

	Activity	Planned Date	Actual Date
SCOPING PHASE			
1	EIA Application Submission to DEA		19/07/09
2	DEA Acknowledgement of EIA Application		28/07/09
3	Specialist Field Trips		13/07/09
4	Focus Group Meetings		Ongoing
5	Specialist Report Compilation		Stage 1: 14/07/09-10/08/09 Stage 2: 09/11/09-04/12/09
6	Draft Scoping Report Compilation		Stage 1:11/08/09 –14/09/09 Stage 2:12/02/10– 11/06/10
7	Public review of Draft Scoping Report		1/07/10- 13/08/10
8	Finalisation of Draft Scoping Report		16/08/10- 19/08/10
9	Submission of FSR to DEA and NWDACERD	27/08/10	31/08/10
10	Review and decision making of FSR by DEA	27/08/10 – 30/09/10	07/10/10
EIA PHASE			
11	Public Review of DEIR	18/01/11 – 17/02/11	
12	FEIR Submission to DEA	25/02/11	
13	DEA Review of FEIR	28/02/10 – 21/07/11	
14	Issue RoA	18/07/11	
15	Advertise RoA	20/07/11 – 02/08/11	

3.4. METHODOLOGY FOR SUBSTATION SITES AND POWER LINE CORRIDORS SELECTION

A preliminary screening exercise was initiated by the EAP during Scoping for the purpose of ascertaining whether the alternatives recommended by the Client were feasible. The initial exercise that was carried out was the selection of the sites and route alignments for the proposed substation and associated turn-ins. The criteria that was used was as follows:

Substation Site Selection Criteria:

- Absence of drainage lines and possible dolomitic areas.
- Availability of adequate land for the proposed substation.
- Current land use.
- Accessibility.
- Ease of connectivity to proposed power line route alignments.

Power line Route Alignment Selection Criteria:

- Environmental considerations – avoidance of sensitive environments
- Alignment along existing linear infrastructure e.g roads or power lines.
- Straightest route alignment with minimal turns.
- Shortest alignment (where possible).
- Avoidance of man made (e.g. buildings) and natural (e.g wetlands) obstacles.
- Accessibility.

It became apparent during the preliminary investigations and public consultations that some of these sites were not viable and therefore had to be dropped from the study. The results of this exercise on the initial three sites (Sites A – C) were only obtained after the Scoping phase.

The inputs obtained from the various Stakeholders, the EAP knowledge of the study area, information from the Specialist report and from the Delta – Epsilon (Masa – Selomo) 6 x 765kV Power line project, the study was able to determine environmental issues with respect to the project alternatives. Specialists investigated various potential impacts and mitigation measures in the EIA phase.

The selection exercise involved the consideration of the following key factors:

- Preliminary geotechnical investigations undertaken by Eskom.
- Site visits by the project team.
- Input from various stakeholders.
- GIS and Google earth mapping exercise to ascertain the:
 - Presence of obstacles.
 - Availability of adequate space for the proposed developments.
 - Accessibility
 - Shortest and straightest possible corridor alignment.
 - Location of proposed site from the load centre.
- Desktop review of Municipal Integrated Development Plans and Spatial Development Frameworks.

The public consultation process carried out during the Scoping played crucial role in the site selection exercise and in the overall planning of the proposed project. This was complemented by detailed EIA phase studies, which are hereto presented.

3.5. METHODOLOGY TO SPECIALIST STUDIES

The EIA phase specialist studies aimed to undertake detailed studies on the potential impacts of the proposed electricity transmission infrastructure and to propose mitigation measures to minimise negative impacts and ways of enhancing positive spinoffs from the project. The specialists based their findings on expert opinion and on the assimilation of information gathered through the desktop and site visits that were conducted. The respective specialist's reports are included as Appendix 4 to 9.

The objectives of the respective studies are summarised below:

Avifauna Assessment: To provide an overview of the main ecosystem and habitats in order to determine presence of power line sensitive listed and protected bird species within the study area.

Biodiversity Assessment: To provide an overview of ecological attributes and the inherent ecological sensitivity of the study area, to highlight specific areas of sensitivity and the presence of flora and fauna species that are sensitive and of ecological importance.

Heritage Assessment: To provide a description of the heritage and archaeological environment with the view to identify presence of sites, structures, and settlements of important and in danger of being affected by the proposed project.

