

# Eskom Holdings SOC Limited

PROPOSED ESTABLISHMENT OF THE  
**ANDERSON-DINALEDI 400 kV TRANSMISSION LINE BETWEEN THE  
PROPOSED NEW ANDERSON SUBSTATION (FLORA PARK) AND  
THE DINALEDI SUBSTATION (BRITS), NORTH WEST AND GAUTENG  
PROVINCES**



## DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT



DEA Ref No: 12/12/20/1567

December 2012



### ENVIRONMENTAL AND SOCIAL CONSULTANTS

P.O. BOX 1673  
SUNNINGHILL  
2157

147 Bram Fischer Drive  
FERNDALE  
2194

Tel: 011 781 1730  
Fax: 011 781 1731  
Email: [info@nemai.co.za](mailto:info@nemai.co.za)

## PUBLIC REVIEW

This document presents the Draft EIA Report for the proposed Anderson-Dinaledi 400kV Transmission Line. The main purpose of the report is the following:

- To describe the need for the project;
- To explain the environmental legal framework governing the project;
- To explain the Environmental Impact Assessment (EIA) process;
- To present the assumptions and limitations associated with the EIA;
- To describe how the proposed project will be executed during the project life-cycle;
- To provide a description of the receiving environment that could be affected by the proposed project;
- To provide a summary of the specialist studies conducted as part of the EIA;
- To assess the significant impacts associated with the project;
- To conduct a comparative analysis of the proposed alternative alignments to the transmission line;
- To describe the public participation process that was undertaken to date, as part of the EIA phase; and
- To draw conclusions regarding the EIA and to make recommendations for decision-making.

To date, the following activities have been undertaken as part of the overall EIA process:

- An application form for Scoping and EIA, in terms of Regulation 27 of Government Notice No. R385 of 21 April 2006, was submitted to the Department of Environmental Affairs (DEA) on 29 July 2009 and the following reference number was assigned to the project: **12/12/20/1567**;
- Public participation was conducted for the Scoping phase, which included the identification of Interested and Affected Parties (I&APs), project announcement (via onsite notices, Background Information Documents, newspaper advertisements and public meetings) and public review of the Draft Scoping Report;
- DEA issued approval for the Scoping Report on 03 March 2011, which allowed the commencement of the EIA phase;
- Specialist studies were undertaken to address certain key environmental issues that were identified during the Scoping phase; and
- The Draft EIA Report (version 1) was released to I & APs for comment from the 25 October 2012 – 03 December 2012. Public meetings were held on the 14 and 15 November 2012; and
- The Draft EIA Report (version 2) is available to I & APs for review.

In accordance with Regulation 58(2) of Government Notice (GN) No. R385 of 21 April 2006, registered I&APs are granted an opportunity to review and comment on the Draft EIA Report. To this end, copies of the report have been lodged at the following places for review from **12 December 2012 – 14 December 2012 and 03 January 2013 - 31 January 2013**:

Location	Address	Tel. No.
Madibeng Community Library	51 Van Velden Street, Brits Office Hours: Mon-Fri: 09:00-17:00 Saturdays: 09:00-12:00	012 318 9318
Schoemansville Library	Marais Street, Schoemansville	012 253 1177

The following public meetings will also be held to present the Draft EIA Report (version 2):

15 January 2013	Venue:	Motozi Lodge, R104 Hartbeespoort
	Time:	17:30-19:30
16 January 2013	Venue:	Dassie Paleis, Spoorweg St, Brits
	Time:	17:30-19:30

## EXECUTIVE SUMMARY

### ELECTRICITY GENERATION, TRANSMISSION AND DISTRIBUTION - OVERVIEW

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Electricity is generated, supplied and distributed by Eskom via a network called a “Grid”. The amount of electricity being fed into the grid must always match what the customers are taking out. The amount of electricity required by the customers varies not just from day to day, but from minute to minute. As electricity demand increases, and loads are connected, more power stations and associated substations and lines need to be built to meet the electricity demands. An overview of electricity generation, transmission and distribution is provided in Section 2.1 of this Report.

### PROJECT BACKGROUND AND MOTIVATION

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The Medupi integration identified the need for the new 2 x 400kV Spitskop-Dinaledi lines to transmit power further into the grid beyond Spitskop. The Dinaledi Main Transmission Substation (MTS) is the main node to link the Waterberg generation and the Mpumalanga pools. Dinaledi MTS is connected by 400kV lines to Bighorn (Rustenburg), Apollo (Pretoria) and will be connected by 2x400kV lines to Spitskop (Northam). This meshed network will be linked to the Central Grid by establishing a new 400kV line from Dinaledi MTS to a new substation called Anderson.

Over the past 15 years, load in the Tshwane area has increased by 80%. This load is anticipated to double in the next 20-30 years, to meet the future electricity requirements in this area and as part of the Tshwane Strengthening Project a new substation named Anderson is proposed to feed the Hartebeespoort and neighbouring areas. This new substation will be linked to the existing Dinaledi Main Transmission Substation by a 40km 400kV line.

The proposed Anderson Substation will be located in Flora Park. The Dinaledi – Anderson 400kV line will transmit power from Dinaledi to the Central Grid and strengthen it. This will ensure that the transmission system north of Johannesburg, Brits and Rustenburg are heavily meshed. This will improve the reliability of the Transmission system and sustain economic growth in the three areas.

## **PROJECT DETAILS**

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### **Description**

Eskom Holdings SOC Limited (Eskom) is proposing the construction of a new Anderson-Dinaledi 400kV Transmission Line, and a proposed new Anderson 400kV Substation as part of their Tshwane Strengthening Scheme Project. The proposed powerline will be approximately 40km in length and will run between the proposed new Anderson Substation, which will be located to the north of the Nuclear Energy Corporation of South Africa (NECSA), located in Flora Park, to the existing Dinaledi Substation which is located approximately 8km North East of Brits. The proposed powerline will be constructed in the following two Municipal Areas: Madibeng Local Municipality (North West Province) and the City of Tshwane Local Municipality (Gauteng Province). The proposed substation is earmarked for construction within the City of Tshwane Metropolitan Municipality. Please note that a separate Environmental Impact Assessment process is being undertaken for the proposed Anderson 400kV Substation.

### **Location**

The Dinaledi Substation is located on Portion 843 of the Farm Roodekopjes of Zwartkopjes 427 JQ, which is located approximately 8km North East of Brits. Three site alternatives are being investigated for the proposed construction of the Anderson Substation. Two of the site alternatives are located directly to the north of NECSA, in Broederstroom, within the Madibeng Local Municipality, North West Province. The third site alternative is located in Flora Park, Gauteng Province. Three alternative powerline routes have been identified (refer to the locality map attached to Appendix A, and to Figure 4). A 1km buffer area has been placed around each alternative route, which will form the study area/corridor to be investigated during the Scoping and EIA Phase. During the EIA Phase a preferred study area/corridor will be selected. The Department of Environmental Affairs (DEA) may authorise the identified preferred corridor, the Department may authorise one of the other corridors, or the Department may request that additional information be submitted in order to make a decision regarding the proposed project. Once DEA authorises a corridor, a walk down survey will be undertaken by suitably qualified specialists in order to determine the exact location of the powerline.

Several properties are located within these 1km study areas/corridors. Details of the affected properties are provided in Section 8.1 of this Report.

### **Construction Footprint/Construction Details**

The proposed powerline requires a servitude width of 55m (27.5m on either side of the centre of the powerline). Generally, the pylons to be used for the powerline can be spaced at 350m to about 550m apart, depending on the type of pylon used, location of the bend points, topography and sensitive areas. The type of Pylons used is dependent on bend points, conductor configuration, voltage level and topography. A minimum vertical clearance of 8.1m between the line and the ground will be required after construction. Details of the construction footprint and construction details are discussed in Section 8 of this Report.

### **Surrounding Land Uses**

Land uses in the study area for the proposed powerline alternatives is mainly comprised of agriculture, mining, vacant land, conservation and tourism, industrial, commercial, recreational and residential.

### **Access**

Existing main roads and farm access roads, should the landowner agrees will be utilised during the construction phase of the proposed powerline. Where existing roads does not exist access roads and roads for construction purposes will be developed. A maintenance road will be required in order for Eskom to undertake maintenance on the powerline. The maintenance road will be located within the 55m servitude. Roads developed for construction purposes which will not be used during maintenance procedures will be closed and rehabilitated at the end of the construction phase. Where roads needs to be developed on side slopes where the slope is steeper than 4%, cut and fill operations may be required to level the roads. Road construction and levelling will be undertaken in terms of the "Transmission Line Towers and Line Construction" (TRMSCAAC1 – Rev 3) document compiled by Eskom. This document provides certain specification for road construction and levelling to ensure that side slopes are stable. All roads to be constructed as part of the proposed project will most likely be gravel roads.

Where construction and maintenance roads intersect with fences gates need to be installed. Furthermore all existing infrastructure along the access and maintenance roads should be maintained in its existing condition. Access points and access roads needs to be negotiated with the landowners.

### **Zoning**

Various land use zonings occur along the study area as various different types of land uses occur. Once a preferred corridor has been approved by the authorities, the exact location of the tower structures will be determined which will determine the exact location of the centre line. Eskom will then negotiate with all affected landowners to purchase a 55m wide servitude. The zoning of the affected properties will therefore not change, only an Eskom servitude will be registered on the affected properties. An application for rezoning may be required for the temporary construction camps, however, clarity on this matter needs to be obtained from the Local Municipalities.

### **Ownership**

The proposed powerline will be approximately 40km in extent and will traverse many properties. Details of the properties affected are provided in Sections 8 of this report.

## **DETAILED ROUTE DESCRIPTION (DIRECTLY AFFECTED PROPERTIES)**

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Eskom Grid Planning is responsible for establishing future electricity demands as a result of growth and development. Once an area has been identified where future growth will result in electricity constraints, methods for strengthening the grid to sustain future growth patterns is considered. The Tshwane Strengthening Scheme is one of these projects which were identified by Eskom to ensure a stable and

efficient electricity supply for the future. After Eskom Grid Planning has identified the selected method to strengthen the grid, the various substations and powerlines which will be required for this project were identified.

The transmission line route selection process involves the consideration of various technical criteria to determine where a line could be located within the selected study area where grid strengthening is required. The technical criteria used by Eskom to determine the route alignments includes *inter alia* the following:

- The cost of construction of Transmission Line Routes is directly proportional to the total length, therefore the longer the route the more expensive construction becomes, the shortest route between two points area therefore preferable;
- Bend towers on a Powerline are extremely expensive due to the large quantities of steel and the large foundations required to construct such towers, therefore the least amount of bends in a line is preferable;
- The maximum angle for a bend tower is 60 degrees, therefore a line cannot just be deviated easily, and proper planning is required. For larger bends, special towers have to be constructed;
- Transmission line routes with existing access routes are preferred, as heavy vehicles and cranes are used for tower construction which needs to travel to the servitude area and specifically to tower positions; and
- When planning a route it is preferable to avoid construction on erosive land, land which is undermined where sinkholes occur or where sinkholes could occur in future, furthermore area with poor geotechnical conditions should be avoided as far as possible.

Three route alternatives each with a 1km wide study area and some deviations are being considered for this proposed project. A detailed route description of all properties currently directly affected by the proposed centre line is discussed in Section 8 of this Report.

#### **PROPERTIES AFFECTED BY 1KM STUDY AREA**

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A list of all properties located within the 1km study area of the three alternative proposed Powerline Routes is provided in Section 7 of this Report. The table also includes all the directly affected properties. The Cadastral 2006 information was used to determine the affected properties. Therefore all subdivisions undertaken after 2006 will not be reflected on this list.



## **UPGRADE OF EXISTING 88KV LINE**

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The proposed Madibeng Substation project which is undertaken by Eskom Distribution forms part of the Tshwane Strengthening Scheme Project. This project entails the construction of a proposed Madibeng Substation which will be located at about 8km south-west of the Dinaledi Substation. The Madibeng Substation will be fed from Dinaledi MTS through 2x132kV lines and thereby split the existing 88kV network in the Tshwane and Brits area. The existing 88kV network in and around the Brits and Tshwane area will be split in such a way that an existing 88kV Lomond-De Wildt line becomes redundant. The Lomond-De Wildt line route is located within the Anderson-Dinaledi 400kV line study area and thus it can be decommissioned after the construction of the Madibeng Substation in order to accommodate the proposed Anderson-Dinaledi 400kV line.

The Madibeng substation project is scheduled to be commissioned by 2014 depending on the speed acquisition of servitudes. The current 88kV Lomond-De Wildt line route servitude is designed for 88kV lines and therefore becomes inadequate for a 400kV line route. The majority of the existing line towers are wood poles which were designed for 88kV lines in terms of clearances and insulations. It is thus necessary that the servitude be extended and the towers be re-designed or changed for the 400kV line.

The foundation of the towers will most probably change as the centre line servitude may change due to the servitude extension and different towers.

The centre line will change because the existing line runs closer to another existing 88kV line. It is therefore with noting that the decommissioning and dismantling of the existing 88kV Lomond-De Wildt line for the proposed 400kV Anderson-Dinaledi line can only begin when Madibeng substation is successfully commissioned.

