



**Draft Scoping Report for the proposed
AuroraOmega765kV powerline
approximately 85km and substations
upgrade in the Western Cape.**

**NEAS Reference: DEA/EIA/0001573/2012
DEA REFERENCE: 14/12/16/3/3/2/443**

Draft Scoping Report

24 October 2013



Draft Scoping Report

Draft Scoping Report for the proposed AuroraOmega 765kV powerline approximately 85km and substations upgrade in the Western Cape.

NEAS Reference: DEA/EIA/0001573/2012

DEA REFERENCE: 14/12/16/3/3/2/443

24 October2013

Prepared by: Hellen Mlotshwa

External Review: Quinton

For and on behalf of
Nzumbululo Sustainable, Energy and
Environmental (SEE)

*Approved by:*McEdward Murimbika

Signed:

*Position:*Senior Environmental Officer

Date: 24 October 2013

This report has been prepared by NzumbululoSustainable, Energy and Environmental the trading name of Nzumbululo (Pty) Limited, one of the few consultancies able to combine natural, cultural and social environmental expertise under a one-stop consultancy supported by local expertise and knowledge with sub-Saharan regional reach and experience.

This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

This proposal is provided solely for the purposes set out in it and may not, in whole or in part, be used for any other purpose without Nzumbululo (SEE) prior written consent. Reproduction of this report is a criminal offence.

DOCUMENT INFORMATION

TITLE:	DRAFT SCOPING REPORT FOR THE PROPOSED AURORA- OMEGA 765KV POWERLINE APPROXIMATELY 85KM AND SUBSTATIONS UPGRADE IN WESTERN CAPE PROVINCE.		
	NEAS REFERENCE: DEA/EIA/0001573/2012		
	DEA REFERENCE: 14/12/16/3/3/2/443		
PURPOSE OF SCOPE:			
The purpose of this Draft Scoping Report/ document is to describe the environmental values and factors that may be impacted on by the proposed AuroraOmega 765kV power-line approximately 85km and substations upgrade in the Western Cape. This report is part of EIA study being conducted in compliance with the National Environmental Management Act (Act 107 of 1998) and Government Notices No. R.387 of 2008 and R544 June 2010. The EIA process is required in order to get approval for the project from a competent authority. As such, an application was lodged with the Department of Environmental Affairs (DEA) for the proposed AuroraOmega 765kV powerline approximately 85km and substations upgrade in the Western Cape was assigned a NEAS Reference: DEA/EIA/0001573/2012 and DEA Reference: 14/12/16/3/3/2/443.			
DOCUMENT VERIFICATION			
Signature:	Position:		
Name:	Date:		
ENDORSED			
Client	Project		
Responsible			
Officer to sign off.			
Signature	Position		
Name:	Date:		

Nzumbululo RACIE Terms

R	Responsible: the person actually produces the document
A	Accountable: the person who has to answer for quality assurances
C	Consulted: those who are consulted before the document is finalised
I	Informed: those who must be informed when the document is published

Issue	Date	Reason For Issue	Responsible	Accountable
1	September 2013	Draft Scoping Report	H.Mlotshwa	M. Murimbika
2	October 2013	Draft Scoping Report	H.Mlotshwa	M. Murimbika

Citation:	<p>DRAFT SCOPING REPORT FOR THE PROPOSED AURORA – OMEGA 765KV POWERLINE APPROXIMATELY 85KM AND SUBSTATIONS UPGRADE IN THE WESTERN CAPE PROVINCE.</p> <p>NEAS REFERENCE: DEA/EIA/0001572/2012</p> <p>DEA REFERENCE: 14/12/16/3/3/2/443</p>
Recipients:	<p>PREPARED FOR:</p> <p>ESKOM HOLDINGS SOC Limited Megawatt Park Maxwell Drive P.O Box 1091 Johannesburg</p> <p>Tel: 011 800 2706 Fax: 086 662 2236 E-mail: MakhanKK@eskom.co.za</p>
NZUMBULULO REFERENCE NO.	HESSA REF NO: 2012_JHB.HESSA_ENV.PRO_0008

Caveat

This Draft Scoping Report has been prepared for Eskom Holdings SOC Limited by Nzumbululo Heritage Solutions. This report is part of EIA study being conducted in compliance with the National Environmental Management Act (Act 107 of 1998) and Government Notices No. R.387 of 2008 and R544 June 2010. The EIA process is required in order to get approval for the project from a competent authority.

Authorship: This Report has been prepared for Eskom Holdings SOC Limited, by Nzumbululo Heritage Solutions.

Copyright: This report and the information it contains is subject to copyright and may not be copied in whole or part without written consent of Eskom Holdings SOC Limited and Nzumbululo Heritage Solutions except that the Report may be reproduced by the Department of Environmental Affairs and the South African Government agencies to the extent that this is required for the purposes of the Environmental Management in accordance with the National and auxiliary Legislations.

Geographic Co-ordinate Information: Geographic co-ordinates in this report were obtained using a hand-held Garmin Global Positioning System device. The manufacturer states that these devices are accurate to within +/- 5 m.

Maps: Maps included in this report use data extracted from the NTS Map and data from Google Earth Pro were also utilised.

Disclaimer: Nzumbululo Heritage Solutions is not responsible for omissions and inconsistencies that may result from information not available at the time this report was prepared.

Signed by Principle EAP:

Mlotshwa. H
October 2013

Table of Contents

1	EXECUTIVE SUMMARY.....	1
1.1	INTRODUCTION	1
1.2	MOTIVATION FOR THE DEVELOPMENT.....	1
1.3	PROJECT ALTERNATIVES.....	2
1.4	LEGISLATIVE REQUIREMENTS	4
1.5	PLAN OF STUDY	4
1.6	PUBLIC PARTICIPATION PROCESS.....	5
1.7	PRELIMINARY SCOPING	7
1.8	ENVIRONMENTAL AUTHORISATION PROCESS.....	7
1.9	OBJECTIVES OF SCOPING PHASE.....	7
1.10	SPECIALIST STUDIES FOR THE DETAILED EIA PHASE.....	9
1.11	WAY FORWARD	9
2	INTRODUCTION	11
2.1	BACKGROUND	11
3	EXPERTISE OF THE ENVIRONMENTAL ASSESSEMENT PRACTITIONERS	12
3.1	INTRODUCTION	12
3.2	DETAILS OF LEAD AUTHORITY REPRESENTATIVE.....	13
3.3	DETAILS OF THE EAP	13
4	DESCRIPTION OF THE PROPOSED PROJECT.....	14
4.1	INTRODUCTION	14
4.2	PROJECT LOCATION	14
4.3	ROUTE OPTIONS.....	14
4.4	LAYOUT AND DESIGN.....	15
4.5	PROJECT MOTIVATION.....	16
4.6	TECHNICAL DETAILS OF THE PROPOSED POWERLINE.....	19
4.7	PROPOSED ACTIVITIES AND PROJECT TIMELINE.....	20
5	STATUTORY REQUIREMENTS.....	24
5.1	INTRODUCTION	24
5.2	LEGISLATIONS RELATED TO THE PROJECT	24
5.3	APPLICABLE LOCAL MUNICIPAL SPATIAL DEVELOPMENT FRAMEWORKS.....	37
5.4	ESKOM GUIDELINES.....	37
5.5	BEST PRACTICE GUIDELINES	37
5.6	EXISTING ENVIRONMENTAL MANAGEMENT SYSTEM.....	38
6	DESCRIPTION OF STUDY AREA	42
6.1	INTRODUCTION	42
6.2	BIODIVERSITY.....	42
6.3	CLIMATE.....	46