Social Assessment: To determine potential project related impacts with the view to minimise social disruptions likely to result from the proposed project, by selecting preferred route alignment for the turn- ins and substation site from a socially acceptable perspective.

Visual Assessment: To ascertain the aesthetic value of the visual resource (receiving environment) and the influence the proposed development will have on the receiving environment from a visual point of view.

Flood Risk Assessment: To provide an assessment based on risk by flooding, and potential impact on flood lines for the project. The risk assessment has been done utilising indicative floodlines; developed using a catchment based hydrological assessment, and hydraulic surveys at selected points on the watercourse.

3.6. METHODOLOGY TO PUBLIC PARTICIPATION PROCESS

The PPP is an ongoing process that is effectively carried out throughout the entire EIA study. It plays a critical role in keeping stakeholders abreast about the proposed project and more importantly it allows them the opportunity to interface with the project planners, to provide feedback that aids to define the project such that it is more acceptable. The PPP activities include identifying I&APs, developing and managing a stakeholder database, informing and addressing stakeholders about the proposed project through print media, focus and public meetings respectively. Ensuring that I&APs concerns are recorded and addressed in the FSR and the Environmental Impact Report (EIR) and maintaining a detailed issues and response trail relevant to the project activities. Details of this process have been elaborated in Chapter 7. The detailed PPP Report is Appendix 10 of this report.

4. TECHNICAL DETAILS OF PROJECT PROPOSAL

This chapter provides a description of the proposed project and therefore highlights “what” the project comprises off, and “how” it will be implemented. It is also important that the reader also understands “why” the project is needed and “how” it fits in the larger picture in terms of the other major projects that Eskom is to implement and as such the project background and motivation are provided.

4.1. PROJECT LOCATION

The study area is located in the North West Province, which is bordered by the Limpopo province on the northeast, Gauteng province in southeast and Botswana on the northwest (Figure 5). It is located in Bojanala Platinum District Municipality and will affect three local municipalities of Moses Kotane, Rustenburg and Kgetlengrivier. It is in the surrounding environs of the Pilanesberg Nature Reserve and Sun City area in close proximity of Chaneng, Phatsima and Ledig Townships. Rustenburg is the closest city to the study area.