## **LEGISLATION AND GUIDELINES CONSIDERED**

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A summary of the legislation and guidelines which has been considered during the Scoping and Environmental Impact Assessment Phases for this project is provided in Section 4 of this Report. Please note this project will be undertaken in terms of the Environmental Impact Assessment (EIA) Regulations of 2006, as the Application Form for undertaking the Environmental Authorisation Phase for this project was submitted to the Department of Environmental Affairs (DEA) on the 29<sup>th</sup> of July 2009. However, the new EIA Regulations which was promulgated on the 18<sup>th</sup> of June 2010 and which came into effect on the 2<sup>nd</sup> of August 2010 will be considered as part of the Scoping and EIA Phases in order to ensure that listed activities under the new EIA Regulations are considered, assessed and addressed. The EIA Regulation of 2006 and of 2010 as well as the relevant listed activities which will be triggered as part of this proposed project is addressed in Section 4.1 of this Report.



## SCOPING AND EIA PROCESS

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The proposed Anderson-Dinaledi 400kV powerline project entails certain activities that require authorisation in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA), as described in Section 4.1 of this Report. The process for seeking authorisation is undertaken in accordance with the Environmental Impact Assessment (EIA) Regulations, 2006, promulgated in terms of Section 24(5) of the NEMA.

Section 24C(2)(d)(iii) of the National Environmental Management Amendment Act (Act 62 Of 2008) states that the Minister must be identified as the competent authority in terms of subsection (1) if an activity is undertaken, or is to be undertaken, by a statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government.

Section 4(1) of Regulation 385 of the Environmental Impact Assessment Regulation, 2006, states that if the Minister is the competent authority in respect of a specific application, the application must be submitted to DEA. Eskom is a parastatal or statutory body, and therefore the decision-making authority for this project is DEA.

The Department will make a decision on whether authorisation will be granted for this project or not based on the content of the Scoping and Environmental Impacts Assessment Reports which will be submitted to the Department for review and decision making. The Scoping and EIA Report will also be submitted to the following authorities for comment:

- Department of Environmental Affairs (DEA);
- Gauteng Department of Agriculture and Rural Development (GDARD);
- North West Department of Agriculture, Conservation and Environment;
- Madibeng Local Municipality;
- City of Tshwane Local Municipality;
- South African National Roads Agency (SANRAL);
- North West Province Roads Department;
- North West Department of Housing;
- Department of Mineral Resources (DMR);
- Department of Water Affairs (DWA);
- National Department of Agriculture (NDA);
- Provincial Heritage Resources Authority, Gauteng; and
- South African Heritage Resources Authority.

Comment received from these authorities will be incorporated into the final EIA Report which will be submitted to DEA for review and decision making.

The Scoping Phase is the first phase of an Environmental Impact Assessment and has been completed. The second phase, the EIA phase has commenced and the draft EIR will be submitted to I & APs for comment. A Scoping and EIA process consist of various phases. These phases have been illustrated in a Process Flow Diagram (Figure 2).

An application to undertake Scoping and EIA for this proposed project was submitted to DEA on the 21<sup>st</sup> of July 2009. DEA acknowledged receipt of this application from and issued the project with the following reference number: 12/12/20/1567.

## **THE RECEIVING ENVIRONMENT**

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The EIA Report provides a general description of the status quo of the receiving environment in the project area (1 km wide corridor for each of the alternative routes), and also provides local and site-specific discussions on those environmental features investigated by the respective specialists. This allows for an appreciation of sensitive environmental features and possible receptors of the effects of the proposed project. The following environmental features are discussed:

- Geology;
- Topography;
- Climate;
- Soils and Land Capability;
- Land Use;
- Flora;
- Fauna;
- Surface Water;
- Groundwater;
- Air Quality;
- Noise;
- Visual;
- Traffic;
- Socio-Economic Environment;
- Infrastructure and Services; and
- Archaeological and Cultural Historical.

## **SPECIALIST STUDIES**

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The necessary specialist studies triggered by the findings of the Anderson-Dinaledi 400kV Scoping process, aimed at addressing the identified key issues and compliance with legal obligations, include the following:

- Fauna and Flora Impact Assessment;
- Invertebrate Impact Assessment;
- Herpetological Impact Assessment;
- Heritage Impact Assessment;
- Agricultural Potential Assessment;
- Visual Impact Assessment; and
- Socio-Economic Impact Assessment.

The information obtained from the respective specialist studies were incorporated into the EIA report in the following manner:

- The information was used to complete the description of the receiving environment in a more detailed and site-specific manner;
- A summary of each specialist study is contained in the report, focusing on the approach to the study, key findings and conclusions drawn;
- The evaluations performed by the specialists on the alternative routes were included in the comparative analysis to identify the most favourable option;
- The specialists' impacts assessment, and the identified mitigation measures, were included in the overall project impact assessment;
- Specialist input was obtained to address comments made by I&APs that related to specific environmental features pertaining to each specialist discipline; and
- Salient recommendations made by the specialists were taken forward to the final EIA Conclusions and Recommendations.

## IMPACT ASSESSMENT

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This section of the EIA Report focuses on the pertinent environmental impacts that could potentially be caused by the proposed Anderson-Dinaledi 400kV transmission line during the pre-construction, construction and operation phases of the project.

The impacts to the environmental features are linked to the project activities, which in broad terms relate to the physical infrastructure (emphasis on construction and operation stages). Impacts were identified as follows:

- An appraisal of the project description and the receiving environment;
- Impacts associated with listed activities contained in GN No. R386; R387; R544; R545 and R546;
- Issues highlighted by environmental authorities;
- Findings from specialist studies; and
- Comments received during public participation.

The impacts associated with the listed activities and raised by environmental authorities are discussed on a qualitative level. In order to understand the impacts related to the project's components, the activities and environmental aspects associated with the project life-cycle were identified. The following significant environmental impacts associated with the proposed Anderson Dinaledi 400kV transmission line are assessed quantitatively and concomitant mitigation measures are provided.

CONSTRUCTION PHASE	
Feature	Impact
Topography	<ul style="list-style-type: none"> <li>• Visual impact on ridges</li> <li>• Erosion of affected areas on steep slopes</li> </ul>
Surface Water	<ul style="list-style-type: none"> <li>• Impacts where access roads and the transmission lines cross watercourses</li> </ul>
Geology and Soil	<ul style="list-style-type: none"> <li>• Erosion on steep slopes</li> </ul>

CONSTRUCTION PHASE	
Feature	Impact
Flora	<ul style="list-style-type: none"> <li>Removal of vegetation for stringing, building of new access roads, tower construction and construction camp(s) establishment</li> </ul>
Fauna	<ul style="list-style-type: none"> <li>Impacts to animals</li> <li>Impacts to livestock</li> </ul>
Socio-economic	<ul style="list-style-type: none"> <li>Loss of income</li> <li>Reduction in property value</li> <li>Damage to property</li> <li>Relocation of structures situated within servitude</li> </ul>
Agricultural Potential	<ul style="list-style-type: none"> <li>Loss of agricultural land</li> <li>Impacts to livestock</li> </ul>
Archaeological and Cultural Features	<ul style="list-style-type: none"> <li>Damage to heritage resources</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>Damage to roads by heavy construction vehicles</li> </ul>
Aesthetics	<ul style="list-style-type: none"> <li>Clearing of vegetation.</li> <li>Construction-related operations.</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>Visual and noise impacts from construction operations.</li> <li>Influence to ecotourism.</li> <li>Reduction in tourism to areas affected by construction</li> </ul>
OPERATIONAL PHASE	
Feature	Impact
Topography	<ul style="list-style-type: none"> <li>Visual impact on ridges from disturbed area and infrastructure.</li> <li>Erosion along access roads on steep slopes.</li> </ul>
Surface Water	<ul style="list-style-type: none"> <li>Inadequate stormwater management on access roads</li> <li>Damage to towers from major flood events</li> </ul>
Geology and Soil	<ul style="list-style-type: none"> <li>Erosion on steep slopes</li> </ul>
Flora	<ul style="list-style-type: none"> <li>Encroachment by exotic species through inadequate eradication programme.</li> <li>Clearing of vegetation along maintenance road.</li> </ul>
Fauna	<ul style="list-style-type: none"> <li>Risk to birds from collision with infrastructure and from electrocution</li> </ul>
Socio-economic	<ul style="list-style-type: none"> <li>Loss of land with extension of existing servitude</li> <li>Reduction in property value</li> <li>Threats to human and animal health from EMF</li> </ul>
Agricultural Potential	<ul style="list-style-type: none"> <li>Loss of agricultural land</li> </ul>
Transportation	<ul style="list-style-type: none"> <li>Use of maintenance roads</li> </ul>
Aesthetics	<ul style="list-style-type: none"> <li>High visibility of transmission lines.</li> <li>Inadequate reinstatement and rehabilitation of construction footprint.</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>High visibility of transmission lines</li> <li>Loss of "sense of place"</li> </ul>

Cumulative impacts, such as use of local road network, alien and invasive vegetation along the corridor, following existing high-voltage power lines, high erodible nature of local soils and benefits to macro-economy, are also considered.

## ANALYSIS OF ALTERNATIVES

Based on the recommendations of the specialists and the comparison of the impacts associated with the various alignments, the following options are considered to be the preferred alternatives:

Western Alternative: The invertebrate and herpetological specialist recommends that the western route be recommended as the preferred route, the southern, eastern and western deviations will not ameliorate any potential impact.

Western Alternative – Western Deviation: The flora and fauna specialist recommends that this route be recommended in terms of flora and fauna sensitivity as most parts of the route are along the main road and existing powerline and are considered less sensitive than the alternative routes in terms of biodiversity.

Eastern Alternative: The heritage, agricultural, visual and socio-economic specialists recommend that the eastern alternative route be recommended.

Based on the recommendations by the specialists and the impact assessment, **the Best Practicable Environmental Option (BPEO) is the Eastern Route.**

## **PUBLIC PARTICIPATION PROCESS**

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A Public Participation Process was conducted as described in Regulation 58 of the EIA Regulations, 2006. The Public Participation Process included the following:

- Consultation and involvement of relevant Authorities at various levels;
- Consultation and involvement of the owners and occupiers of land adjacent to the properties earmarked for development, and within a 100m radius of the boundary of the site where the activity is to be undertaken, by hand delivering Background Information Documents (BID's) to all owners and occupiers within a 100m radius of the properties earmarked for development;
- Consultation and involvement of the municipal ward councillors of the wards in which the properties earmarked for development are located;
- Consultation and involvement of the municipality which has jurisdiction in the area;
- Consultation and involvement of any organ of state having jurisdiction in respect of any aspect of the activity;
- Compilation and placing of advertisements in local and regional newspapers;
- Compilation and placing of site notices on the properties earmarked for development;
- Compilation and distribution of Background Information Documents (BID's) to all relevant Stakeholders within a 100m radius;
- Hosting of a Public Meeting; and
- The Draft Scoping Report was made available to I & APs for review.

The Public Participation Process is described in detail in Section 13 of this Report.

## **EIA CONCLUSIONS AND RECOMMENDATIONS**

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With the selection of the BPEO for the transmission line route, the adoption of the mitigation measures included in the EIA Report and the dedicated implementation of the Environmental Management Programme (EMPr), it is believed that the significant environmental aspects and impact associated with this project can be suitably mitigated. With the aforementioned in mind, it can be concluded that there are no fatal flaws associated with the project and that authorisation can be issued, based on the findings of the specialists and the impact assessment, through the compliance with the identified environmental management provisions.

The EIA Report recommends various conditions that are regarded as critical mitigation measures emanating from the environmental assessment process.