6.4 LAND USE	47
6.5 GEOLOGY AND SOILS	48
6.6 AGRICULTURE	49
6.7 EXISTING INFRASTRUCTURE	50
6.8 TOURISM	51
6.9 NOISE	52
6.10 WATER FEATURES	52
6.11 AIR QUALITY	52
6.12 HUMAN ENVIRONMENT	53
6.13 HERITAGE	56
6.14 VISUAL LANDSCAPE	57
7 DISCUSSION OF THE PROJECT ALTERNATIVES	59
7.1 STRATEGIC ALTERNATIVES	59
7.2 TECHNICAL AND PROCESS ALTERNATIVES	60
7.3 DESIGN ALTERNATIVES	61
7.4 ROUTE ALTERNATIVES	64
7.5 DEMAND ALTERNATIVES	66
7.6 NO-GO OPTION	67
8 POTENTIAL ENVIRONMENTAL IMPACTS	ERROR! BOOKMARK NOT DEFINED.
8.1 BIODIVERSITY	ERROR! BOOKMARK NOT DEFINED.
8.2 LAND USE	ERROR! BOOKMARK NOT DEFINED.
8.3 VISUAL IMPACT	ERROR! BOOKMARK NOT DEFINED.
8.4 ARCHAEOLOGICAL/HERITAGE RESOURCES	ERROR! BOOKMARK NOT DEFINED.
8.5 WATER RESOURCES	ERROR! BOOKMARK NOT DEFINED.
8.6 SOIL	ERROR! BOOKMARK NOT DEFINED.
8.7 NOISE	ERROR! BOOKMARK NOT DEFINED.
8.8 AIR QUALITY	ERROR! BOOKMARK NOT DEFINED.
8.9 HEALTH AND SAFETY	ERROR! BOOKMARK NOT DEFINED.
8.10 INFRASTRUCTURE AND SERVICES	ERROR! BOOKMARK NOT DEFINED.
8.11 SOCIO ECONOMIC	ERROR! BOOKMARK NOT DEFINED.
8.12 TOPOGRAPHY	ERROR! BOOKMARK NOT DEFINED.
8.13 AVIFAUNA	ERROR! BOOKMARK NOT DEFINED.
9 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGIES	ERROR! BOOKMARK NOT DEFINED.
9.1 CRITERIA FOR ASSESSING IMPACTS	ERROR! BOOKMARK NOT DEFINED.
9.2 MEASURING ENVIRONMENTAL IMPACTS	ERROR! BOOKMARK NOT DEFINED.
9.3 SPECIALIST STUDIES	ERROR! BOOKMARK NOT DEFINED.
10 AUTHORITY CONSULTATION AND PUBLIC PARTICIPATION	ERROR! BOOKMARK NOT DEFINED.

10.1 INTRODUCTION	ERROR! BOOKMARK NOT DEFINED.
10.2 PUBLIC PARTICIPATION PROCESS	ERROR! BOOKMARK NOT DEFINED.
10.3 OBJECTIVES OF PUBLIC PARTICIPATION	ERROR! BOOKMARK NOT DEFINED.
10.4 PUBLIC PARTICIPATION– SCOPING PHASE	ERROR! BOOKMARK NOT DEFINED.
10.5 ON-SITE AND PRESS ADVERTISING	ERROR! BOOKMARK NOT DEFINED.
10.6 BACKGROUND INFORMATION DOCUMENT (BID)	ERROR! BOOKMARK NOT DEFINED.
10.7 PUBLIC REVIEW OF DRAFT SCOPING REPORT	ERROR! BOOKMARK NOT DEFINED.
10.8 PUBLIC MEETINGS	ERROR! BOOKMARK NOT DEFINED.
10.9 ISSUES AND RESPONSE REPORT	ERROR! BOOKMARK NOT DEFINED.
11 CONCLUDING REMARKS	ERROR! BOOKMARK NOT DEFINED.
11.1 INTRODUCTION	ERROR! BOOKMARK NOT DEFINED.
12 BIBLIOGRAPY	ERROR! BOOKMARK NOT DEFINED.

List of Tables

Table 1: Details of Lead Authority	13
Table 2: Details of Assistant EAP (H.Mlotshwa).....	13
Table 3: Details of the Proponent.	13
Table 4: Activities listed within Government Notice No. R544, R545 and R546 applicable to this project (as per Numbering in the Government Notice)	34
Table 5: Summary of typical electric field levels measured in the vicinity of the Eskom Powerlines (Empetus Close Corporation).	54
Table 6: Summary of magnetic field in the vicinity of the Eskom Powerlines (Empetus Close Corporation).....	55
Table 7: Period of Impact Rating.....	Error! Bookmark not defined.
Table 8: Extent of Impact Rating.	Error! Bookmark not defined.
Table 9: Impact Intensity Rating.	Error! Bookmark not defined.
Table 10: Significance Rating.....	Error! Bookmark not defined.
Table 11: Comprehensive Criteria for assessing significance of impacts. Error! Bookmark not defined.	
Table 12: Significance Rating Matrix	Error! Bookmark not defined.
Table 13: Positive/Negative Mitigation Ratings.	Error! Bookmark not defined.
Table 14: Impact Probability Rating.	Error! Bookmark not defined.
Table 15: Risks identified.	Error! Bookmark not defined.
Table 16: Degree of Confidence.....	Error! Bookmark not defined.
Table 17: Specialists Studies.	Error! Bookmark not defined.
Table 18: List of contact for specialists.....	Error! Bookmark not defined.

List of Figures

Figure 1: Locality map in 1: 50 000 showing the 3 powerline routes and main features within the project area..... 18

Figure 2: The ISO 14001 Approach for Eskom EMS.....39

Figure 3: Proposed Implementation of EMP via the Eskom EMS.40

DEFINITIONS

“**Air pollution**” means any change in the composition of the air, caused by smoke, soot, dust (including fly ash), cinders and solid particles of any kind, gases, fumes, aerosols and odorous substances” (Air Quality Act, 2004).

“**Alternative**” means a different means of meeting the general purpose and need of a proposed activity” (National Environmental Management Act, 1998 (Act No. 107 of 1998), Guideline 5, June 2006). A possible course of action, in place of another, that would meet the same purpose and need (of the proposal). Alternatives can refer to any of the following but are not limited to: alternative sites for development, alternative projects for a particular site, alternative site layouts,

“**Biodiversity**” the structural, functional and compositional attributes of an area, ranging from genes to landscapes.

“**Catchment**” The area from which any rainfall will drain into the watercourse or watercourses or part of the water course, through surface flow to a common point or common points.

“**Environment**” The surroundings within which humans exist and that are made up of:

- i. the land, water and atmosphere of the earth;
- ii. micro-organisms, plant and animal life;
- iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
- iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being. This includes the economic, social, cultural, historical and political circumstances, conditions and objects that affect the existence and development of an individual, organism or group.

“**Environmental Impact Assessment**” An Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of any proposed project, plan, programme or policy which requires authorisation of permission by law and

which may significantly affect the environment. The EIA includes an evaluation of alternatives. As well as recommendations for appropriate mitigation measures for minimising or avoiding negative impacts, measures enhancing the positive aspects of the proposal and environmental management and monitoring measures.

“Expansion” means the modification, extension, alteration or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the capacity of the facility or the footprint of the activity is increased.

“Habitat” An ecological or environmental area inhabited by a particular species or that which supports a typical community of species.

“Hydrogeological” The study of distribution and movement of groundwater.

“Impact” The positive or negative effects on human well-being and / or on the environment.

“Interested and Affected Parties” Individuals, communities or groups, other than the proponent or the authorities, whose interests may be positively or negatively affected by the proposal or activity and/ or who are concerned with a proposal or activity and its consequences.

“Natural Habitat” Land and water areas where (i) the ecosystems' biological communities are formed largely by native plant and animal species, and (ii) human activity has not essentially modified the area's primary ecological functions. All natural habitats have important biological, social, economic, and existence value.