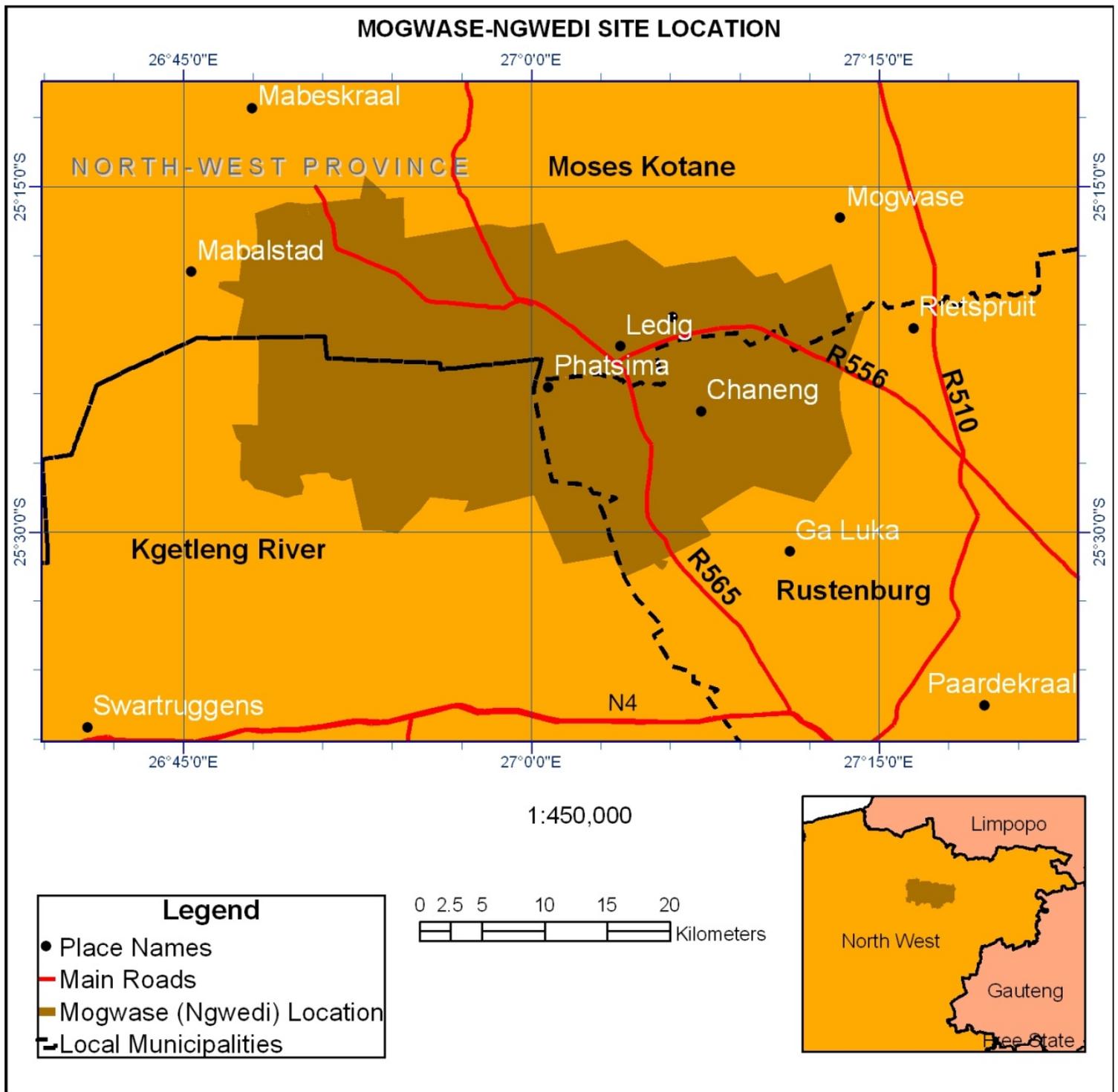


Figure 5: Location Map

4.2. PROJECT MOTIVATION

Over the next 20 years, i.e. between 2010 and 2030, the Rustenburg area (see Figure 6 below) electricity load demand is a forecast to by approximately. Approximately 45% of this growth is predicted to be natural growth on the existing mining operations and the balance is anticipated to be due to new mining expansions.

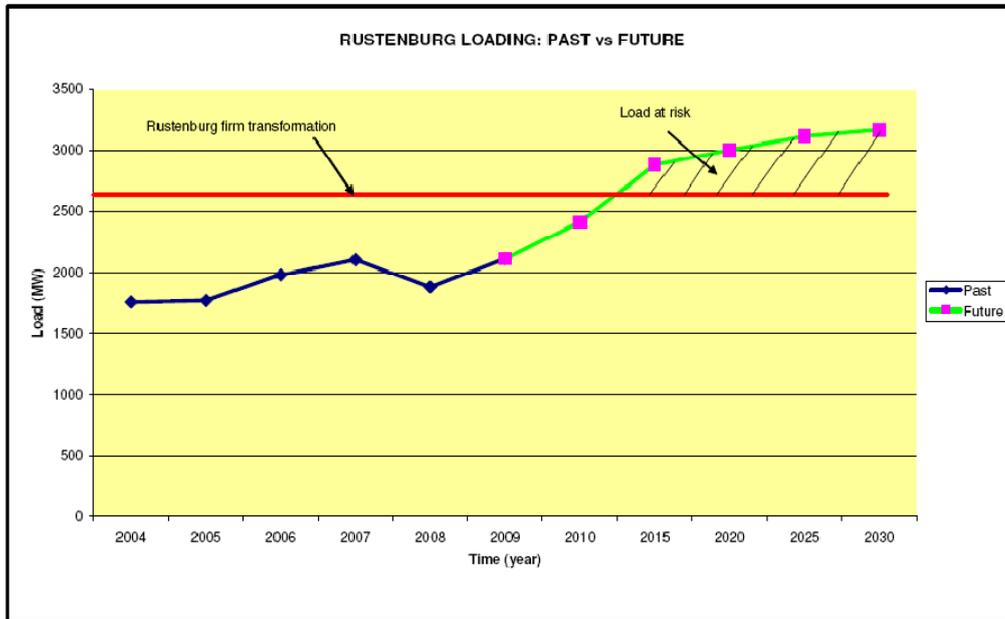


Figure 6: Rustenburg Load Forecast Graph

(Source: Eskom Planning Division)

At present the area is supplied via the Main Transmission Substation (MTS) of Marang, Ararat, Trident and Bighorn. Ararat currently supplies the greater portion of the load to the Rustenburg area. In 2010 the substation exceeded its firm installed capacity, this hampers load growth for the Ararat 88kV network. Possibilities of expanding the Ararat transformation capacity are constrained by space limitations and the fact that new load centre is located some 30km north of Ararat.