**TITLE AND APPROVAL PAGE**

**TITLE:** Proposed Establishment of the Anderson-Dinaledi 400 kV Transmission Line between the proposed new Anderson Substation (Flora Park) and the Dinaledi Substation (Brits), North West and Gauteng Provinces – Draft EIA Report

**CLIENT :** Eskom Holdings SOC Limited  
P.O. Box 1091  
Johannesburg  
2001

**PREPARED BY** Nemai Consulting C.C.  
P.O. Box 1673  
Sunninghill  
2157  
Telephone : (011) 781 1730  
Facsimile : (011) 781 1731

**AUTHOR** M.Chetty, D. Henning, N. Naidoo

\_\_\_\_\_  
**Signature** **Date**

**APPROVAL** \_\_\_\_\_  
**Signature** **Date**



**AMENDMENTS PAGE**

Date	Nature of Amendment	Amendment No.	Signature
25 October 2012	Draft Copy for Public Review	1	
12 December 2012	Final Copy for Public Review	2	

## TABLE OF CONTENTS

PUBLIC REVIEW	2
EXECUTIVE SUMMARY	4
TITLE AND APPROVAL PAGE	15
AMENDMENTS PAGE	16
TABLE OF CONTENTS	17
1 DOCUMENT ROADMAP	27
2 PROJECT BACKGROUND AND MOTIVATION	29
2.1 Setting the Scene	29
2.2 Transmission and Distribution of Electricity	29
3 LEGISLATION AND GUIDELINES CONSIDERED	31
3.1 Legislation	31
3.2 Guidelines	41
3.3 Environmental Authorisations Required	41
3.4 Regional Plans, Policies and Programmes	42
3.5 Energy Sector Strategic Documents	42
3.6 Magaliesberg Protected Environment EMF	42
4 SCOPING AND EIA PROCESS	45
4.1 Environmental Assessment Triggers	45
4.2 Environmental Assessment Authorities	45
4.3 Amendment of the Application Form	45
4.4 Scoping Process	46

4.5	EIA Methodology	47
4.5.1	Need and Desirability	47
4.5.2	Formal Process	49
4.5.3	Alignment with the Plan of Study	50
4.5.4	Key Amendments / Clarification of Information from the Scoping Report	52
4.5.5	Route Selection	53
4.5.6	Screening and Assessment of Alternatives	54
4.5.7	Impact Prediction	54
4.6	Servitude Negotiation and the EIA Process	55
5	ASSUMPTIONS AND LIMITATIONS	56
6	ENVIRONMENTAL ASSESSMENT PRACTITIONER	59
7	PROJECT LOCATION	60
8	PROJECT DESCRIPTION	64
8.1	Power Line Routes	64
8.1.1	Eastern Route Alternative	65
8.1.2	Central Route Alternative	73
8.1.3	Western Route Alternative	75
8.2	Upgrade of the Existing 88kV Line	86
8.3	Power Line Servitude	88
8.4	Design Considerations	88
8.5	Tower Structures	89
8.6	Substations	93
8.6.1	Dinaledi Substation	93
8.6.2	Anderson Substation	94
8.7	Project Life-cycle	94
8.7.1	Construction	94
8.7.2	Operation and Maintenance	104
8.7.3	Decommissioning	105
8.8	Resources Required for Construction and Operation	106
8.8.1	Water	106

8.8.2	Sanitation	106
8.8.3	Roads	106
8.8.4	Waste	106
8.8.5	Electricity	106
8.8.6	Construction Workers	107
9	PROFILE OF THE RECEIVING ENVIRONMENT	108
9.1	Geology	108
9.2	Topography	110
9.3	Climate	114
9.3.1	Temperature	114
9.3.2	Precipitation	115
9.3.3	Wind	115
9.4	Soil and Land Capability	116
9.5	Land Use	118
9.6	Flora	121
9.7	Fauna	126
9.7.1	Mammals (Phampe, 2012)	126
9.7.2	Avifauna (Phampe, 2012)	128
9.7.3	Reptiles (Cook, 2012)	130
9.7.4	Amphibians (Cook, 2012)	132
9.7.5	Invertebrates( van de Merwe, 2012)	135
9.8	Surface Water	136
9.8.1	Regional Description	136
9.8.2	Site Description	138
9.9	Groundwater	139
9.9.1	Regional Description	139
9.9.2	Site Description	139
9.10	Air Quality	139
9.10.1	Regional Description	139
9.10.2	Area/Local Description	140
9.11	Noise	140

9.11.1	Area/Local	140
9.12	Visual	140
9.12.1	Area/Site Description	140
9.13	Traffic	141
9.14	Socio-Economic Environment (Munshi, 2012)	144
9.14.1	Regional Description	144
9.14.2	Sub-Place Description	144
9.14.3	Social Issues	145
9.14.4	Economic Issues	146
9.15	Infrastructure and Services	147
9.15.1	Regional Description	147
9.15.2	Site Description	147
9.16	Archaeology and Cultural Historical	147
9.16.1	Regional Description	147
9.16.2	Site Description (Marais-Botes, 2011)	148
10	SUMMARY OF SPECIALIST STUDIES	149
10.1	Fauna, Flora and Avifauna Survey	150
10.2	Invertebrate Assessment	153
10.3	Herpetological Assessment	155
10.4	Visual Impact Assessment	159
10.5	Socio-Economic Impact Assessment	162
10.6	Heritage Impact Assessment	168
10.7	Soil Survey and Agricultural Potential Study	171
11	IMPACT ASSESSMENT	173
11.1	Overview	173
11.1.1	Impacts associated with Listed Activities	173
11.1.2	Issues raised by Environmental Authorities and I & APs	175
11.1.3	Project Activities and Environmental Aspects	175
11.1.4	Significant Environmental Impacts	177

11.1.5	Impact Assessment Methodology	180
11.1.6	Impact Mitigation	181
11.2	Watercourses	182
11.2.1	Impact Overview	182
11.2.2	Impact Assessment	184
11.3	Geology and Soil	186
11.3.1	Impact Overview	186
11.3.2	Impact Assessment	186
11.4	Flora	187
11.4.1	Impact Overview	187
11.4.2	Impact Assessment	188
11.5	Fauna	191
11.5.1	Impact Overview	191
11.5.2	Impact Assessment	193
11.6	Heritage Resources	200
11.6.1	Impact Overview	200
11.6.2	Impact Assessment	200
11.7	Visual Quality	202
11.7.1	Impact Overview	202
11.7.2	Impact Assessment	206
11.8	Agriculture	211
11.8.1	Impact Overview	211
11.8.2	Impact Assessment	211
11.9	Social Environment	212
11.9.1	Impact Overview	212
11.9.2	Impact Assessment	218
11.10	Cumulative Impacts	223
12	ANALYSIS OF ALTERNATIVES	225
12.1	Overview of Alternatives	225
12.1.1	Alignment Options	225
12.1.2	Tower Structures	226
12.1.3	Placing the Transmission Line Underground	226

12.1.4	“No Go” Option	227
12.2	Specialist Studies	227
12.2.1	Fauna and Flora Impact Assessment	227
12.2.2	Invertebrate Impact Assessment	228
12.2.3	Herpetological Study	228
12.2.4	Heritage Impact Assessment	228
12.2.5	Agricultural Potential Assessment	229
12.2.6	Visual Impact Assessment	229
12.2.7	Socio-Economic Study	229
12.2.8	Summary	230
12.3	Comparative Impacts of Alternative Routes	231
12.4	BPEO Selection	240
12.5	Route Refinement	241
13	PUBLIC PARTICIPATION – EIA PHASE	243
13.1	Maintenance of the I&AP Database	245
13.2	Notification – Approval of Scoping Report	245
13.3	Comments and Response Report	245
13.4	Review of Draft EIA Report	245
13.4.1	Notification	245
13.4.2	Lodging and Distribution of Draft EIA Report	246
13.4.3	Public Meetings	247
13.5	Review of Final EIA Report	248
13.6	Notification of DEA Decision	248
13.7	Landowner Notification	248
14	EIA CONCLUSIONS AND RECOMMENDATIONS	249
14.1	Sensitive Environmental Features	249
14.2	Environmental Impact Statement	250
14.3	Key Recommendations	250



14.4	Conditions for Authorisation	250
15	REFERENCES	252

## APPENDICES

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APPENDIX A: MAPS	253
APPENDIX B: DEA APPROVAL OF SCOPING REPORT	255
APPENDIX C: MINUTES OF MEETING HELD WITH DEA	256
APPENDIX D: SPECIALIST REPORTS	257
APPENDIX E: ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)	266
APPENDIX F: SERVITUDE NEGOTIATION PROCESS	267
APPENDIX G: CURRICULA VITAE	268
APPENDIX H: COMMENTS RAISED BY I & APS	269
APPENDIX I: PROOF OF PUBLIC PARTICIPATION	270

## LIST OF TABLES

---

Table 1: Anderson-Dinaledi 400 kV Transmission Line EIA Report Roadmap	27
Table 2: Environmental Statutory Framework	31
Table 3: EIA Regulations of 2006 - list of Activities Triggered	33
Table 4: EIA Regulations of 2010 - list of Activities Triggered	36
Table 5: Need and Desirability of the Project	47
Table 6: Alignment of EIA Report with Plan of Study	50
Table 7: Scoping and EIA Team Members	59
Table 8: Eastern Route Alternative bend points (start and end points from south to north)	66
Table 9: Eastern Route Alternative Deviation bend points (start and end points from south to north)	72
Table 10: Central Route Alternative bend points (start and end points from south to north)	74
Table 11: Western Route Alternative bend points (start and end points from south to north)	77
Table 12: Western Route Alternative Deviation 1 bend points (start and end points from south to north)	81
Table 13: Western Route Alternative Deviation 2 bend points (start and end points from south to north)	83
Table 14: Western Route Alternative Deviation 3 bend points (start and end points from south to north)	86
Table 15: Minimum standards for vegetation clearing for new Transmission power line	95
Table 16: Vegetation Cover and Associated Geology	108
Table 17: Vegetation Types and Associated Topography	111
Table 18: Class 2 of the four classes of ridges in Gauteng Province and the percentage of transformation	112
Table 19: Average Wind Speed and Direction for the Pretoria (Tshwane Area)	115

Table 20: Land Use Patterns – North West Province (2001)	119
Table 21: Irrigation Schemes in the Vaal and Harts Rivers	119
Table 22: Study Area Vegetation Types and Associated Conservation Status	121
Table 23: Red Data Mammal Species Recorded in the MPNE	127
Table 24: Mammals recorded on the proposed transmission lines	127
Table 25: Bird species recorded in the study area	128
Table 26: Frog species recorded by the Southern African Frog Atlas Project (SAFAP) for the combined locus 2527DB and 2527DD quarter degree grid squares	133
Table 27: Red Data Herpetofauna Species Recorded for the North West Province	134
Table 28: Affected Sub-Places in terms of Census 2010	144
Table 29: Population figures for the study area (Statistics South Africa, 2001)	145
Table 30: List of Heritage Sites along the Western and Eastern Routes	148
Table 31: List of Heritage Sites along the Western and Eastern Routes	169
Table 31: Impacts associated with the key listed activities	174
Table 32: Activities associated with the Anderson-Dinaledi 400kV Power Line Project Life-Cycle	175
Table 33: Environmental Aspects associated with the Anderson-Dinaledi 400kV Power Line Project Life-Cycle	177
Table 34: Significant environmental impacts associated with the project	179
Table 36: Locations for review of Draft EIA Report	246
Table 37: Locations for review of Draft EIA Report	246
Table 38: Details of public meetings held to present the Draft EIA Report (version 2)	247

## LIST OF FIGURES

Figure 1: Illustration of the transmission and distribution of electricity	30
Figure 2: Outline of Scoping and EIA process	50
Figure 3: Maps showing the old transmission line (a) and the amended transmission line route (b)	52
Figure 4: Municipal areas traversed by the corridors	62
Figure 5: Locality Map	63
Figure 6: Aerial Map Showing the Centre of Each Route Option	64
Figure 7: View of the centre line of the Eastern Route corridor in blue	68
Figure 8: Map showing the start point of the centre line of the eastern route corridor in blue at the Anderson substation site	69
Figure 9: Map showing the end point of the centre line of the eastern route corridor in blue at the Dinaledi substation	69
Figure 10: North-eastern view along Eastern Route Alternative	70
Figure 11: South-eastern view along the Eastern Route Alternative (crossing of R566, Magaliesberg in background)	70
Figure 12: Southern view along the Eastern Route Alternative (crossing of R513, Magaliesberg in background)	71

Figure 13: South-eastern view along the Eastern Route Alternative (crossing of R514, Witwatersberg in background)	71
Figure 14: Aerial map showing the start and end point of the centre line of the Eastern route alternative deviation corridor in light blue	73
Figure 15: Aerial map showing the start and end point of the centre line of the central route corridor in green	74
Figure 16: Aerial map showing the start and end point of the centre line of the western route corridor in red	75
Figure 17: Aerial map showing the start point of the centre line of the western route corridor at proposed Anderson substation site	78
Figure 18: Aerial map showing the end point of the centre line of the western route corridor at the Dinaledi substation	78
Figure 19: South-eastern view along the Western Route Alternative (Magaliesberg in background)	79
Figure 20: North-western view along the Western Route Alternative (western boundary of Damonsville on the right)	79
Figure 21: South-eastern view along the Western Route Alternative (crossing of the N4)	80
Figure 22: Aerial map showing the start and end point of the centre line of the western route-western deviation corridor	81
Figure 23: Southern view along the Western Route Alternative – Deviation 1 (crossing of the R511)	82
Figure 24: Aerial map showing the start and end point of the centre line of the western route-eastern deviation corridor	83
Figure 25: North-eastern view along the Western Route Alternative – Deviation 2 - route situated between the slimes dam (left) and the N4 (right)	84
Figure 26: Aerial map showing the start and end point of the centre line of the western route-southern deviation corridor	85
Figure 27: South-eastern view along the Western Route Alternative – Deviation 3 - route situated to the right of the R511	86
Figure 28: Map illustrating the Le-Mondt line that will be decommissioned in yellow	87
Figure 29: Cross-rope suspension tower	90
Figure 30: Self-supporting tower	91
Figure 31: Guyed suspension tower	92
Figure 32: Dinaledi Substation (feeder bays shown in inserted photograph)	93
Figure 33: Vegetation clearance for stringing	95
Figure 34: Examples of Construction camps	97
Figure 35: Access gate for an Eskom transmission line	98
Figure 36: Access roads	99
Figure 37: Drilling rig and generator (top) and excavation activities (bottom)	100
Figure 38: Foundation work	100
Figure 39: Delivery of steel (top) and assembly of tower (bottom)	101
Figure 40: Erection of towers	102

Figure 41: Cable drums	103
Figure 42: Stringing with pilot tractor (top) and pulleys (bottom)	103
Figure 43: Example of an access road used for maintenance	105
Figure 44: Map showing the geology within the proposed site	110
Figure 45: Gauteng Ridges in relation to the proposed transmission line	113
Figure 46: North West hills and ridges (in blue) in relation to the proposed transmission line	114
Figure 47: Wind Rose for Hartbeespoort Dam (November 2009-October 2010)	116
Figure 48: Soil Types for the proposed area	117
Figure 49: Map indicating the land use for the proposed routes	120
Figure 50: Vegetation units identified in the study area	122
Figure 51: Protected areas in the study area	123
Figure 52: <i>Hypoxis hemerocallidea</i> recorded along the proposed routes	124
Figure 53: Alien invasive plant species recorded along the proposed routes	125
Figure 54: A collage of photographs displaying the granitic outcrops and low-lying rocky sheets to the north-east of Brits	131
Figure 55: Reptile species recorded along the alignment included A: Distant's Ground Agama; B Herald Snake; Flap-necked Chameleon; Rhombi Night Adder	132
Figure 56: A conglomerate of photographs displaying frog species likely to occur along the alignments in a suitable habitat	134
Figure 57: Species of concern known to occur in the vicinity of the alternative routes	136
Figure 58: Rivers found within the study area	138
Figure 59: Aerial Map showing major traffic routes	142
Figure 60: Map showing the major traffic routes	143
Figure 61: Land Use Map	146
Figure 62: Maps showing the old transmission line (a) and the amended transmission line route (b)	170
Figure 63: Mitigation Hierarchy	181
Figure 64: Layout of Anderson-Dinaledi 400kV alignment alternatives	230
Figure 65: Public Participation Process for Anderson-Dinaledi 400 kV transmission line	244

# 1 DOCUMENT ROADMAP

This draft EIA Report for the proposed **Anderson-Dinaledi 400 kV Transmission Line** aims to satisfy the requirements stipulated in Government Notice (GN) No. R385 (21 April 2006), regulation 32(2). **Table 1** presents the document's composition, in terms of the aforementioned requirements.