“Mitigate” The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

“Phased Activities” means an activity that is developed in phases over time on the same or adjacent properties to create a single or linked entity through interconnected internal vehicular or pedestrian circulation, sharing of infrastructure,

or the continuum of design, style or concept by the same proponent or his or her successors.

“Proponent” who is applying for an environmental authorisation in terms of the relevant environmental legislation.

“Construction” means the building, erection or expansion of a facility, structure or infrastructure that is necessary for the undertaking of an activity, but excludes any modification, alteration or upgrading of such facility, structure or infrastructure that does not result in a change to the nature of the activity being undertaken or an increase in the production, storage or transportation capacity of that facility, structure or infrastructure;” (National Environmental Management Act, 1998 (Act No. 107 of 1998), Regulation 386 of 2006).

“Interested and Affected Party”- refers to:

- (a) Any person, group of persons or organization interested in or affected by an activity; and
- (b) Any organ of state that may have jurisdiction over any aspect of the activity;” (R385, 2006).

“Linear Activity” - means an activity that is undertaken across several properties and which affects the environment or any aspect of the environment along the course of the activity in different ways, and includes a road, railway line, power line, pipeline or canal” (National Environmental Management Act, 1998 (Act No. 107 of 1998) Regulation 385 of 2006).

“Public Participation Process” - means a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters.”(R385, 2006). A process of involving the public in order to identify issues and concerns, and obtain feedback on options and impacts associated with a proposed project, programme or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to specific matters.

“Plan Of Study for environmental impact assessment” - means a document contemplated in regulation 28(1) (i) which forms part of a scoping report and sets out how an environmental impact assessment must be conducted;” (R543, 2010).

“Scoping” the process of determining the spatial and temporal boundaries (i.e. extent) and key issues to be addressed in an environmental assessment. The main purpose of scoping is to focus the environmental assessment on a manageable number of important questions. Scoping should also ensure that only significant issues and reasonable alternatives are examined.

“Significance” significance can be differentiated into impact magnitude and impact significance. Impact magnitude is the measurable change (i.e. intensity, duration and likelihood). Impact significance is the value placed on the change by different affected parties (i.e. level of significance and acceptability). It is an anthropocentric concept, which makes use of value judgements and science-based criteria (i.e. biophysical, social and economic).

“Significant Impact” - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.”(R385, 2006).

ABBREVIATIONS

BID	Background Information Document
CFR	Cape Floristic Region
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DSR	Draft Scoping Report
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMF	Electrical and magnetic field
EMP	Environmental Management Plan
EMS	Environmental Management System
GN	General Notice
GNR	General Notice Regulation
HVAC	High Voltage Alternative Current
IAPs	Interested and Affected Parties
ICNIRP	International Commission for Non- ionising Radiation Protection
IRR	Issues and Responses Report
kV	Kilovolts
kwh	Kilowatt hours
LSA	Late Stone Age
MW	Megawatt
MSA	Middle Stone Age
NEMA	National Environmental Management Act (Act No: 107 of 1998)
NEMAQA	National Environmental Management: Air Quality Act 39 of 2004
NEMPAA	National Environmental Management Protected Areas Act
NEMWA	National Environmental Management: Waste Act 59 of 2008
NERSA	National Energy Regulator of South Africa
NGL	Natural Ground Level
NGO	Non Government Organisation

NHRA	National Heritage Resources Act 25 of 1999
NIRP2	National Integrated Resource Plan
	Nzumbululo Heritage Solutions South Africa
PPP	Public Participation Process
PSP	Public Service Provider
SA	South Africa
SAHRA	South African Heritage Resources Agency
SHE	Safety, Health and Environment
SoER	State of the Environment Report
TRFR's	Transformers
ToR	Terms of Reference.

1 EXECUTIVE SUMMARY

1.1 Introduction

This Draft Scoping Report (DSR) forms part of a broader Environmental Impact Assessment (EIA) study for the proposed **±85km 765kV transmission powerline from the Aurora Substation to (Omega) Substation near Koeberg in the Western Cape Province** by Eskom Holdings SOC Limited (Eskom). The proposed project includes upgrading of the Aurora and Omega substations to accommodate the new line.

The proposed development of a transmission powerline has been necessitated by the incremental shifts in electricity demand in the Western Cape Province. Existing network constraints and increased electricity demand in the region has prompted Eskom to develop a high capacity powerline and associated substation infrastructure. This would improve the stability, reliability and capacity of the transmission network to the Western Cape given that the generation sources are outside the province. As such, as part of a strategy to achieve this, Eskom has proposed to develop a 765kV transmission line between the existing Aurora and Omega substation sites. To integrate the new transmission power line into the transmission grid, auxiliary and ancillary developments (such as access roads, construction camps, relocation of existing lines – where necessary, and construction of new feeder bays) will form part of the proposed development, this study has the National Department of Environmental Affairs application Reference numbers: 14/12/16/3/3/2/443 and NEAS: DEA/EA/0001573/2012.

1.2 Motivation for the Development

Eskom Holdings SOC Limited is responsible for the provision of reliable and affordable power to its consumers in South Africa. Electricity cannot be stored and therefore must be used as it is generated. Electricity is generated in accordance with supply-demand requirements.

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

The Cape Area is experiencing an exponential increase in energy demand from various socio-economic development and land use activities such as mining, agriculture and local users in the region. The proposed powerline is therefore necessary to:

- Avoiding current and future possible voltage collapse;
- Contributing towards a more flexible electrical network;
- Improvement in the overall reliability of the electrical systems, which would benefit electricity users in the region; and
- To sustain economic growth in the region.

1.3 Project Alternatives

There is a set of project alternatives considered as part of the EIA process. These include:

- Strategic alternatives
- Technical alternative
- Route alternatives
- Demand alternative and
- No-go option.

Technically feasible alternative transmission line corridors have been identified for investigation within the EIA process. These alternatives were selected on the basis of the local topography, powerline construction viability as well on technical criteria. Through the EIA process, the most preferred transmission power line corridor will be nominated for consideration in the decision-making process by the National Department of Environmental Affairs (DEA), the competent authority for this project. Should the proposed project be authorised by the DEA, Eskom will enter into a

negotiation process with each affected landowner for the acquisition of the servitude. The negotiation process is independent of the EIA process, and will be undertaken directly by Eskom Transmission.

Three alternative power line corridors have been identified for this project, each planning and environmental studies for the proposed powerline development corridors are 2000m (2km) in width. The approved corridor would be required to accommodate 110m wide servitude for the construction of the 765kV power line transmission towers (Refer to map attached Figure 1 and Appendix D).

There are three (3) route alternatives considered at this stage.

Route Option 1 (Red): Starts at Aurora substation and cuts through Elandsfontein 349 in Hopefield town and continues for about +/- 20 cutting Schnpatein 455, Burgerspains and Dooge valley 456 at Wildschwel. It passes railway approaching the town Darling and goes to GrootePost 716. Running parallel to Ankerling Aurora Transmission line. It goes further to Atlantic town and slightly away from Ankerling substation. When it approaches Omega it runs parallel to a railway line for about 10km to Omega Substation. It passes R307 and west coast road R27 and Dassenburg road.

Route Option 2 (Purple): Starts at Aurora substation and runs slightly away from alternative 1 through they are all in Hopefield town. It cuts through Groentrewel farm and runs slightly away from the West coast national park and running parallel the railway at Zwarbrgs valley 447 and Buffesfontein and all the way Yzerfontein and it will pass the Yzerfontein Road at Grootwater 569. It bends to Rhebokfontein 568 and alternative 1 just near Darling town. It also crosses the R315 and West Coast road (R27)

Route Option 3 (Green): Starts at the bend of alternative 2 at Rhetokfontein 568 and run parallel to west coast road R27 and about +/- 2km away from west coast. It then bends at Kransdonen 719 to join the red alternative 1 and 2 at Modderfarm

and at Klein Midlands. It branches and runs about +-4km to take a best at the corner of west coast R27 and the railway line at buffelsriver and bends to join alternative1 at wizard.