The main increase in electricity demand is forecast to come from the Sun City area, where the Styldrift Mine, Wesizwe Platinum Limited and Turnberry mining operations are planned. These operations are expected to draw an electricity load of nearly 200MW. It is primarily for this reason, in addition to the limited space constraints of the Ararat Substation, that Eskom Grid

Planning is proposing the establishment of a new a new 2 x 500MVA, 400/132kV MTS, to be called Ngwedi. The proposed new substation would be ideally located in the centre of the new load growth area which is in the vicinity just south of Sun City.

The location of a new 400/132kv substation in this area would benefit the network as follows:

- It would reduce the load at Ararat substation and ensure that there is spare transformation capacity to support and sustain load growth.
- Ngwedi load will improve the transient stability of Medupi.
- It will improve load shift flexibility between Trident and Ararat Substations, thereby improving network reliability.

- It will be the central link for the Delta - Epsilon (Masa-Selomo) 765kV operated at 400kV, Matimba-Midas 400kV as well as Midas-Marang 400kV networks for new generation from the Waterberg area.
- It will generally improve the reliability of supply to the Rustenburg area and therefore improve the reliability of the Rustenburg Customer Load Network (CLN).
- It will minimise the length of turn-ins from the Matimba-Midas 400kV and Delta - Epsilon (Masa- Selomo) 765kV lines, as well as minimise the length of new distribution 132kV lines to supply the new mining operations.

From the above, it is evident that the proposal for the location of Ngwedi Substation in the area south and south-west of Sun City, in the vicinity of the communities of Ledig, Phatsima and Chaneng is the best option. The main beneficiaries of the new substation will be the mining operations and the communities in that area, and this would support the location of the substation within the mining areas where possible.

4.3. PROJECT BACKGROUND & DESCRIPTION

Eskom has planned developments for the expansion of generation, transmission and distribution capacity. This project is a component of the Medupi Integration Project as depicted in Figure 7 below. This section serves to provide background to this project and of other associated projects.

Eskom's generation capacity is heavily reliant on the coalfields that are predominantly located in the Mpumalanga Highveld. It has become clear that these coalfields are however nearing depletion within the next 20 to 30 years whilst at the same time, demand for power is expected to increase as the national economy continues to grow. As it is, there are generation constraints in the Eskom's system.

The Lephalale and Botswana coal reserves have significant potential for long - term generation solutions and the generation constraints. Eskom plans to address the expected power shortages, by establishing new generation points, utilising the latest power station, generation technology with high yields and significantly lower pollution. A new power station, Medupi, is currently under construction close to the existing Matimba Power Station (PS). Eskom also plans to source additional power from the proposed Mmamabula PS in Botswana.

Overhead transmission power lines will be used to transmit the generated electricity to the various load centres dispersed throughout the country. Transmission integration studies were carried out in order to determine the most optimum network that will minimise the number of transmission lines to Eskom's system. These studies indicated that the best solution would be to couple the two power stations; Mmamabula and Medupi PS to the proposed Delta (Masa) substation. Six high voltage 765kV transmission lines will be used to transmit the generated electricity from the proposed Delta (Masa) substation to another new substation Epsilon (Selomo) near Potchefstroom. The six lines are to run in two corridors of three lines each namely Delta – Epsilon (Masa - Selomo) Corridor CB_3 and Delta – Epsilon (Masa -Selomo) Corridor D. Two of the 765kV power lines will transmit power to the proposed Ngwedi Substation from either Corridor CB_3 or Corridor D but preferably from the latter. Corridor CB_3 is situated west of the study area along the existing Matimba-Midas power lines whilst Corridor D is to the east and south east of the Pilanesberg Nature Reserve and it actually runs through the Ngwedi substation load centre.