**Table 1: Anderson-Dinaledi 400 kV Transmission Line EIA Report Roadmap**

Chapter	Title	Correlation with G.N. No. R385	Description
2	Project Background and Motivation	R32(2)(f)	A description of the need and desirability of the proposed activity.
3	Legislation and Guidelines Considered	–	–
4	Scoping and EIA Process	–	–
5	Assumptions and Limitations	R32(2)(l)	A description of any assumptions, uncertainties and gaps in knowledge.
6	Environmental Assessment Practitioner	R32(2)(a)	Details of – (i) the EAP who compiled the report; and (ii) the expertise of the EAP to carry out an environmental impact assessment.
7	Project Location	R32(2)(c)	A description of the location of the activity.
8	Project Description	R32(2)(b)	A detailed description of the proposed activity.
		R32(2)(c)	A description of the property on which the activity is to be undertaken and the route of the linear activity.
9	Profile of the Receiving Environment	R32(2)(d)	A description of the environment that may be affected by the activity.
10	Summary of Specialist Studies	R32(2)(i)	A summary of the findings and recommendations of any specialist reports.
11	Impact Assessment	R32(2)(d)	A description of the manner in which the physical, biological, social, economic and cultural features of the environment may be affected by the proposed activity.
		R32(2)(g)	An indication of the methodology used in determining the significance of potential environmental impacts.
		R32(2)(j)	(j) 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;
		R32(2)(k)	An assessment of each identified potentially significant impact, including – (i) cumulative impacts; (ii) the nature of the impact; (iii) the extent and duration of the impact; (iv) the probability of the impact occurring; (v) the degree to which the impact can be reversed; (vi) the degree to which the impact may cause irreplaceable loss of resources; and

Chapter	Title	Correlation with G.N. No. R385	Description
			(vii) the degree to which the impact can be mitigated.
12	Analysis of Alternatives	R32(2)(f)	A description 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.
		R32(2)(h)	A description and comparative assessment of all alternatives identified during the environmental impact assessment process.
13	Public Participation	R32(2)(e)	Details of the public participation process.
14	EIA Conclusions and Recommendations	R32(2)(m)	An opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.
		R32(2)(n)	An environmental impact statement
Appendix E		R32(2)(o)	A draft Environmental Management Plan.
Appendix D		R32(2)(p)	Copies of any specialist reports and reports on specialised processes.
N/A	N/A	R32(2)(q)	Any specific information that may be required by the competent authority.

## 2 PROJECT BACKGROUND AND MOTIVATION

### 2.1 Setting the Scene

---

The Medupi integration identified the need for the new 2 x 400kV Spitskop-Dinaledi lines to transmit power further into the grid beyond Spitskop. The Dinaledi Main Transmission Substation (MTS) is the main node to link the Waterberg generation and the Mpumalanga pools. Dinaledi MTS is connected by 400 kV lines to Bighorn (Rustenburg), Apollo (Tshwane) and will be connected by 2 x 400 kV lines to Spitskop (Northam). This meshed network will be linked to the Central Grid by establishing a new 400 kV line from Dinaledi MTS to a new substation called Anderson.

Over the past 15 years, load in the Tshwane area has increased by 80%. This load is anticipated to double in the next 20-30 years, and to meet the future electricity requirements in this area and as part of the Tshwane Strengthening project a new substation named Anderson is proposed to feed the Hartebeespoort and neighbouring areas. This new substation will be linked to the existing Dinaledi MTS by an approximate 40 km 400 kV line.

The Anderson- Dinaledi 400kV line will transmit power from Dinaledi to the Central Grid and strengthen it. This will ensure that the transmission system north of Johannesburg, Brits and Rustenburg are heavily meshed, which will improve the reliability of the Transmission system and sustain economic growth in the three areas.

**Note:** This report only focuses on the Anderson- Dinaledi 400kV transmission line. A separate EIA process is being conducted for the proposed Anderson Substation.

### 2.2 Transmission and Distribution of Electricity

---

Electricity is generated, supplied and distributed by Eskom via a network called a “Grid”. The electricity being fed into the grid must always match what the customers are taking out. The electricity required by the customers varies not just from day to day, but from minute to minute. As electricity demand increases, and loads are connected, more power stations and associated substations and lines need to be built to meet the electricity demands.

Eskom produces electricity at power stations. Most of the power stations in South Africa are located near coal mines in Mpumalanga and the Waterberg area in the Limpopo Province. The largest load centres are located in Gauteng, the Western Cape and Kwa-Zulu Natal. After electricity is generated at a power station, it is conveyed from the power stations to the load centres via high voltage power lines. As electricity leaves the power station, the electricity is boosted by a ‘step-up’ transformer to voltages such as 400kV, 275kV



and 132kV. Electricity is 'stepped-down' at sub-stations to voltages used for distribution to customers. A diagram of the Eskom Supply Chain is provided in **Figure 1**.

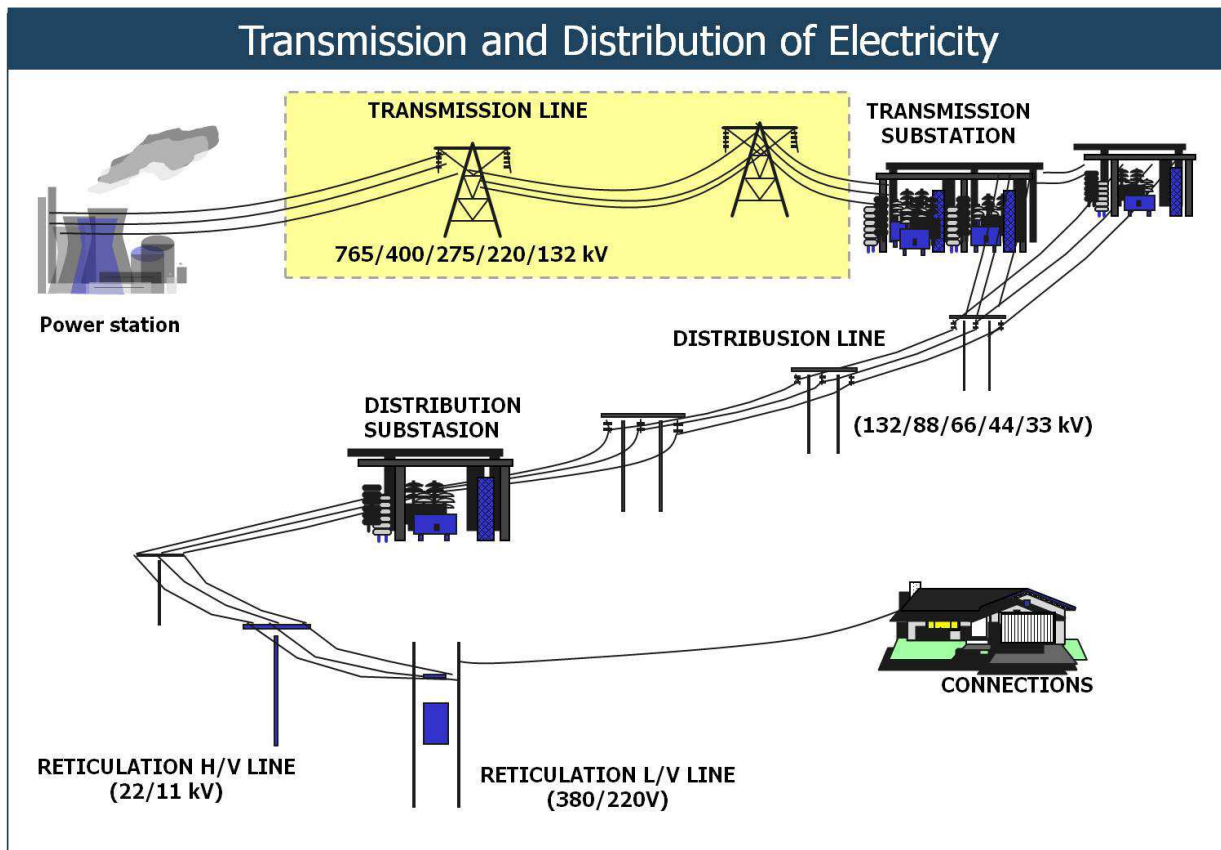


Figure 1: Illustration of the transmission and distribution of electricity

### 3 LEGISLATION AND GUIDELINES CONSIDERED

#### 3.1 Legislation

The legislation that has possible bearing on the proposed Anderson-Dinaledi 400 kV transmission line project is captured in Table 2 below. A more detailed overview of relevant legislation was provided in the Scoping Report.

**Note:** This list does not attempt to provide an exhaustive explanation, but rather an identification of the most appropriate sections from pertinent pieces of legislation.

**Table 2: Environmental Statutory Framework**

Legislation	Relevance
Constitution of the Republic of South Africa, (No. 108 of 1996)	<ul style="list-style-type: none"> <li>Chapter 2 – Bill of Rights.</li> <li>Section 24 – environmental rights.</li> </ul>
National Environmental Management Act (No. 107 of 1998)	<ul style="list-style-type: none"> <li>Section 24 – Environmental Authorisation (control of activities which may have a detrimental effect on the environment).</li> <li>Section 28 – Duty of care and remediation of environmental damage.</li> <li>Environmental management principles.</li> <li>Authorities – National: Department of Environmental Affairs (DEA); Provincial: North West Department of Agriculture, Conservation, Environment and Rural Development (NWDACERD) and Gauteng Department of Agriculture and Rural Development (GDARD)</li> </ul>
National Water Act (No. 36 of 1998)	<ul style="list-style-type: none"> <li>Chapter 3 – Protection of water resources.</li> <li>Section 19 – Prevention and remedying effects of pollution.</li> <li>Section 20 – Control of emergency incidents.</li> <li>Chapter 4 – Water use.</li> <li>Watercourse crossings.</li> <li>Authority – Department of Water Affairs (DWA).</li> </ul>
Environment Conservation Act (No. 73 of 1989):	<ul style="list-style-type: none"> <li>Environmental protection and conservation.</li> <li>Section 25 – Noise regulation.</li> <li>Section 20 – Waste management.</li> <li>Authority – DEA</li> </ul>
National Environmental Management Air Quality Act (No. 39 of 2004)	<ul style="list-style-type: none"> <li>Air quality management</li> <li>Section 32 – dust control.</li> <li>Section 34 – noise control.</li> </ul>

Legislation	Relevance
	<ul style="list-style-type: none"> <li>• Authority – DEA.</li> </ul>
National Environmental Management: Biodiversity Act, 2004 (No. 10 of 2004)	<ul style="list-style-type: none"> <li>• Management and conservation of the country's biodiversity.</li> <li>• Protection of species and ecosystems.</li> <li>• Authority – DEA.</li> </ul>
National Environmental Management: Protected Areas Act (No. 57 of 2003)	<ul style="list-style-type: none"> <li>• Protection and conservation of ecologically viable areas representative of South Africa's biological diversity and natural landscapes.</li> <li>• Section 16 to 18 - a section of the proposed Anderson-Dinaledi power line traverses the Magaliesberg Protected Natural Environment (MPNE).</li> </ul>
National Environmental Management: Waste Act (No. 59 of 2008)	<ul style="list-style-type: none"> <li>• Chapter 5 – licensing requirements for listed waste activities (Schedule 1).</li> <li>• Authority – provincial (general waste) or national (hazardous).</li> </ul>
National Forests Act (No. 84 of 1998)	<ul style="list-style-type: none"> <li>• Section 15 – authorisation required for impacts to protected trees.</li> <li>• Authority – Department of Agriculture, Forestry and Fisheries</li> </ul>
Minerals and Petroleum Resources Development Act (No. 28 of 2002)	<ul style="list-style-type: none"> <li>• Permit required for borrow pits.</li> <li>• Authority – Department of Mineral Resources (DMR).</li> </ul>
Occupational Health & Safety Act (No. 85 of 1993)	<ul style="list-style-type: none"> <li>• Provisions for Occupational Health &amp; Safety.</li> <li>• Authority – Department of Labour.</li> </ul>
National Heritage Resources Act (No. 25 of 1999)	<ul style="list-style-type: none"> <li>• Section 34 – protection of structure older than 60 years.</li> <li>• Section 35 – protection of heritage resources.</li> <li>• Section 36 – protection of graves and burial grounds.</li> <li>• Section 38 – Heritage Impact Assessment for linear development exceeding 300m in length; development exceeding 5 000m<sup>2</sup> in extent.</li> <li>• Authority – South African Heritage Resources Agency (SAHRA), Provincial Heritage Resources Agency.</li> </ul>
Conservation of Agricultural Resources Act (No. 43 of 1983)	<ul style="list-style-type: none"> <li>• Control measures for erosion.</li> <li>• Control measures for alien and invasive plant species.</li> <li>• Authority – Department of Agriculture.</li> </ul>
National Road Traffic Act (No. 93 of 1996)	<ul style="list-style-type: none"> <li>• Authority – Department of Transport</li> </ul>
Tourism Act of 1993	<ul style="list-style-type: none"> <li>• Authority – South African Tourism Board</li> </ul>

### **Environmental Impact Assessment Regulations**

The Anderson-Dinaledi 400 kV power line project entails certain activities that require authorisation in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). The environmental assessment for this project is being conducted in terms of the Environmental Impact Assessment (EIA) Regulations of 2006 (GN No. R385 of 21 April 2006), which was promulgated in terms of Chapter 5 of

NEMA. **Table 3** lists the associated relevant activities that apply to the proposed project in terms of GN No. R386 and R387 of 21 April 2006.