1.4 Legislative requirements

The construction of the 765kV transmission powerline, including associated infrastructures, is an activity identified in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), in respect of the Environmental Impact Assessment (EIA) Regulations No. R543 of 2010, which stipulates that such developments, may not commence without Environmental Authorization (EA) from the National Department of Environmental Affairs (DEA).

The National Department of Environmental Affairs (DEA) is the competent authority for this project. An application for authorization has been acknowledged by DEA with above mentioned reference numbers as follows: NEAS Reference: DEA/EIA/0001573/2012 and DEA Reference: 14/12/16/3/3/2/443. Through the decision-making process, the DEA will be supported by the Western Cape Department of Environmental Affairs and Planning Development.

1.5 Plan of Study

In line with applicable legislative and regulatory requirements for the proposed powerline development, Eskom Holdings SOC Limited (Eskom) appointed Nzumbululo Heritage Solutions (Independent Environmental Management Consultants) to conduct a full EIA process for the project. The EIA study comprises three key phases and process: (i) Scoping Phase (Phase 1); Public Participation Process (Phase 2 which will run concurrently with Phase 1 and 3) and the EIA phase (Phase 3). This Scoping process, consists of:

- Desktop data review
- Reconnaissance data collection and, organizing,
- Preliminary field survey of the proposed powerline servitude and associated alternatives

- Data analysing and interpreting, and
- Public Participation Exercise so far:
- Stakeholder database development,
- Public announcement of the proposed development communicating key stakeholders and IAPs all information that is relevant for the consideration of the environmental application.
- Public Notices and Advertisement of the project

The purpose of the Scoping Study is to describe the project-receiving environment and identify the physical, biological, socio-economic and cultural aspects of the environment that may be affected by the proposed activity.

A Plan of Study (PoS) for the EIA phase is included in this draft Scoping Report. The PoS provides information on the methodology that would be adopted in assessing the potential impacts that would be identified as part of the EIA process for the proposed development. The PoS include details of any specialist studies that would be undertaken to obtain information that is more comprehensive and specific and anticipated or predicted impacts on the receiving terrestrial and socio-cultural environments within the project area. Overall the Scoping study is considers feasible and reasonable alternatives for the proposed developmental activities.

1.6 Public Participation Process

Public Participation Process is a legislated and regulated mandatory exercise that forms part of the EIA exercise. The process runs from Scoping to final authorisation of the proposed development. The process kicks off with the identification of Interested and Affected Parties (IAPs). This identification exercise will continue as the study proceeds. At this stage IAPs, are being identified, contacted and informed about the project through electronic mailing system and hard copies mailed letters and the publication of the Background Information Document (BIDs).

Copies of the BIDs are distributed throughout the study area and they could also be accessed from different key public area and an on-line

platform(www.nzumbululo.com/media). Furthermore, notices of the project and invitation to register on the I&AP Register were posted at different places along the proposed power line routes and the entire project area particularly in towns and farms located within close proximity to the proposed alternative powerline routes.

The Draft Scoping Report (DSR) will be circulated to key stakeholders and IAPs. IAPs will also be able to access the report at public libraries and municipalities along the affected project areas. The report will also be widely available on an online media platform. The commenting authorities in the Western Cape Province includes Western Cape Provincial Environmental Affairs and Development Planning, Heritage Western Cape, the South African Heritage Resource Agency, Farmers Unions and the Department of Agriculture, Forestry and Fisheries will receive the report for their commenting. All IAPs will be afforded an opportunity to raise objections, issues and comments on the Draft Scoping Report and send these comments and issues via a dedicated e-mail, fax, telephone or post office to the Environmental Assessment Practitioner (EAP) at Nzumbululo Heritage Solutions whose contact details will be published along with these notices about the study.

All comments and issues that may be raised by key stakeholders and IAPs will be recorded and considered by the EAP in finalising the Scoping Report. The final Scoping Report will then be compiled and submitted for evaluation and consideration of the Department of Environmental Affairs (DEA). The Next Phase of the study would consist of the EIA Phase, which can be undertaken after the DEA has issued their response on the SR. Therefore, the decision on the proposed development will be made after the DEA has considered the Scoping and the Environmental Impact Assessment Report (EIAR) following which they may grant permission or Environmental Authorisation (EA). Thereafter, IAPs will have yet another opportunity to consider the DEA decision and make their representations where necessary in an appeal process if they so choose. The approval of the development may be considered after all appeals have been successfully dealt with and the pronouncement is made by the DEA.

1.7 Preliminary Scoping

The scoping study has identified potential significant detrimental environmental issues associated with the proposed Aurora to Omega 765kV transmission powerline and auxiliary infrastructure development. Subject to further impact assessment study, a conclusive decision will be made after:

- Taking into consideration stakeholders and IAPs' concerns; and
- Results and recommendation from Independent specialist studies.
- Identification of viable and suitable options for the proposed development.

1.8 ENVIRONMENTAL AUTHORISATION PROCESS

1.8.1 Scoping and Impact Assessment Process

This EIA process comprises of two phases namely, Scoping Phase and a detailed Environmental Impact Assessment Phase. Scoping is executed to determine the environmental issues to be addressed in relation to the project's receiving environment, the information to be collected, and the analysis required to assess the environmental impacts of a project. This draft Scoping process applied the following methods to:

- Identify concerns of the public and scientists about a proposed project or action;
- Evaluate these concerns to determine the key issues for the purposes of the EIA (and to eliminate those issues which are not significant); and
- Organise and communicate these to assist in the analysis of issues and the ultimate making of decisions (Department of Environmental Affairs).
- There are two key concepts that this Scoping exercise addressed:
- Consultation with stakeholders to identify issues and concerns; and
- Evaluation and prioritisation of issues.

1.9 Objectives of Scoping Phase

The Scoping phase of the EIA determines the baseline environment and the manner in which the biophysical and the socio-economic environment may be affected by the proposed development. It also addresses technical constraints that

the biophysical environment could place on the routing, construction and operation of the transmission powerline. As highlighted above, Scoping is meant to identify the potential issues associated with the proposed development and define the nature and extent of the studies required in the EIA stage. To summarise, the objectives of the Scoping study are:

- Identify potential environmental impacts of the proposed development;
- Examine the sustainability of the proposed development in terms of the biophysical, ecological, socio-economic environment;
- Identify environmental issues that require further investigation;
- Identify Interested and Affected Parties (IAPs), inform them of the proposed development and identify any key concerns to be considered in decision making;
- Provide relevant governmental and non-governmental authorities and agencies with the necessary information to make informed decisions regarding the proposed development at the scoping level;
- Consider alternatives, which could be in terms of: site selection, layout, construction materials, processes, engineering solutions and designs and sustainability best practice; and
- Outline the methodology employed to date and proposed activities to be undertaken during the Environmental Impact Assessment (EIA) stage. Information gathering was carried out through:
 - Review of baseline desk survey of existing literature;
 - Correspondence with specialists and local residents;
 - Geographic Information System (GIS);
 - Interaction with individuals; and
 - Interaction with authorities and key stakeholders.

The public participation process (PPP) is initiated at the beginning of the Scoping phase, and will continue throughout the EIA process. All issues raised or identified during the PPP will be recorded in the Scoping Report. The process would also assist the EAP in identifying ways of optimising positive impacts on the environment.