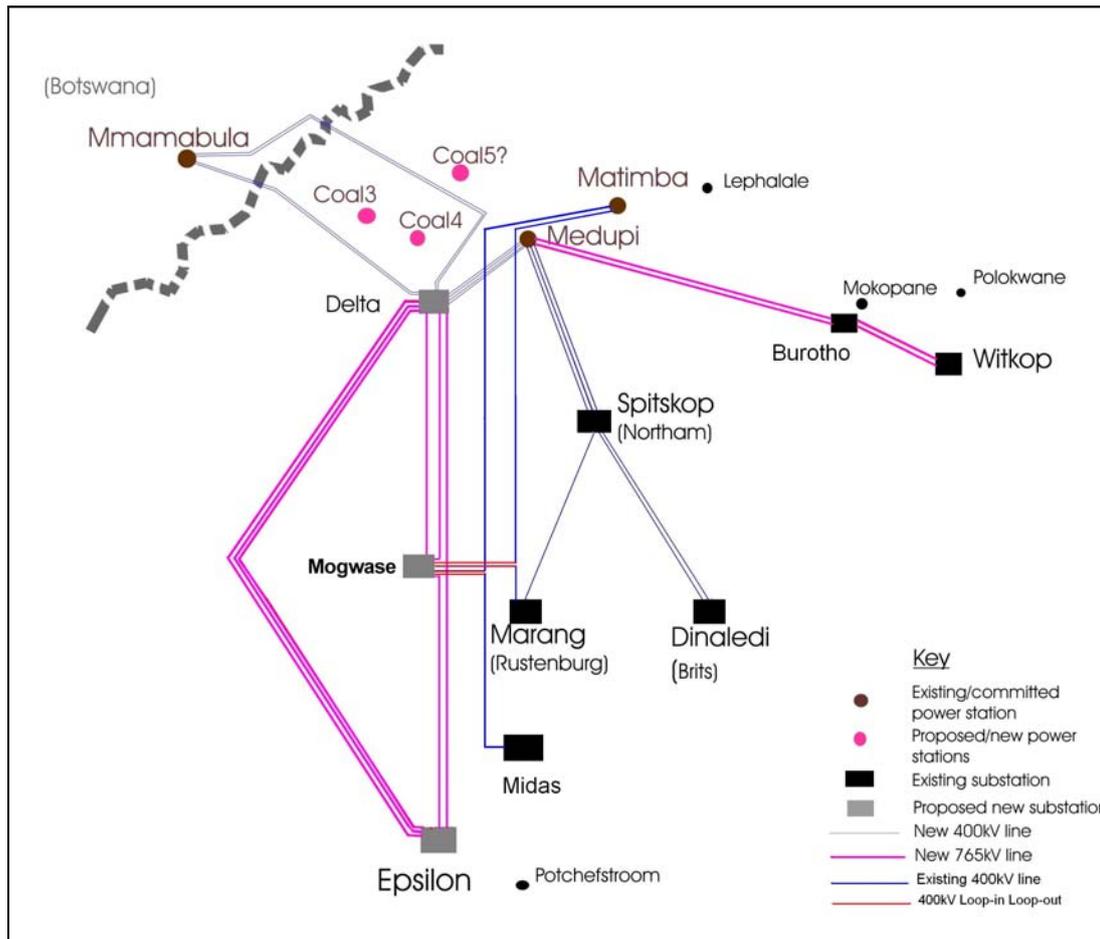


Figure 7: Schematic for the Medupi Integration Project.

4.4. PROJECT COMPONENTS

The project will consist of the construction of:

- Ngwedi 2 x 500MVA, 400/132kV step-down substation.
- Looping the Matimba-Midas 400kV line in and out of Ngwedi MTS by establishing 2 x 400kV turn-ins.
- Looping the Matimba-Marang 400kV in and out of Ngwedi MTS by establishing 2 x 400kV turn-ins.
- Operate and terminate a 400kV power line from Delta (Masa) to Ngwedi MTS.
- Looping the 765kV power line from Delta (Masa) substation to Ngwedi MTS and to Epsilon (Selomo) substation. This line will be operated as a 400kV.
- Install 2 x 500MVA, 400/132kV transformers as well as providing terracing for 4 x 500MVA 400/132kV units.
- Terrace the Ngwedi 400kV yard for an end-state of 5x 400kV feeders.
- Terrace the Ngwedi 132kV yard for an end-state of 10x 132kV feeders.
- Establish the control building, telecommunication infrastructure, oil dam.
- Establish the access road infrastructure to and within Ngwedi MTS.