**Table 3: EIA Regulations of 2006 - list of Activities Triggered**

GN No.	Activity	Description	Relevance to Project
R387	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.	The project involves the construction of a 400kV Transmission Line
R387	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.	This activity was considered as construction of a power line will occur within a 55m wide servitude over a distance of approximately 40km. Therefore the total project area will be approximately 220ha in extent. However, this activity is not applicable for linear developments and is therefore excluded as a listed activity.
R387	5	The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before the publication of this notice and which has not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 made under section 24(5) of the Act and published in Government Notice No. R.385 of 2006, where – (a) It is a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No.7 of 1998); (b) it is a road administered by a provincial authority; (c) the road reserve is wider than 30 meters; or (d) the road will cater for more than one lane of traffic in both directions.	This activity will not be applicable as only single lane access and maintenance roads will be required for this proposed project. The proposed maintenance roads will be gravel roads which will be located within the 55m servitude. Access roads will most likely also be single lane gravel roads.

GN No.	Activity	Description	Relevance to Project
R386	1(m)	<p>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 -</p> <ul style="list-style-type: none"> <li>(i) canals;</li> <li>(ii) channels;</li> <li>(iii) bridges;</li> <li>(iv) dams; and</li> <li>(v) weirs.</li> </ul>	<p>A 1km study corridor for the construction of the 400kV power line will be considered as part of this project. Once a corridor has been approved by DEA, a walk down survey will be undertaken by all the relevant specialists to determine where the actual centre line (power line) will be located within the corridor. It is therefore not yet known whether it would be necessary to construct pylons within the 32m of the bank of rivers or streams, or whether it will be possible to span across. New road bridges may be require or existing bridges may need to be upgraded.</p>
R386	1(p)	<p>The construction of facilities or infrastructure, including associated structures or infrastructure for the temporary storage of hazardous waste.</p>	<p>This activity is not applicable as any hazardous waste produced on site will be temporarily stored and then disposed of at an approved landfill site.</p>
R386	4	<p>The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland.</p>	<p>This activity relates to where construction work may need to take place in watercourses to build new road bridges or to upgrade existing bridges for access roads.</p>
R386	7	<p>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.</p>	<p>Diesel storage tanks may be erected at the construction camps during the construction phase. The size of these tanks is not known.</p>
R386	12	<p>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).</p>	<p>It is not yet clear exactly where the proposed power line will be located within the 1km corridor. This activity has therefore been included. Authorities have indicated in the past that this activity is not applicable for linear projects, however, should transformation of vegetation occur within the proposed 55m servitude over a</p>

GN No.	Activity	Description	Relevance to Project
			long distance within a sensitive area, then this activity may be triggered.
R386	14	The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding - (a) masts of 15 metres and lower exclusively used, (i) by radio amateurs; or (ii) for lighting purposes; (b) flag poles; and (c) lightning conductor poles.	The project will include the construction of towers for electricity transmission.
R386	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.	Maintenance roads will be required in order for Eskom to access the power lines for maintenance purposes. Details on the maintenance roads are not yet known as the exact power line location within the corridor is yet to be determined. It is not anticipated that any of these maintenance roads will be wider than 4m.
R386	20	The transformation of an area zoned for use as public open space or for a conservation purpose to another use.	It is not yet clear exactly where the proposed power line will be located within the 1 km corridor. This activity have therefore been included as it is not yet known exactly what types of land uses will be affected by the power line servitude.

On 18 June 2010 the amended EIA Regulations were promulgated in terms of Chapter 5 of NEMA. From the date of effect of these amended EIA Regulations on 02 August 2010, they replaced the previous EIA Regulations that had been promulgated on 21 April 2006. In terms of transitional arrangements, an application submitted in terms of the previous EIA regulations (2006) and which were pending when the amended EIA regulations (2010) took effect, must be dispensed with in terms of the former regulations (despite the repeal of these regulations). This is the case with the proposed Anderson-Dinaledi 400 kV power line project, where the Application Form for Scoping and EIA, in terms of Regulation 27 of GN No. R. 385 of 21 April 2006, was submitted to DEA on 29 July 2009.

For the sake of completeness, the activities contained in the listing notices of the amended EIA Regulations (2010) (i.e. GN No. R544, R545 and R546 of 18 June 2010) are presented in **Table 4** and are also assessed in this report. Schedule R544 defines activities which will trigger the need for a Basic Assessment and R545 defines activities which trigger a Scoping and EIA process. If activities from both schedules are

triggered, then an EIA process will be required. R546 defines certain additional listed activities for geographical areas, based on environmental attributes, for which a Basic Assessment would be required.

**Table 4: EIA Regulations of 2010 - list of Activities Triggered**

GN No.	Activity	Description	Relevance to Project
R544	11	<p>The construction of:</p> <ul style="list-style-type: none"> <li>(i) canals;</li> <li>(ii) channels;</li> <li>(iii) bridges;</li> <li>(iv) dams;</li> <li>(v) weirs;</li> <li>(vi) bulk storm water outlet structures;</li> <li>(vii) marinas;</li> <li>(viii) jetties exceeding 50 square metres in size;</li> <li>(ix) slipways exceeding 50 square metres in size;</li> <li>(x) buildings exceeding 50 square metres in size; or</li> <li>(xi) infrastructure or structures covering 50 square metres or more</li> </ul> <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p>	<p>A 1km study corridor for the construction of the 400kV power line will be considered as part of this project. Once a corridor has been approved by DEA, a walk down survey will be undertaken by all the relevant specialists to determine where the actual centre line (power line) will be located within the corridor. It is therefore not yet known whether it would be necessary to construct pylons within the 32m of the bank of rivers or streams, or whether it will be possible to span across. New road bridges may be required or existing bridges may need to be upgraded.</p>
R544	13	<p>The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;</p>	<p>Diesel storage tanks may be erected at the construction camps during the construction phase. The size of these tanks is not known.</p>
R544	18	<p>The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock from</p> <ul style="list-style-type: none"> <li>(i) a watercourse;</li> <li>(ii) the sea;</li> <li>(iii) the seashore;</li> <li>(iv) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater- but excluding where such infilling, depositing, dredging, excavation, removal or moving</li> </ul> <p>(i) is for maintenance purposes undertaken in</p>	<p>This activity relates to where construction work may need to take place in watercourses to build new road bridges or to upgrade existing bridges for access roads.</p>

GN No.	Activity	Description	Relevance to Project
		<p>accordance with a management plan agreed to by the relevant environmental authority; or</p> <p>(ii) occurs behind the development setback line.</p>	
R544	22	<p>The construction of a road, outside urban areas,</p> <p>(i) with a reserve wider than 13,5 meters or,</p> <p>(ii) where no reserve exists where the road is wider than 8 metres, or</p> <p>for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.</p>	<p>Maintenance roads will be required in order for Eskom to access the power lines for maintenance purposes. Details on the maintenance roads are not yet known as the exact power line location within the 1km corridor is not yet known. It is not anticipated that any of these maintenance roads will be wider than 4m and as such this activity will no longer be applicable.</p>
R544	39	<p>The expansion of</p> <p>(i) canals;</p> <p>(ii) channels;</p> <p>(iii) bridges;</p> <p>(iv) weirs;</p> <p>(v) bulk storm water outlet structures;</p> <p>(vi) marinas;</p> <p>within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line.</p>	<p>This activity relates to where construction work may need to take place in watercourses to build new road bridges or to upgrade existing bridges for access roads.</p>
R545	8	<p>The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.</p>	<p>The project involves the construction of a 400kV Transmission Line.</p>
R546	4	<p>The construction of a road wider than 4 metres with a reserve less than 13,5 metres</p> <p><b>(b) In Gauteng:</b></p> <p>i. A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>ii. National Protected Area Expansion Strategy Focus</p>	<p>Access and construction / maintenance roads will be required in order for Eskom to access the servitude and power line for construction and maintenance purposes. A section of the</p>



GN No.	Activity	Description	Relevance to Project
		<p>areas;</p> <p>iii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>iv. Sites identified in terms of the Ramsar Convention;</p> <p>v. Sites identified as irreplaceable or important in the Gauteng Conservation plan;</p> <p>vi. Areas larger than 2 hectares zoned for use as public open space;</p> <p>vii. Areas zoned for a conservation purpose.</p> <p>viii. Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environment Conservation Act, 1989 (Act No. 73 of 1989) and the Nature Conservation Ordinance (Ordinance 12 of 1983);</p> <p>Any site identified as land with high agricultural potential located within the Agricultural Hubs or Important Agricultural Sites identified in terms of the Gauteng Agricultural Potential Atlas, 2006.</p> <p><b>(c) In North West :</b></p> <p>i. Outside urban areas, in:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(dd) Sites or areas identified in terms of an International Convention;</p> <p>(ee) Critical biodiversity areas (Terrestrial Type 1 and 2 and Aquatic Type 1) as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p>	<p>proposed power line will traverse the Magaliesberg Natural Protected Environment (MPNE).</p>

GN No.	Activity	Description	Relevance to Project
		<ul style="list-style-type: none"> <li>(ff) Core areas in biosphere reserves;</li> <li>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from a biosphere reserve.</li> <li>ii. In urban areas: <ul style="list-style-type: none"> <li>(aa) Areas zoned for use as public open space;</li> <li>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</li> <li>(cc) Natural heritage sites.</li> </ul> </li> </ul>	
R546	12	<p>The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.</p> <ul style="list-style-type: none"> <li>(a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;</li> <li>(b) Within critical biodiversity areas identified in bioregional plans;</li> <li>(c) Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuary, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas.</li> </ul>	<p>Vegetation clearing within the servitude may be required. The extent of vegetation clearance is not yet known. A section of the proposed power line will traverse the MPNE.</p>
R546	13	<p>The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:</p> <ul style="list-style-type: none"> <li>1) The undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list.</li> </ul>	<p>Vegetation clearing within the servitude may be required. The extent of vegetation clearance is not yet known. A section of the proposed power line will traverse the MPNE.</p>

GN No.	Activity	Description	Relevance to Project
		<p>2) The undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No522 of 2010</p> <p>(a) Critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority.</p> <p>(b) National Protected Area Expansion Strategy Focus areas.</p> <p>(d) <b>In Gauteng:</b></p> <p>i. A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>ii. National Protected Area Expansion Strategy Focus areas;</p> <p>iii. Any declared protected area including Municipal or Provincial Nature Reserves as contemplated by the Environment Conservation Act, 1989 (Act No. 73 of 1989), the Nature Conservation Ordinance (Ordinance 12 of 1983); (v) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>iv. Sites or areas identified in terms of an International Convention;</p> <p>v. Sites identified as irreplaceable or important in the Gauteng Conservation Plan.</p> <p>(e) <b>In North West:</b></p> <p>i. Outside urban areas, in:</p> <p>(aa) A protected area identified in terms of NEMPAA, excluding conservancies;</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>(dd) Sites or areas identified in terms of an</p>	

GN No.	Activity	Description	Relevance to Project
		<p>International Convention;</p> <p>(ee) Critical biodiversity areas (Type 1 only) and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(ff) Core areas in biosphere reserves;</p> <p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve.</p> <p>ii. In urban areas:</p> <p>(aa) Areas zoned for use as public open space;</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose;</p> <p>(cc) Natural heritage sites.</p>	

### 3.2 Guidelines

The following guidelines were considered during the preparation of the EIA Report:

- Guideline in Alternatives: NEMA Environmental Impact Assessment Regulations (prepared by the Western Cape Department of Environmental Affairs and Development Planning, 2006);
- Guideline 3: General Guide to the Environmental Impact Assessment Regulations, 2005. Integrated Environmental Management Guideline Series (DEAT, 2005a); and
- Guideline 4: Public Participation, in support of the EIA Regulations. Integrated Environmental Management Guideline Series (DEAT, 2005).