1.10 Specialist Studies for the detailed EIA phase

The following specialist studies will be undertaken as part of the detailed EIA Phase of the process:

- Ecological impacts (including fauna and flora),
- Avifaunal impacts
- Heritage Impact assessment study including:
 - Archaeological and Cultural Heritage resources
 - Built environment heritage
 - Cultural landscape and culture history
 - Colonial / historical heritage
 - Palaeontological heritage
- Wetland and River crossing study
- Tourism study
- Social Economic Assessment study
- Agricultural study
- Visual Impact Study

1.11 Way Forward

The issues raised and matters identified during the Scoping Phase will be addressed further in the EIA Phase of the EIA process. Reconnaissance and preliminary field survey and alternative powerline route determination field survey indicates that the proposed project area consists of a mixture of previously developed landscapes generally heavily disturbed from previous and current commercial and subsistence farming with a mixture of game and cattle husbandry and crop cultivation as well as rural and urban settlements. The identified project routes and associated alternatives will traverse through local authority lands and commercial farmlands including portions of conservancies.

There are mainly three potential corridors or servitude routes that were identified within the broader study area. As highlighted in the discussion above, by its nature, the proposed powerline development is listed activity in accordance with EIA Regulations. In terms of the NEMA, this means the project is considered to have

potential activities detrimental to the environment and therefore require Environmental Authorisation from the relevant authority. In order to effectively assess the potential impacts, Eskom identified three possible alternative powerline route options for the project:

- The Alternative Route Option 1
- Alternative Route Option 2, and
- Alternative Route Option3

The detailed way forward for the project will be outlined in the Plan of Study for EIA. The Plan of Study for EIA will also include the terms of reference for specialists, the impact assessment methodology to be used to rate impacts and the deliverables of the EIA Phase.

2 INTRODUCTION

2.1 Background

Nzumbululo Heritage Solutions South Africa (Nzumbululo) was appointed by Eskom Holdings SOC Limited (Eskom) to conduct an Environmental Impact Assessment (EIA) study for the proposed construction of a 85-km-long 765kV transmission powerline and upgrade of an associated substations. The proposed line will start at Aurora substation HV-yard (Western Cape) to the Sterekus (Omega) substation HV-yard near Koeberg in Western Cape Province. These proposed powerline and upgrade of substations are listed activities as defined by GNR 545 (Listing Notice 1) Of 18 June 2010 of the National Environmental:

Activity 8 (l): "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."

The above mentioned activities requires a full Environmental Impact Assessment (EIA) study, in line with the 2010 Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). As such an EIA application was lodged with DEA (Application Reference 14/12/16/3/3/2/443) and NEAS: DEA/EA/0001573/2012. Acknowledgement letter is attached in Appendix A. Figure 1 shows project area within South Africa.

3 EXPERTISE OF THE ENVIRONMENTAL ASSESSEMENT PRACTITIONERS

3.1 Introduction

The Environmental regulations as stipulated under NEMA specifically requires practitioners involved in the EIA process to list their qualifications and expertise in the EIA report. Accordingly, an Environmental Assessment Practitioner (EAP) appointed in terms of regulation 17 (1) is required to:

- Be independent
- Have expertise in conducting environmental impact assessments including knowledge of the Act, these regulations and any guidelines that have relevance to the proposed activity
- Perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- Comply with the Act, these regulations and all other applicable legislation
- Take into account, to the extent possible, the matters listed in regulation 13 when preparing the application and
- Disclose to the applicant and the competent authority all material information in the possession of the EAP that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority in terms of these regulations or the objectivity of any report, plan or document to be prepared by the EAP in terms of these regulations for submission to the competent authority.

Nzumbululo Heritage Solutions is the independent consultant and have assigned a designated project EAP that meets the above requirements. The table below lists the EAP study team involved in this project. These will work with other independent scientists.

3.2 Details of Lead Authority Representative

Table 1: Details of Lead Authority

Name	Vincent Chauke
Authority	Department of Environmental Affairs
Physical Address	Fedsure Building, 315 Pretorius Street, Pretoria, 0001
Postal Address	Private Bag X447, Pretoria, 0001
Telephone Number	012 310 3911
Fax Number	012 322 2682
E-mail	vchauke@environment.gov.za

3.3 Details of the EAP

Table 2: Details of EAP (H.Mlotshwa)

Name	Hellen Mlotshwa
Company	Nzumbululo Heritage Solutions for South Africa
Physical Address	4 Berger Road Vorna Valley Midrand
Postal Address	P. O. BOX 4106; Halfway House, 1685
Telephone Number	011 021 4937
Fax Number	086 544 2177
E-mail	mloshwah@nzumbululo.com
Role in Project	Environmental Consultant/Practitioner

Hellen Mlotshwa has nearly a decade of environmental management experience. This includes linear and powerline development projects authorisation (refer to CV is included in Appendix B).

3.3.1 Detail of Applicant

Table 3: Details of the Proponent.

Name	KentridgeMakhanya (Representative of Proponent)
Company	Eskom Holdings SOC Limited
Postal Address	P.O. Box 1091, Johannesburg, 2000 or Megawatt Park, Maxwell Drive, Sunninghill
Telephone number	011 800 2706
Fax number	086 662 2236
Email	MakhanKK@eskom.co.za
Role in Project	Project Manager

4 DESCRIPTION OF THE PROPOSED PROJECT

4.1 Introduction

The proposed project will include the construction of the 765kV powerline from the Aurora substation High Voltage (HV)-yard to the Sterekus (Omega) substation HV-yard substation and upgrade for the Aurora and Omega substations to accommodate the proposed powerline, the powerline will be approximately 85km within the Western Cape Province. The development will include auxiliary works such as access roads and construction camps along the proposed powerline servitude.

4.2 Project Location

The affected project area is located in the Western Cape Province. The powerline alternative routes will traverse through the following municipalities:

- West Coast Local Municipality
- Swartland Local Municipality
- Saldana bay Local Municipality

List of farms along the proposed routes are attached in Appendix C. These farms are within the Western Cape Province and comprises of commercial animal husbandry, commercial agricultural farming areas, plantations and vineyards, urban and rural settlements, agro-industrial areas with associated infrastructures as well as vast networks of national regional and local roads, existing transmission and distribution powerlines, bulk and reticulation subsurface water supply networks and such other auxiliary infrastructures.

4.3 Route Options

The Aurora to Omega route option are along the coast with the closest point being just under +-2km away and to the West of R27. The red route options go close Ankerlig substation. It then goes to the east of Atlantis settlement through the

dunes. Route 3, also runs close to the conservation area called Ronderburg Nature Reserve along the coast. There is also a wall stone's remains along the R356. The proposed route 2 also passes wind turbines at co-ordinates: S33° 19' 58.88" E 18° 115' 00.59", and also close to the lowest level above sea level is at 57m which is the nearest point to the coast. The proposed Aurora Omega route crosses a number of agricultural fields

4.4 Layout and design

The proposed project includes the following activities:

- Equip 1 x 765kV feeder bay at Aurora substation (extend existing busbar if necessary)
- Equip 1 x 765kV feeder bay at Omega / Sterrekus substation (extend existing busbar if necessary).

4.5 Project Motivation

4.5.1 Introduction

Electricity cannot be stored, It is therefore necessary to generate and deliver power over long distances at the very instant it is needed. In South Africa, thousands of kilometres of high voltage Transmission power lines transmit power, mainly from the Power Stations located at the Mpumalanga and Limpopo (Waterberg) coal fields, to major substation where the voltage is reduced for distribution to industry, businesses, homes and farms all over the country.

For Eskom Transmission to honour its mandate and commitment to meet the increasing needs of the end users, it has to establish and expand its infrastructure of Transmission power lines and Substations on an on-going basis. Due to substantial annual load growth, load shifts and step loads, it has become necessary to reinforce the existing electrical infrastructure.