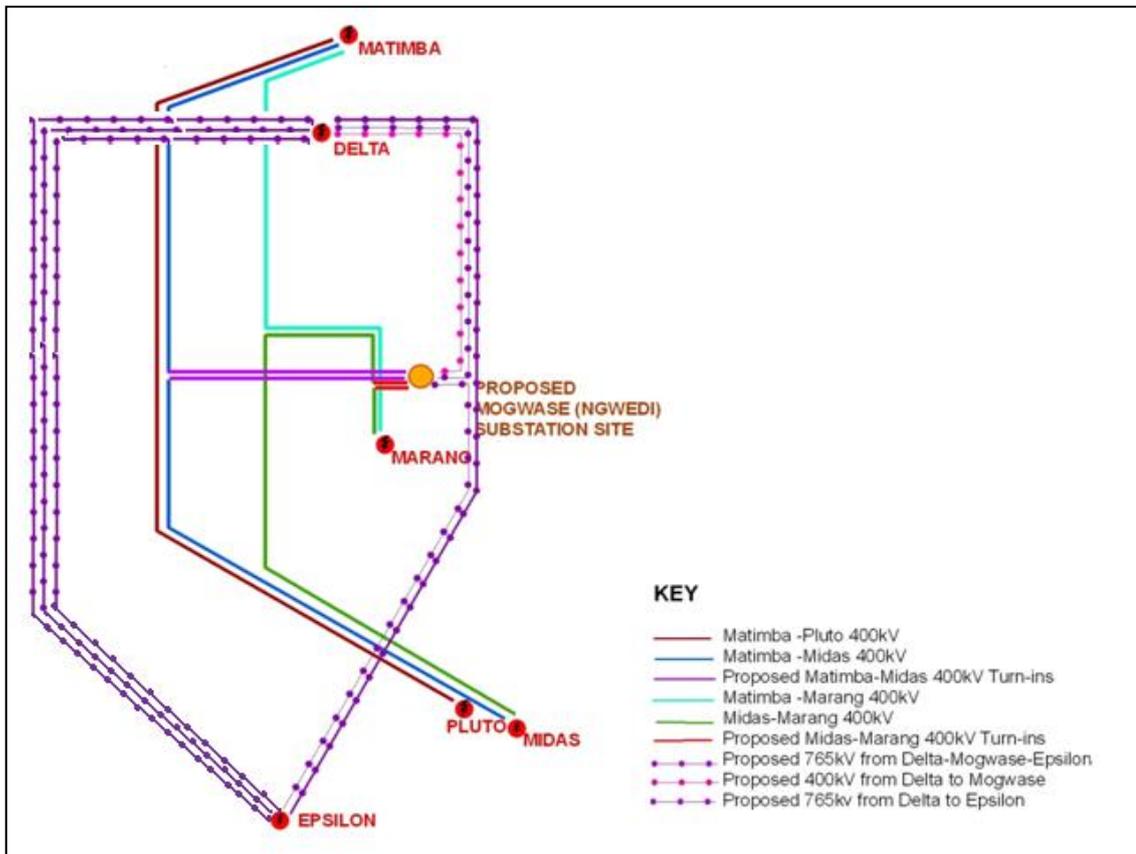


Figure 8: Schematic of the Ngwedi Substation and Associated Turn-ins Integration.

The proposed project is presented in Figure 8 above. In addition to the transmission lines from Delta (Masa) substation there are two additional sets of transmission lines to the proposed substation.

The existing Matimba – Midas transmission power line to Ngwedi substation will be looped in and out of Ngwedi substation. In addition, the existing Matimba – Marang 400Kv Line will also be looped into the proposed substation. The turn-ins will improve the transient stability of Matimba Power Station and the reliability of electricity supply to the Rustenburg area.

4.4.1. Substation Infrastructure

Ngwedi substation is a 400/132kV step-down substation that will transform the 400kV to 132kV and it therefore link Ngwedi to the existing 132kV distribution network in the area. The technical details regarding the substation are as follows:

- The footprint size of the substation is 600m x 600m.
- The substation will initially accommodate 2x 500MVA, 400/132kV transformers.
- The initial installed capacity of the substation will be 1000MW.
- The substation yard will be fenced and secured.
- A Telecommunication tower will be 30m high.

An example of how a MTS looks like is shown below in Figure 9. The illustrated substation is the Spitskop near Northam in the Limpopo province.