### 3.3 Environmental Authorisations Required

From the relevant legislation listed in **Section 3.1**, the following environmental authorisations will be required for the proposed Anderson-Dinaledi 400 kV transmission line:

1. Approval required from DEA for listed activities associated with the project. Scoping and EIA conducted under NEMA, in accordance with the EIA Regulations (Government Notice No. R385, R386 and R387 of 21 April 2006).

2. If applicable, permit to be obtained under National Forests Act (No. 84 of 1998) if protected trees are to be cut, disturbed, damaged, destroyed or removed.
3. If applicable, permit to be obtained from SAHRA under the National Heritage Resources Act (No. 25 of 1999) if heritage resources are to be impacted on.
4. If applicable, authorisation from DWA, in terms of section 21(i) [and potentially 21(c)] of the National Water Act (No. 36 of 1998), for any activities (including the positioning of the towers) within the extent of a watercourse (i.e. 1:100 year floodline or the delineated riparian habitat, whichever is greatest).
5. If applicable, Environmental Management Programme to be submitted for approval to DMR for burrow pits, under the Minerals and Petroleum Resources Development Act (No. 28 of 2002).

### **3.4 Regional Plans, Policies and Programmes**

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The following regional plans were considered during the execution of the EIA:

- Spatial Development Frameworks(when available);
- Integrated Development Plans;
- Relevant provincial, district and local policies and strategies.
- The Gauteng Ridges Guideline Policy – relates to the protection of ridges within the Gauteng Province. Sections of the transmission line routes traverse the Magaliesberg and Witwatersberg.

### **3.5 Energy Sector Strategic Documents**

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The EIA further considered Energy Sector Strategic Documents, including the following:

- White Paper on the Energy Policy of the Republic of South Africa (December 1998);
- Eskom's Transmission Development Plan;
- Integrated Energy Plan;
- Integrated Strategic Electricity Planning (ISEP);
- Electricity Regulation Act (Act 4 of 2006) as amended;
- National Electricity Response Plan (NERP) (2008);
- National Guidelines on Environmental Impact Assessment for facilities to be included in the Electricity Response Plan (2008); and
- Environmental Impact Assessment Guidelines for transmission lines within the Southern African Power Pool Region (1999).

### **3.6 Magaliesberg Protected Environment EMF**

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The main objectives of the Magaliesberg Protected Environment (MPE) Environmental Management Framework (EMF) include the following:

- To maintain and enhance the contribution of the MPE to water quality and quantity to the Crocodile West Water Management Area and specifically to the Elands and Upper Crocodile Sub-management Areas;
- To maintain and promote the contribution of the MPE to the conservation of biodiversity in South Africa, both in terms of ecosystem integrity and species diversity;
- To protect and manage all types of heritage resources within the MPE as an important physical and eco-tourism asset;
- To maintain and enhance the visual and aesthetical character of the MPE with a view to protect the eco-tourism potential of the mountain;
- To manage and build environment and development activities in a sustainable manner, without reducing the aesthetic appeal or ecosystem function of the MPE; and
- To optimize potential economic and social development opportunities compatible with the MPE, and to conserve the MPE's ability to provide and support these opportunities.

The EMF and Plan for the MPE is aimed at addressing the requirements of Section 71 of the EIA Regulations of Government Notice R385 (21 April 2006), as well as the basic components of a Management Plan for a protected area as described in Section 41 of the National Environmental Management: Protected Areas Act (Act 57 of 2003).

The following sub-objectives stipulated in the EMF are of particular importance in terms of the proposed Anderson-Dinaledi 400 kV line:

- **Objective 1.1:** To maintain and enhance water quality emanating from the MPE;
- **Objective 1.3:** To protect and conserve special water features within the MPE (such as mountain streams, wetlands, and natural springs);
- **Objective 1.4:** To maintain the functionality of wetlands in the MPE;
- **Objective 2.1:** To conserve the ecological integrity of ecosystems of the mountain;
- **Objective 2.2:** To conserve indigenous threatened species and other species of high conservation priority in the mountain;
- **Objective 2.3:** To conserve the rich indigenous biodiversity of the mountain;
- **Objective 3.2:** To prohibit the alteration or destruction of heritage resources and cultural landscapes resulting from uncontrolled and unplanned development within and immediately adjacent to the MPE;
- **Objective 4.3** To prohibit the development of bulk infrastructure such as power lines, reservoirs and bulk water supply pipelines, within or traversing the MPE;
- **Objective 5.1:** To manage the intensity of development around the MPE in order to limit the “edge effect” on the MPE boundaries; and
- **Objective 5.5:** To prohibit the development of bulk infrastructure such as power lines, reservoirs and bulk water supply pipelines, within or traversing the MPE.

The construction of bulk infrastructure (including power lines) is regarded as an incompatible activity in the MPE. The MPE EMF recommends that all applications for development activities within the MPE not classified as “compatible activities” be subject to a full EIA process. The EMF further recommends that the EIA reports for all applications in the EMF area should include at least specialist studies which will address the key aspects as outlined in the objectives for the MPE. This is the case with this EIA Report for the Anderson-Dinaledi 400 kV line, where the specialists have considered the recommendations included in the EMF.

## 4 SCOPING AND EIA PROCESS

### 4.1 Environmental Assessment Triggers

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As noted in **Section 3.1**, the Anderson-Dinaledi 400 kV power line project triggers activities under GN No. R386 and R387 of 21 April 2006, and thus a Scoping and EIA process that conforms to the requirements stipulated in GN No. R385 of 21 April 2006 is required.

### 4.2 Environmental Assessment Authorities

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Section 24C(2)(d)(iii) of the National Environmental Management Amendment Act (Act 62 of 2008) states that the Minister must be identified as the competent authority in terms of subsection (1) if an activity is undertaken, or is to be undertaken, by a statutory body, excluding any municipality, performing an exclusive competence of the national sphere of government.

Section 4(1) of GN No. R385 of the EIA Regulations (2006) states that if the Minister is the competent authority in respect of a specific application, the application must be submitted to the Department of Environmental Affairs (DEA). Eskom is a parastatal or statutory body, and therefore the decision-making authority for this project is DEA. The Scoping and EIA Report will also be submitted to the following authorities for comment:

- Gauteng Department of Agriculture and Rural Development (GDARD);
- North West Department of Agriculture, Conservation, Environment and Rural Development (DACERD);
- Department of Water Affairs (DWA);
- National Department of Agriculture (NDA);
- Provincial Heritage Resources Authority, Gauteng (PHRA-G);
- South African Heritage Resources Agency (SAHRA);
- Madibeng Local Municipality (Environmental and Town Planning Departments); and
- City of Tshwane Metropolitan Municipality (Environmental and Town Planning Departments).

Comments received from these authorities will be incorporated into the EIA Report which will be submitted to DEA for review and decision making.

### 4.3 Amendment of the Application Form

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Note that the initial Application Form did not include the following activity listed in term of GN No. R386 of 21 April 2006:

- 4 - The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic



metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland.

The above activity relates to where construction work may need to take place in watercourses to build new road bridges or to upgrade existing bridges for access roads.

An amended Application Form was submitted to DEA.

#### 4.4 Scoping Process

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The following milestones were reached during the completion of the preceding Scoping process (as contemplated in regulation 28(e) of GN No. R. 385 of 21 April 2006):

1. An application form for Scoping and EIA, in terms of Regulation 27 of GN No. R. 385 of 21 April 2006, was submitted to DEA on 29 July 2009 and the following reference number was assigned to the project: 12/12/20/1567;
2. Meeting held with DEA on 08 July 2011 to confirm EIA study area and public participation approach.
3. A database of Interested and Affected Parties (I&APs) was compiled, which included (amongst others):
  - a. Owners and occupiers of land directly affected by the centreline of each alternative route; and
  - b. Key affected stakeholders (e.g. mines, Nuclear Energy Corporation South Africa);
  - c. Parastatals (e.g. SANRAL, Transnet);
  - d. Local authorities (City of Tshwane Metropolitan Municipality and Madibeng Local Municipality);
  - e. Commentary authorities; and
  - f. Environmental groups (e.g. Magaliesberg Protection Association, Bird Life Africa, Hartbeespoort Environment).
4. I&APs were notified via onsite notices, Background Information Documents (BIDs), newspaper advertisements and meetings of the proposed project in October 2010;
5. A Scoping-level impact assessment was completed to identify potentially significant environmental issues for detailed assessment during the EIA phase;
6. Feasible alignment alternatives were screened and identified for further appraisal during the EIA phase;
7. A Comments and Response Report was compiled (which was updated during the execution of the Scoping process), which summarised the salient issues raised by I&APs and the project team's response to these matters;
8. A Plan of Study, which explains the approach to be adopted to conduct the EIA, was prepared in accordance with Regulation 29(1)(i) of GN No. R. 385 of 21 April 2006; which included *inter alia* the Terms of Reference for the identified specialist studies;
9. A Draft Scoping Report, which conformed to Regulation 29 of GN No. R. 385 of 21 April 2006, was compiled;
10. The Draft Scoping Report was lodged for public review from 08 November 2010 until 15 December 2010;
11. The final Scoping Report was submitted to DEA in December 2010; and

12. DEA issued approval for the Scoping Report on 03 March 2011 (refer to **Appendix B**), which allowed the commencement of the EIA phase.

A meeting was held with DEA on the 8<sup>th</sup> of July 2010 to discuss the Public Participation process to be followed, whether DEA finds the 1km study corridor acceptable for the proposed powerline alternatives, and whether a 1x1km study area will be allowed for the proposed substation. The minutes of the meeting with DEA is attached to Appendix C.

## 4.5 EIA Methodology

### 4.5.1 Need and Desirability

In terms of Regulation 32(2)(f) of GN No. R385 (21 April 2006), this section discusses the need and desirability of the project.

Note that the questions raised in the Guideline on Need and Desirability (DEA&DP, 2009) was used to complete this section.

**Table 5: Need and Desirability of the Project**

No.	Question	Response
<b>NEED ('timing')</b>		
1.	Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (i.e. is the proposed development in line with the projects and programmes identified as priorities within the IDP).	<b>Section 2.1</b> explains the strategic need for the proposed Anderson-Dinaledi 400kV project in an endeavour to ensure the reliability of the transmission system north of Johannesburg, Brits and Rustenburg.
2.	Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time?	Any future development would need to take cognisance of the servitude restrictions.
3.	Does the community/area need the activity and the associated land use concerned (is it a societal priority)? This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate)	The Anderson-Dinaledi 400kV power line will strengthen the Central Grid and sustain economic growth in the Johannesburg, Brits and Rustenburg areas.
4.	Are the necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	Current services are sufficient.

No.	Question	Response
5.	Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services)?	Planning consideration to be given to upgrading of electricity distribution and reticulation infrastructure.
6.	Is this project part of a national programme to address an issue of national concern or importance?	Strengthening of Central Grid will benefit the reliability of the transmission system north of Johannesburg, Brits and Rustenburg
<b>DESIRABILITY ('placing')</b>		
7.	Is the development the best practicable environmental option (BPEO) for this land/site?	Through the comparative analysis ( <b>Section 12</b> ), the BPEO was selected.
8.	Would the approval of this application compromise the integrity of the existing approved municipal IDP and SDF as agreed to by the relevant authorities?	The alternatives will cross the Magaliesberg Protected Natural Environment, however provided that the relevant mitigation measures are implemented, the potential impacts will be minimal.
9.	Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?	The proposed power line is regarded as an incompatible activity in the MPE. The MPE EMF recommends that all applications for development activities within the MPE not classified as "compatible activities" be subject to a full EIA process. The EMF further recommends that the EIA reports for all applications in the EMF area should include at least specialist studies which will address the key aspects as outlined in the objectives for the MPE. This is the case with this EIA Report for the Anderson-Dinaledi 400 kV line, where the specialists have considered the recommendations included in the EMF.
10.	Do location factors favour this land use (associated with the activity applied for) at this place? (this relates to the contextualisation of the proposed land use on this site within its broader context).	<ul style="list-style-type: none"> <li>• The western alternative follows existing transmission line and existing roads in an attempt to minimise impact in western portion of project area.</li> <li>• Controlled activities (e.g. agriculture) will be permissible within the servitude.</li> <li>• Power line will detract from the visual quality of the area.</li> </ul>
11.	How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	<ul style="list-style-type: none"> <li>• Through walk-down survey, sensitive environmental features can be avoided, as far as possible.</li> <li>• Special construction methods employed for crossing inaccessible and sensitive areas.</li> <li>• Power line will detract from the visual quality of the area.</li> <li>• The western route will follow existing transmission lines over the Magaliesberg and Witwatersberg.</li> </ul>

No.	Question	Response
12.	How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?	<ul style="list-style-type: none"> <li>• Refer to impact assessment contained in <b>Section 11</b>.</li> <li>• Potential risks associated with electromagnetic fields – see <b>Appendix D8</b> (Electric and Magnetic Fields from Overhead Powerlines – A Summary of Technical and Biological Aspects).</li> <li>• Potential impacts during construction phase to be managed through EMPr.</li> <li>• See response provided for question no. 11 above.</li> </ul>
13	<p>Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?  <i>[Opportunity costs = the net benefit that would have been yielded by the next best alternative, e.g. if farming is the next best alternative for a piece of land, then the foregone benefit of losing the farming option will be the opportunity cost of any other land use]</i></p>	<ul style="list-style-type: none"> <li>• The Eastern Route follows existing transmission lines.</li> <li>• The western route follows existing transmission line and roads in an attempt to minimise impact in western portion of project area.</li> <li>• Controlled activities (e.g. agriculture) will be permissible within the servitude.</li> </ul>
14	Will the proposed land use result in unacceptable cumulative impacts?	<ul style="list-style-type: none"> <li>• See <b>Section 11</b>.</li> <li>• It is believed that the cumulative impacts can be mitigated to a satisfactory level.</li> </ul>

#### 4.5.2 **Formal Process**

Key objectives for the EIA phase include the following:

- Carry out relevant specialist studies;
- Conduct public participation;
- Assess receiving environment;
- Undertake quantitative assessment of significant environmental impacts and identify concomitant mitigation measures;
- Evaluate alternative alignments through a comparative analysis; and
- Compile EIA Report in accordance with the requirements stipulated in GN No. R385 of 21 April 2006, regulation 32(2); for review by I&APs. Refer to **Section 1** for the document's composition, in terms of the regulatory requirements.