Most towns and cities purchase electricity in bulk from Eskom and sell it to households, industrialists and other end users within their areas of jurisdiction, while Eskom also sells bulk electricity directly to end users in some parts of South Africa.

4.5.2 Mandate of Eskom

Eskom has a mandate to satisfy potential customer needs, which implies certain responsibilities. One of the most significant of these is to find and maintain the balance between satisfying the needs of society and remaining within the capabilities of the environment. In order to achieve this, Eskom must continually re-asses its present infrastructure and take into account new developments to ensure that there is a continued supply of electricity, without significantly impacting on the environment.

4.5.3 The need for additional transmission capacity in the Cape Area (Western Cape combined with the growth in the Eastern Cape)

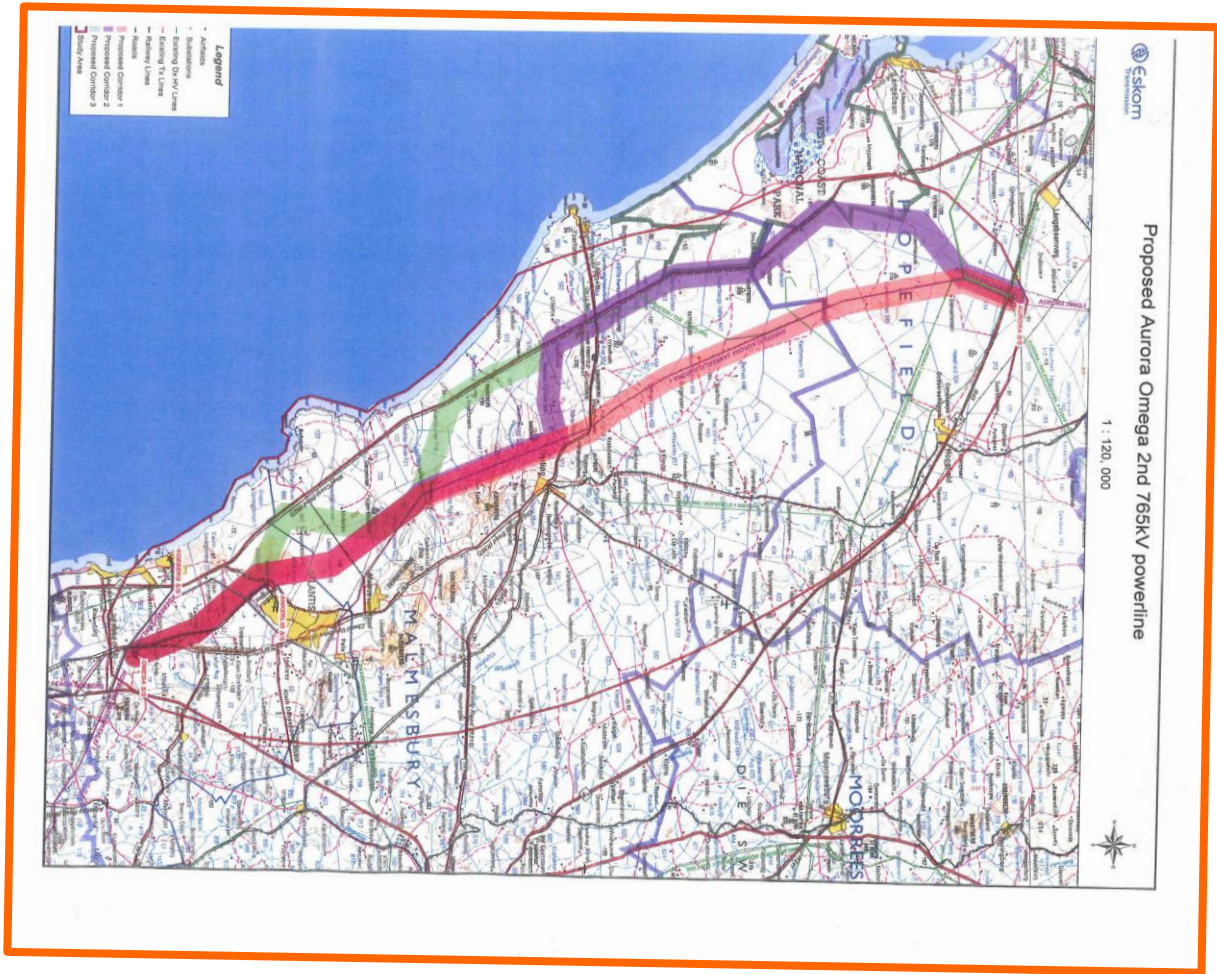
Eskom uses long-distance transmission lines to cater for power transfer capacity into the Cape network. Initially, the 400kV schemes were used and currently also making use of 765kV schemes as well. Based on the load forecast contained in the Transmission Ten-Year Development Plan 2012-2021, the load growth in the Cape (Western Cape combined with the growth in the Eastern Cape) indicates an increasing demand of power in the region.

The existing Transmission power lines are becoming heavily loaded and are predicated to reach their full capacity very soon. These Transmission power lines and substations currently cannot supply the increased demand in the Cape area. It is becoming very difficult to manage with one power line out of service since the other power lines have to carry some part of the load while the bulk of power will be supplied by Koeberg Nuclear Power Station. This makes it difficult to carry out routine maintenance, the condition of the operating lines can deteriorate and this will result in poor line performance.

It is even more difficult to supply the Cape load without Koeberg Nuclear Power Station generation capacity. Koeberg nuclear station is the only source of generation at present and therefore the increase in power demand will need to be supplied by the existing and emerging coal fired power stations in the Mpumalanga and Limpopo (Waterberg) area which are situated more than thousand kilometers away.

Eskom initiated a study to investigate the options for further 765kV line reinforcement of the Cape network to cater for this power demand increase. The line will be very critical for the supply of power when there is no generation output at Koeberg.

Figure 1: Locality map in 1: 50 000 showing the 3 powerline routes and main features within the project area. Please refer to appendix D for a bigger map



4.6 Technical Details of the Proposed Powerline

The proposed powerline will be approximately 85km long joining Aurora and Omega substations. Various tower structures on which powerlines will be suspended are being considered for use during the construction in different sections of the line subject to landscape, engineering and biophysical environment of the receiving areas.

Towers for the proposed powerline would be between 42.0 and 44.0m in height. The total footprint area for each tower would be around 40m x 52.6m. The distance between each tower would be approximately 450m. The actual number of towers, the type of towers and other support structures associated with the proposed powerline would be confirmed and detailed following approval of draft corridor for the proposed development. In general, the type of towers to be used would consider weight, the area (e.g. topography characteristic), height, costs and erection time. In addition, from an engineering perspective, transmission powerline routes are planned with as few bends as possible.

Two design alternatives have been proposed for this project, the Cross-Rope Suspension type and the Guyed Suspension type. These are illustrated on Appendix E. It is important to note that the topography will largely dictate the type of tower that will be used on a specific locality along the servitude. From this perspective, it should be noted that through more difficult terrain and when the route changes direction at a 3° degree angle, there will be need to use self-supporting towers as illustrated in Appendix E.



Plate 1: Self-supporting strain tower(Photography: H.Mlotshwa 2013)



Plate 2: Guyed Vee structure. ((Photography: H. Mlotshwa 2013)

4.7 Proposed Activities and Project Timeline

The activities for the construction and operation will be finalised during EIA phase. Design details of the powerline will also be finalised during EIA phase. However, the powerline is expected to be operational in 2020.

4.7.1 Preconstruction

The proposed Aurora -Omega powerline project is currently in the pre-construction phase planning where the EIA studies and relevant authorisations are conducted. This study includes describing the project, determining the project alternatives, environmental management plan for the proposed project that would be reported in the EIA Report. Permissions or consents from landowners (through EIA study) would be acquired. When the project EIAR is approved and assessed accordingly with the Environmental Authorisation issued, the project EA will be advertised. The notice will give IAPs a 30-day period for them to lodge appeals to the DEA regarding the EA. Should all parties be satisfied and the EA stands, then the project will proceed to construction phase.

4.7.2 Construction

As illustrated above, construction will commence once pre-construction studies are completed. Construction is estimated to take about +-24 months. Details of activities and the environmental management process associated with the construction phase will be detailed in the EMP to be incorporated in the EIAR. Construction is envisaged to begin in 2017. The construction activities for the proposed development will include:

4.7.3 Accessroads

Creation of access roads and construction camps form part of the proposed project. Access road will enable transportation of the material and construction teams to the site and facilitate post construction maintenance. The access road will be gravel. These access roads will be along the entire length of proposed powerline servitude. They will be used for construction phase and operation, mainly for maintenance. The information about the access point and exact route for the access roads will be negotiated and finalised with the landowners after completion and approval of the EIA study.

4.7.4 ConstructionCamps

The proposed powerline will require the erection of temporary construction camps. Due to the time limits nature of this project the construction camp will be appropriate and in line with the magnitude of the project. Suitable areas will be identified for the placement of the construction camps. The exact locations will be negotiated and finalised with relevant landowners, where applicable, after completion and approval of the EIA study.

4.7.5 Constructionoftransmissionpowerlines

The primary construction activity for this project is to install a series of towers suspending a +/-85km transmission powerline line cable. The following activities form the core part of constructing the transmission powerlines:

- Survey of the route for the powerline
- Selection of best-suited structures and foundations
- Final design of powerlines and placement of towers
- Issuing of tenders and award of contract to construction companies
- Vegetation clearance and construction of access roads (where required)
- Pegging of structures
- Construction of foundations
- Assembly and erection of structures
- Stringing of conductors
- Rehabilitation of disturbed area and protection of erosion sensitive areas
- Testing and commissioning.

4.7.6 StringingofConductors

Eskom Holdings SOC Limited has strict international best-practice methods of building powerlines similar to the proposed Aurora-Omega Transmission Power line. For example, the construction teams would use guide wires, to string the conductors between towers. This can be undertaken mechanically or by hand. The line will generally be strung in sections in a progressive manner until the entire cables are suspended. There will be cable drums placed at 2 km intervals during

this stringing process. In order to minimise any potential negative impacts on the surrounding areas, these cable drums would be placed within the approved servitude. The construction phase would be considered complete once all the cables are suspended and strung between the Aurora and Omega Substations and ready to transmit electricity from one end to the other.

4.7.7 Operation and maintenance

Upon construction completion, the powerline will be commissioned into operation. The operation and maintenance of the transmission powerline will be an on-going process for the planned life span for Aurora -Omega powerline. The powerline will be monitored and managed according to Construction Environmental Management Plan that will be provided in the EIA phase and post-authorisation EMP might also be required. In addition, Eskom has established and approved international practices guides for operating and managing such transmission lines.

5 STATUTORY REQUIREMENTS

5.1 Introduction

Different sections above have eluded in enough details that the proposed development is guided and governed by Legislative Acts and Ministerial Guidelines (also see Table 4). In addition, EIA studies for electricity generation; transmission and distribution projects are also guided by additional internal Eskom Guidelines and Policies which derive from universal industry best practice (also see www.eskom.co.za).

5.2 Legislations Related to the project

5.2.1 Constitution of South Africa (Act 108 of 1996)

The Constitution (Act No. 108 of 1996) provides the legal basis for allocating powers to different spheres of Government and contains a number of rights. Primary to this study are those right specifically relevant to the national energy policy. The Constitution states that Government must establish a national energy policy to ensure that national energy resources are adequately tapped and delivered to cater for the needs of the nation. Energy should be made available and affordable to all citizens, irrespective of geographic location. The production and distribution of energy should be sustainable and lead to an improvement in the standard of living of citizens (DME, 2003b:6). Section 24 of the Bill of Rights provides that:

“Everyone has the right:

- a) to an environment that is not harmful to their well being and
- b) to have the environment protected, for the benefit of present and future generations through reasonable legislative and other measures that:
 - prevent pollution and ecological degradation;
 - promote conservation; and
 - secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.”

5.2.2 Energy Policy

The White Paper on Energy Policy (DME, 1998) sets out Government Policy with regard to the supply and consumption of energy for given decade intervals. The policy strengthens existing energy systems in certain areas and calls for the development of underdeveloped systems and demonstrates a resolve to change in a number of energy supply and consumption areas. The policy addresses most elements of the energy sector (DME, 1998).

Furthermore, the White Paper on Energy Policy identified the need to undertake an Integrated Energy Planning (IEP) process in order to achieve a balance between the energy demand and resource availability, whilst taking into account the health, safety and environmental parameters. In addition, the policy identified the need for the adoption of a National Integrated Resource Planning (NIRP) approach to provide a long-term cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social and economic policies (DME, 1998).

5.2.3 Electricity Regulation Act of 2006

The proposed development is aligned to the following objectives (DME, 2006b: 6):

- Achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa;
- Ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency, effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in South Africa;
- Facilitate investment in the electricity supply industry;
- Promote the use of diverse energy sources and energy efficiency; and
- Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public. In addition, the Electricity Regulation Act (Act No 4 of 2006) in terms of section 46 (2c) projects involving new generation capacity that is needed to ensure

the continued uninterrupted electricity supply would require authorisations or exemptions in terms of NEMA (No. 107 of 1998) or as may be required by any other law for the purpose of authorisation for proposed Eskom developments (DME, 2006).

5.2.4 Integrated Energy Plan (IEP) – 2003

The Department of Minerals and Energy (DME) commissioned the IEP to provide a framework in which specific energy policies, development decisions and energy supply trade-offs could be made on a project-by-project basis. The framework was intended to create a balance in providing low cost electricity for social and economic development, ensuring a security of supply and minimizing the associated environmental impacts. The IEP projected that as the years accumulate the additional demand in electricity would necessitate an increase in electricity generation capacity in South Africa. Therefore, contemporary concerns relate to electricity capacity to accommodate growth in demand (DME, 2003a).

5.2.5 Integrated Resource Plan (IRP) – 2010-2030

The Department of Energy, under the New Generation Capacity regulations has authorised the System Operations and Planning Division in Eskom to produce the IRP for electricity in consultation with the Department and the National Energy Regulator of South Africa (NERSA) (DOE, 2011). The objective of the IRP is to develop a sustainable electricity investment strategy for generation capacity and transmission infrastructure for South Africa over the next 25 years. In summary, the IRP is intended to:

- Improve the long term reliability of electricity supply through meeting adequacy criteria over and above keeping pace with economic growth and development
- Ascertain South Africa's capacity investment needs for the medium term business planning environment;
- Consider environmental and other externality impacts and the effect of renewable energy technologies.

- Provide the framework for Ministerial determination of new generation capacity (inclusive of the required feasibility studies) as envisaged in the New Generation Capacity regulations.

5.2.6 The National Heritage Resources Act (No. 25 of 1999)

The proposed development comprises certain activities (e.g. changing the nature of a site exceeding 5 000m² and linear development exceeding 300m or river crossing for more than 50m in length) that require authorisation in terms of Section 38 (1) of the NHRA, Act 25 of 1999. Section 38 (8) of the Act states that if heritage considerations are taken into account as part of an application process undertaken in terms of the ECA, there is no need to undertake a separate application in terms of the National Heritage Resources Act (NHRA). The requirements of the National Heritage Resources Act can thus be addressed as an element of the EIA process, specifically by the inclusion of a Heritage Impact Assessment (South African Heritage Resource Agency, 1999) and other compliance and commenting authorities such as the Heritage Western Cape. In addition, for instance, NEMA section 24 (4) (b) (iii) appears to reinforce the provisions of NHRA by requiring that procedures for assessing impacts including heritage impacts for most of NHRA sections 38 (1) activities be addressed in an application for Environmental Authorisation.