An outline of the Scoping and EIA process for the proposed Anderson-Dinaledi 400kV Transmission Line is provided in **Figure 2**.

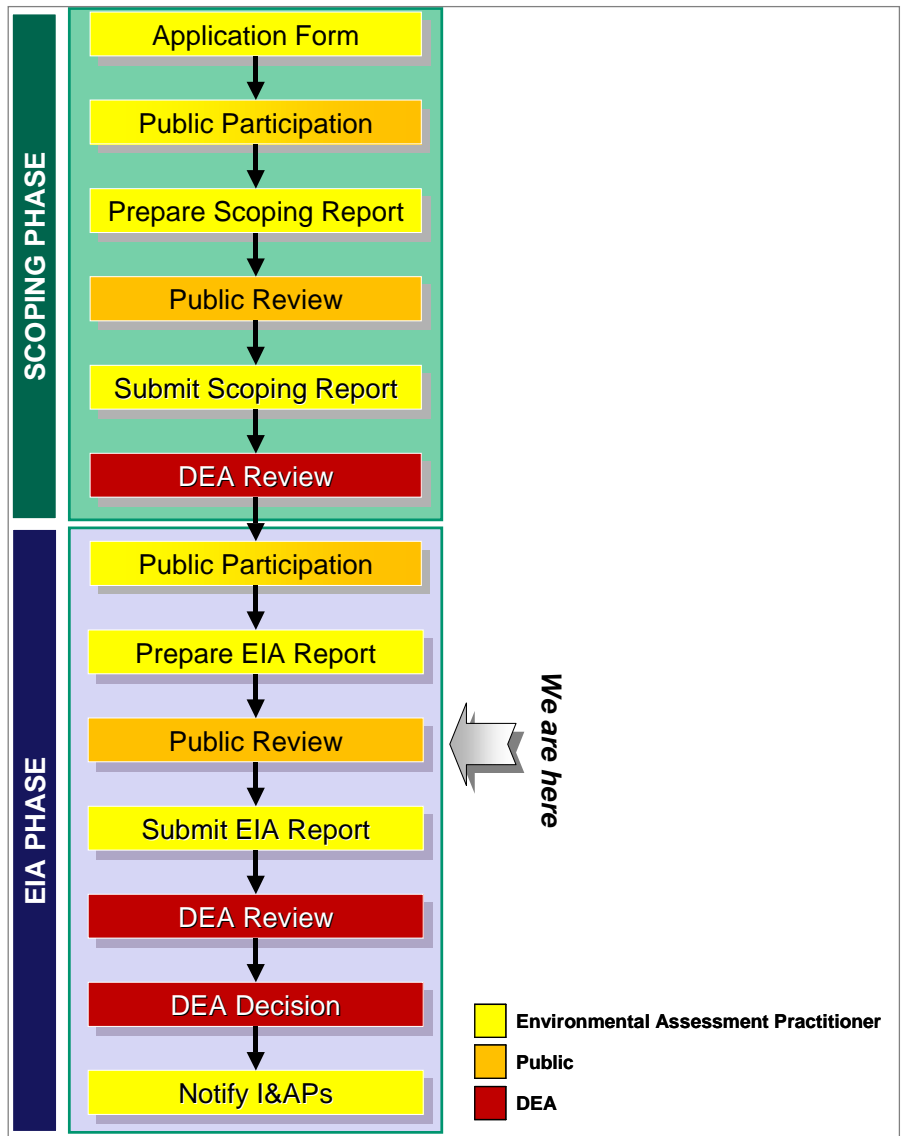


Figure 2: Outline of Scoping and EIA process

**4.5.3 Alignment with the Plan of Study**

The Plan of Study, which was contained in the Scoping Report and was approved by DEA, explained the approach to be adopted to conduct the EIA for the proposed Anderson-Dinaledi 400 kV Transmission Line. The manner in which the EIA Report addresses the requirements of the Plan of Study is tabulated below.

**Table 6: Alignment of EIA Report with Plan of Study**

Plan of Study Requirement	EIA Report Reference
Stakeholder engagement during the EIA - Public participation to include the following (amongst others):	<b>Section 13</b>

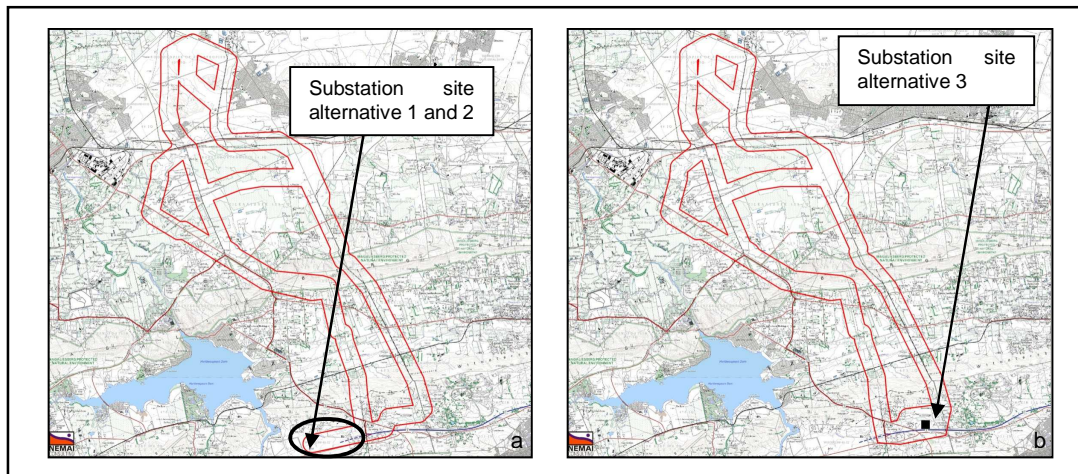
Plan of Study Requirement		EIA Report Reference																			
<ul style="list-style-type: none"> <li>Registration of any additional stakeholders;</li> <li>Notification of the review of the Draft EIA Report;</li> <li>Convening public meetings;</li> <li>On-going communication with authorities and stakeholders throughout EIA process; and</li> <li>Convening steering committee meetings, if required, throughout the EIA phase.</li> </ul>																					
<p><u>Conduct specialist studies</u> -</p> <p>Identified specialist studies to be conducted to satisfy pre-determined objectives.</p> <table border="1"> <thead> <tr> <th>Study Type</th> <th>Status</th> </tr> </thead> <tbody> <tr> <td>Vegetation Assessment</td> <td rowspan="3">Study completed. Combined assessment entitled Flora And Fauna Assessment (Appendix D1)</td> </tr> <tr> <td>Fauna Assessment</td> </tr> <tr> <td>Avifaunal Assessment</td> </tr> <tr> <td>Herpetological Assessment</td> <td>Study completed. Appendix D2</td> </tr> <tr> <td>Invertebrate Assessment</td> <td>Study completed. Appendix D3</td> </tr> <tr> <td>Soil and Land Capability Assessment</td> <td>Study completed. Assessment conducted on a desktop level.</td> </tr> <tr> <td>Geological and Geotechnical Investigation</td> <td rowspan="2">Study forms part of the engineering discipline, and will be conducted during the detailed design stage.</td> </tr> <tr> <td>Stormwater Management Plan</td> </tr> <tr> <td>Heritage Impact Assessment</td> <td>Study completed (Appendix D5).</td> </tr> <tr> <td>Electromagnetic Survey</td> <td>Previous studies have been reviewed and discussed (Appendix F8).</td> </tr> </tbody> </table>		Study Type	Status	Vegetation Assessment	Study completed. Combined assessment entitled Flora And Fauna Assessment (Appendix D1)	Fauna Assessment	Avifaunal Assessment	Herpetological Assessment	Study completed. Appendix D2	Invertebrate Assessment	Study completed. Appendix D3	Soil and Land Capability Assessment	Study completed. Assessment conducted on a desktop level.	Geological and Geotechnical Investigation	Study forms part of the engineering discipline, and will be conducted during the detailed design stage.	Stormwater Management Plan	Heritage Impact Assessment	Study completed (Appendix D5).	Electromagnetic Survey	Previous studies have been reviewed and discussed (Appendix F8).	<b>Sections 10</b>
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<p><u>EIA Report</u> -</p> <p>EIA Report to satisfy the minimum requirements stipulated in Regulation 32 of GN No. R. 385 of 21 April 2006</p>		<b>Section 1</b>																			
<p><u>Environmental Management Plan</u> -</p> <p>Environmental Management Programme (EMPr) to satisfy the minimum requirements stipulated in Regulation 34 of GN No. R. 385 of 21 April 2006.</p>		<b>Appendix E</b>																			

The EIA included the following deviations from the Plan of Study:

- The EIA phase does not conform to the timeframes mentioned in the Plan of Study, due to the dynamic nature of the planning and EIA process for the proposed power line and substation. An additional alternative site for the proposed Anderson Substation (12/12/20/1568) was identified through public participation, which needed to be assessed from a technical and environmental perspective. This caused a delay in the execution of the EIA phase.
- The following additional specialist studies were undertaken, over and above what was indicated in the Plan of Study:
  - Visual Impact Assessment (Appendix D7);
  - Socio-Economic Impact Assessment (Appendix D6);

#### 4.5.4 **Key Amendments / Clarification of Information from the Scoping Report**

Based on comments received from I & AP during the scoping phase, a third site alternative for the substation was included in the EIR for assessment as the preferred alternative. As a result, the proposed transmission line routes that were initially proposed in the scoping phase were amended as indicated in figure 3 below.



**Figure 3: Maps showing the old transmission line (a) and the amended transmission line route (b)**

The consideration of a new site alternative was triggered by findings of the specialist studies and comments received from Nuclear Energy Corporation South Africa (NECSA) and The North West Department of Transport.

Following several discussions with NECSA, on Monday the 16th of November 2009, Mr Cairns Bain from NECSA informed Nemai on the outcome of the CEO meeting. This response included:

- The Executive Management Committee (EMC) considered the information and decided that Eskom needs to directly communicate with the NECSA CEO and submit a formal letter outlining their needs before any in principle decision can be made; and
- The technical team considered the new information submitted in the updated substation description, which indicated that the footprint of the proposed substation will be 600 X 600 meters. NECSA indicated that old substation site was only 350 m by about 100 m. Indicated that because of topography considerations this site would not easily allow for such expansion.

Eskom and NECSA then considered options of establishing the Substation outside of the NECSA high security area, but still within the NECSA property. However, no feasible substation site location existed when eliminating the NECSA high security area and dolomitic areas.

Furthermore, site alternative 1 and 2 are proposed to be located within the M4 road reserve which may hamper any future activities on the widening of that road.

#### **4.5.5 Route Selection**

Eskom Grid Planning is responsible for establishing future electricity demands as a result of growth and development. Once an area has been identified where future growth will result in electricity constraints, methods for strengthening the grid to sustain future growth patterns are considered. The Tshwane Strengthening Scheme is one of these projects which were identified by Eskom to ensure a stable and efficient electricity supply for the future. After Eskom Grid Planning has identified the selected method to strengthen the grid, the infrastructure (i.e. substations and power lines) required was identified.

The transmission line route selection process involves the consideration of the following technical criteria (amongst others):

- Tie-points (i.e. a point through which the route must pass to achieve the overall goals and requirements of the project / an area towards which the transmission line is attracted between its terminals), which are the substations or significant demand centres along the alignment.
- There are certain areas where the route is attracted in a certain way due to extreme topography at some river crossings, or for considerations of access for maintenance. Existing infrastructure such as rail lines, road or other power lines sometimes attract new routes in an effort to create a utility corridor on an already-disturbed area. The westerns and eastern alternatives predominantly follow existing servitudes / services.
- No-Go areas where it is impractical / impossible to build transmission lines, which could include wetlands, steep or unstable terrain, land subject to mineral rights, buffer zones around landing strips or airfields, dense human settlements, erosive land, undermines area, or highly corrosive zones along the coastline.
- The cost of construction of Transmission Lines is directly proportional to the total length, therefore the longer the route the more expensive construction becomes. The shortest route between two points is therefore preferable.
- Bend towers on a power line are expensive due to the large quantities of steel and the foundations required to build such towers. Hence, the least number of bends in a line is preferable.
- The maximum angle for a bend tower is 60 degrees. Deviating the route of a power line is thus not a simple exercise, and it requires proper planning. For larger bends, special towers have to be constructed.
- Transmission line routes with existing access routes are preferred, as heavy vehicles and cranes are used during the construction phase that need to travel to the servitude area and specifically to tower positions.



During the environmental assessment a 1 km corridor (i.e. 500 m on either side of the route centre line) was adopted as the study area. This is to allow for any possible deviations from the current servitude alignment within this corridor, deemed necessary by the following factors:

- Findings of the impact assessment and specialist studies;
- Outcome of Eskom negotiations with landowners; and
- Technical requirements.

The termination points of the Eastern and Western Route alternatives are dependent on the location of the proposed Anderson Substation site. The EIA for the Anderson substation is running parallel with the EIA for the Anderson-Dinaledi 400kV Transmission Line, and the final end point of the power line in the southern part of the study area will thus be determined through the authorisation of the preferred siting of the proposed Anderson Substation.

#### **4.5.6 Screening and Assessment of Alternatives**

Various alternatives to meeting the project's objectives were considered during Scoping, which included options for the alignment route, tower structures, upgrading existing transmission lines and the "no go" option.

The alignment and tower structure alternatives are taken forward in the impact prediction, where the potential adverse effects to the environmental features and attributes are examined further in **Section 11**.

A comparative analysis of the route options (**Section 12**) was also conducted from environmental (including specialist input) and technical perspectives, which included a systematic comparison of the implications of the alternative routes to enable the selection of a Best Practicable Environmental Option (BPEO).

#### **4.5.7 Impact Prediction**

Refer to **Section 11** for the impact assessment of the proposed transmission line.

The potential environmental impacts associated with the project were identified through an appraisal of the following:

- Proposed routes of the power line corridors, which included site investigations and a desktop evaluation with a Geographical Information System (GIS) and aerial photography;
- Project infrastructure and design considerations;
- Activities and associated environmental aspects (i.e. causes of potential impacts) related to the project life-cycle (i.e. pre-construction, construction, operation and decommissioning);
- Nature and profile of the receiving environment and potential sensitive environmental features and attributes (e.g. MPNE);
- Input received during public participation from I&APs;

- Findings of specialist studies;
- Legal and policy context; and
- Cumulative impacts.

The Scoping exercise aimed to identify significant environmental impacts for further consideration and prioritisation during the EIA stage. Note that “significant impacts” relate to whether the effect (i.e. change to the environmental feature / attribute) is of sufficient importance that it ought to be considered and have an influence on decision-making. During Scoping, the impact prediction was executed on a qualitative level, where the main impacts were distilled by considering factors such as the nature, extent, magnitude, duration, probability and significance of the impacts.

During the EIA stage a detailed assessment is conducted to identify significant impacts, which are evaluated via contributions from I&APs, the project team and requisite specialist studies, and through the application of the impact assessment methodology contained in **Section 11.1.5**. Suitable mitigation measures are proposed to manage (i.e. prevent, reduce, rehabilitate and/or compensate) the environmental impacts, and are included in the Environmental Management Programme (EMPr) (see **Appendix E**).

#### **4.6 Servitude Negotiation and the EIA Process**

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Transmission lines are constructed and operated within a servitude (55 m wide for 400 kV lines) that is established along the entire length of the line. Within this servitude, Eskom Transmission 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 (refer to **Appendix F**).

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 tight timeframes for the commissioning of the new 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.

## 5 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations accompany the EIA for the proposed Anderson-Dinaledi 400 kV power line:

- The exact locations of the towers and the route can only be determined following detailed design, and the environmental assessment is thus conducted for a 1 km corridor for each alternative alignment. Nonetheless, a centre line within each corridor presents the key focus area for the environmental assessment.
- Although specialist studies were conducted, the identification of sensitive environmental features and attributes (e.g. protected flora, sensitive habitat, heritage resources) will be facilitated by a detailed walk-down survey of the final approved route. This will allow for a more detailed site appraisal of the entire route through on-ground inspections by a surveyor and a team of appropriate environmental specialists.
- The EIA process does not make provision for borrow pits. The necessary approval of borrow pits will be required from the Department of Mineral Resources (DMR) in terms of the Minerals and Petroleum Resources Development Act (Act No. 28 of 2002).
- It is assumed that the baseline information scrutinised and used to explain the environmental profile is accurate.
- The locations of camp sites are not known at this stage, and the associated impacts will need to be addressed through suitable mitigation measures in the EMPr.
- Although existing access roads will be utilised as far as possible, it is not known which access roads will be used and where river crossings (if applicable) will take place. Following the walk-down survey and final alignment of the transmission line, the access roads will be confirmed. The EMPr will also need to make provision for managing the related aspects and impacts.
- The type of tower structure is unknown at this stage, and is dependent on several factors, including terrain, expense and recommendations that emanated from the Visual Impact Study, as well as the final route of the power line. The final engineering design will include the selection of the most appropriate tower type.
- The alignment of a transmission line alongside existing linear infrastructure (e.g. roads, pipelines, railway lines, existing power lines, etc.) to create a utility corridor is often a preferred approach, due to the impacts associated with traversing greenfield land with no substantial prior disturbance. In the case of this project, the western and eastern alternatives predominantly follow existing transmission lines. The cumulative impact on the electromagnetic field (EMF) associated with the corridor sharing of these two high-voltage power lines is not quantified within the EIA.
- The following assumptions and limitations relate to the fauna and flora assessment:
  - GDARD Conservation Plan (C-Plan) version 3.3 was used with caution as it only covers the Gauteng province;
  - The majority of threatened plant species are extremely seasonal and only flower during specific periods of the year,

- The majority of threatened faunal species are extremely secretive and difficult to survey even during thorough field surveys conducted over several seasons;
- The Magaliesberg EMF was used with caution as the ground-truthing surveys do not cover the proposed study area.
- Since environmental impact studies deal with dynamic natural systems additional information may come to light at a later stage and Nema Consulting can thus not accept responsibility for conclusions and mitigation measures made in good faith based information gathered or databases consulted at the time of the investigation.
- The following assumptions and limitations relate to the visual impact assessment:
  - This assessment was undertaken during the conceptual stage of the project and is based on information available at the time.
  - An exact commencement date for the construction phase is unknown. Construction is expected to commence as soon as public participation is complete and approval is received from the relevant authorities;
  - The exact location, size and number of construction camps and material lay-down yards are not yet specified at this stage of the project. It is anticipated that construction camps will be set up on farms at central locations along the preferred alignment. The construction camps will consist of temporary structures such as tents or temporary buildings. Ablution facilities will also be associated with the construction camps and are expected to be portable toilets and temporary shower facilities;
  - The exact positions of the pylons are not yet determined. The visibility results have been generated from the anticipated alignment and may deviate from the route for the final approved alignment. The differences are considered omissible.
- The following assumptions and limitations relate to the socio-economic impact assessment:
  - It is assumed that information related to the social environment obtained from the strategic documents of the affected areas such as North West Growth and Development Strategy (NWGDS) 2004/14; Gauteng Provincial Growth and Development Strategy (GPGDS) 2005; Growth and Development Strategy for the City of Tshwane Metropolitan (GDSCT) 2004/14; Madibeng Local Municipality Integrated Development Plan – Analysis, 2004 etc were accurate.
  - Unless otherwise stated, the statistical data reflected in this report are from the 2001 Census data obtained from the Municipal Demarcation Board: [www.demarcation.co.za](http://www.demarcation.co.za) and South Africa Community Survey 2007; bearing in mind that the social- demographic profiles may have changed in the recent number of years.
  - The width of the corridor when compared to the required servitude width, and the possibility that the servitude can be anywhere within the corridor, introduces significant variance and uncertainty into the socio-economic study, and impacts cannot be determined with a high degree of precision. Hence this report takes the approach of highlighting potential impacts and provides mitigations measures on how to reduce these impacts. Final route planning should take these recommendations into account.
- The following assumptions and limitation relate to the herpetological study:

- Limitation to a base-line ecological survey for only 1 day (8 hours) during the late winter months (August).
- Access was restricted to certain privately owned properties as well as mining and agricultural areas.
- The majority of amphibian species in Gauteng and North-West Provinces are classified as explosive breeders completing their short duration reproductive cycle in the early summer months between (November-January). These frog species only emerge after the first heavy summer rainfalls and are dormant during the cold winter months. Explosive breeding frogs utilise ephemeral pans or inundated grasslands for their short duration reproductive cycles.
- The majority of threatened reptile species are secretive and difficult to observe even during intensive field surveys (pit-fall trapping) conducted over several years (especially the rare Striped Harlequin Snake).
- Limitation of historic data and available databases. Insufficient knowledge on detailed habitat requirements (migratory, foraging and breeding habitats) of the majority of threatened herpetofaunal species; especially the Striped Harlequin Snake.
- The presence of threatened species on site is assessed mainly on habitat availability and suitability as well as desk research (literature, personal records and previous surveys conducted in the Skurweberg, Magaliesburg and Brits areas between the period of 1999-2012).

## 6 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by Eskom as the independent Environmental Consultancy to undertake the environmental assessment for the proposed Anderson-Dinaledi 400 kV power line.

In accordance with Regulation 29(2) of GN No. R. 385 of 21 April 2006, this section provides an overview of Nemai Consulting and the company's experience with EIAs, as well as the details and experience of the EAPs that form part of the Scoping and EIA team.

Nemai Consulting is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng), Rustenburg (North West Province), and Durban (KwaZulu Natal).

The members of Nemai Consulting that are involved with the Scoping and EIA process for the Anderson-Dinaledi 400 kV power line are captured in **Table 7** below, and their respective Curricula Vitae are contained in to **Appendix G**.

**Table 7: Scoping and EIA Team Members**

Name	Qualifications	Experience	Duties
Ms D. Naidoo	<ul style="list-style-type: none"> <li>B.Sc Eng (Chem)</li> </ul>	17 years	Project Director
Mr D. Henning	<ul style="list-style-type: none"> <li>B.Sc (Hons) Aquatic Health</li> <li>M.Sc River Ecology</li> </ul>	10 years	<ul style="list-style-type: none"> <li>Project Manager</li> <li>Compiling EIA Report</li> </ul>
Mr C. Chidley	<ul style="list-style-type: none"> <li>B.Sc Eng (Civil);</li> <li>BA (Economics, Philosophy)</li> <li>MBA</li> </ul>	20 years	Quality Reviewer
Ms M Chetty	<ul style="list-style-type: none"> <li>BCs (Hons) Biological Science</li> </ul>	4 years	EAP

## 7 PROJECT LOCATION

The Anderson-Dinaledi routes for the alternative alignments traverse the Madibeng Local Municipality (North West) and the City of Tshwane Metropolitan Municipality (Gauteng Province) (See Figure 4).

The proposed powerline will be approximately 40km in length and will run between the proposed new Anderson Substation (Flora Park) to the existing Dinaledi Substation which is located approximately 8km north east of Brits. **Please note that a separate EIA process is being undertaken for the proposed Anderson substation.**

Land uses in the study area for the proposed powerline alternatives is mainly comprised of agriculture, mining, vacant land, conservation and tourism, industrial, commercial, recreational and residential.

A 1 km corridor (i.e. 500 m on either side of the centre line of each alternative route) was adopted as the study area. The various alternatives alignments for the Anderson-Dinaledi 400kV powerline include the following (see **Figure 4** and **5** and enlarged locality map contained in **Appendix A**):

- **Eastern Route** – Route (approximately 30km) runs in a predominantly north-west to south-east direction (mostly alongside existing power lines), from the Dinaledi Substation to Elandsfontein before turning and continuing south-westwards until the proposed new Anderson Substation located on Portions 82, 83 and 76 of Farms Schurveberg 488 JQ.
  - **Eastern Route Alternative Deviation** – deviates from the Eastern Route in the Schietfontein area to form an arch of approximately 3.5km.
  
- **Central Route** – Route (approximately 4.3km) runs from the Dinaledi Substation to Portion 55 of the Farm Elandsfontein 440 JQ (Portion 55 of the Farm Boekenhoutfontein 44-JQ) where the route joins the eastern route alternative.
  
- **Western Route** – Route (approximately 35km) runs in a predominantly north-west to south-east direction (mostly alongside existing power lines), from the Dinaledi Substation to Elandsfontein before turning and continuing south-westwards until the proposed new Anderson Substation located on Portions 82, 83 and 76 of Farms Schurveberg 488 JQ.
  - **Western Route Alternative (Western Deviation)** – This deviation originates on Portion 104 of the Farm Zilkaatsnek 439 JQ from where it links from the Western Route Alternative Deviation 3 (Southern Deviation). This deviation terminates on Portion 0 of the Farm Elandsfontein 440 JQ where it joins the original Western Route Alternative.
  - **Western Route Alternative (Eastern Deviation)** - This deviation originates on Portion 14 of the Farm Zilkaatsnek 439 JQ where it links from the original Western Route Alternative and joins the Eastern Route Deviation on Portion 13 of the Farm Schietfontein 347 JQ.