5.2.7 Minerals and Petroleum Resources Development Act (No. 28 of 2002)

In terms of the Act, the sourcing of material for road construction purposes (i.e. the use of borrow pits) is regarded as mining and accordingly is subject to the requirements of the Act. In terms of the proposed project, Section 106 (3) provides exemption from the Act. "Only where the organ of state has obtained formal exemption from the Minister, the organ of state has to:

- Make formal application for exemption;
- Notice of the exemption has to be gazetted by the Minister; and
- The organ of state has to compile an EMP per borrow pit and submit these to DMR for approval" (DME, 2002).

5.2.8 Development Facilitation Act (No. 67 of 1995)

The Development Facilitation Act (DFA) is the flagship statute, which sets the overall framework and administrative structures for planning throughout the country. It is a framework Act with broadly worded provisions to allow individual provinces to enact more detailed planning laws and regulations to meet their own specific needs and circumstances. The DFA and its provincial equivalent may be relevant should Eskom require a rezoning of the land from agricultural to industrial zoning (South Africa, 1995).

5.2.9 Expropriation Act (No. 63 of 1975)

The Expropriation Act is used to acquire land from unwilling sellers (South Africa, 1975). If necessary, Eskom may need to acquire additional land for this development. This would have to take place during the pre-construction phase of the development should the need to expropriate any section of land become necessary.

5.2.10 National Environmental Management: Biodiversity Act (No. 10 of 2004)

Provisions of this Act, which are relevant to this study are the guiding principles relating to threatened and protected ecosystems and species, species and organisms posing a threat to biodiversity, permits relating to listed threatened and protected species, alien species or invasive species. Cognisance is also taken of the list of critically endangered, vulnerable and protected species as listed in the Government Notice No. R151 of 23 February 2007.

5.2.11 National Environmental Management: Waste Act (Act No. 59 of 2008) (NEMWA)

NEMWA came into effect on 1 July 2009 and Government Notice Regulation GNR 718, the list of waste management activities that have, or are likely to have a

detrimental effect on the environment was published in Government Gazette 32368 on 3 July 2009.

Section 2 of the Act states the objectives of NEMWA are to protect the health and well-being of the environment, ensure awareness of the impacts of waste on health and provide for compliance with measures to protect health in order to secure an environment that is not harmful to health and well-being.

In terms of section 16 (1) of the Act, duty of care is applicable to (DEAT, 2008b):

- Avoid the generation of waste and where such generation cannot be avoided, to minimize the toxicity and amounts of waste that are generated;
- Reduce, re-use, recycle and recover waste;
- Where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner;
- Manage the waste in such a manner that it does not endanger health or the environment or cause a nuisance through noise, odour or visual impacts;
- Prevent any employee or any person under the proponent's supervision from contravening this Act; and
- Prevent the waste from being used for an unauthorised purpose.

5.2.12 Conservation of Agricultural Resources Act (Act 43 of 1983)

In Terms of GN 1048 of 1984 and GN 2485 of 1999, the Act provides management principles relating to weeds and invaders and also categories of weeds and invaders (DOA, 1983).

5.2.13 National Water Act (No 36 of 1998)

The proposed development will traverse through an area where water provision is a key issue. The Constitution of South Africa, 1996 (Act No. 108 of 1996), compels all to ensure the fundamental rights of the citizens of South Africa. Section 24 of the Constitution has caused a paradigm shift towards a new environmental policy for South Africa. The NEMA was promulgated to give legal effect to the principles of sustainability and harmonise decision-making mechanisms aimed at managing the

environment. With regard to the water resource component of the environment, the National Water Act, 1998 (Act No. 36 of 1998), was promulgated to give effect to Section 24 of the Constitution. A person who wishes to use, or who uses water in a manner that is not a Schedule 1 use, not covered under a General Authorisation, or in a manner that is not regarded or declared as, an existing lawful use, may only use that water under the authority of a licence (Section 4).

The National Water Act makes provision for two types of applications for water use licences, namely individual applications and compulsory applications. The Act also provides that the responsible authority may require an assessment by the applicant of the likely effect of the proposed licence on the resource quality, and that such assessment be subject to the Environmental Impact Assessment regulations promulgated under the National Environmental Management Act. This proposal is based on an individual application and includes a component on the determination of the lawfulness of the use.

The process of applying for an Integrated Water Use Licence under the National Water Act, Act 36 of 1998, is based on the following principles:

- The process follows a strong procedural approach;
- Application can be made for multiple water uses through the execution of a single process, resulting in the issuing of a single licence for these water uses;
- Existing water pollution or impact on surface or groundwater will not be legalised and a user will be expected to mitigate the situation. Such mitigatory actions will form part of a water use license application.
- Decision-making by the regulatory authority is based on a set of rules or criteria and makes provision for the integrated assessment of all potential impacts posed by proposed, existing and historical actions;
- An open and participatory approach, where the public are involved in decision-making. Information obtained during the assessment must be made available to the public in an understandable manner. It is assumed that this will form part of the EIA process;

- A staged procedure that increases in complexity as the process progresses, in order to ensure cost effectiveness, with each stage involving some type of assessment by the applicant, and a decision by the DWA; and
- Harmonisation of the Integrated Water Use License Application (IWULA) process with any Environmental Impact Assessment processes.

The following water uses generally have to be licensed, in accordance with Section 21 of the Water Act.

- S21(a) Taking water from a water resource;
- S21(b) Storing water;
- S21(c) Impeding or diverting the flow of water in a watercourse;
- S21(d) Engaging in a stream flow reduction activity;
- S21(e) Engaging in a controlled activity;
- S21(f) Discharging waste or water containing waste into a water resource
 - through a pipe, canal, sewer or other conduit
- S21(g) Disposing of waste in a manner which may detrimentally impact
 - on a water resource;
- S21(h) Disposing in any manner of water which contains waste from, or which has been heated in any industrial or power generation process;
- S21(i) Altering the bed, banks, course or characteristics of a watercourse;
- S21(j) Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- S21(k) Using water for recreational purposes.

Section 4(4) of the NWA replaces the water rights under old legislation, with entitlements under the new legislation. However, existing water uses were allowed to continue as “existing lawful water use”. The following provisions of the NWA define and limit the extent of this entitlement:

- Section 32 defines existing lawful use as a water use that was lawfully undertaken during a two-year period immediately before the date of commencement of the Act.
- Section 33 allows for the declaration of any water use not considered under Section 32, as an existing lawful use.
- Section 34 provides the authority to continue with an existing lawful use until its replacement by a licence.
- Section 35 outlines provisions for persons claiming an existing lawful use entitlement, to apply for the verification of the extent of existing lawful use. Water users may not continue to use the water if they do not apply for verification when requested to do so, or if the verification application has been refused.
- The responsible authority can also conduct its own investigation into the veracity of the claims made.

Briefly, it is clear that the National Water Act placed the burden and duty of care to remedy the effects of pollution to water resources needs to be taken into consideration in all circumstances while stipulating procedures to be followed in the event of an emergency incident that may impact on a water resources, governing water use licences (Section 21) if required for construction purposes (DWAF, 1998).

5.2.14 Promotion of Administrative Justice Act (PAJA) (Act no 3 of 2000)

The Promotion of Administrative Justice Act aims to give effect to the right to administrative action that is lawful, reasonable and procedurally fair, and to the right to written reasons for administrative action as contemplated in Section 33 of the constitution of the Republic of South Africa 1996 and provides for matters incidental thereto (PAJA, 2000). In particular, the proposed development was considered in accordance with this Act in terms of the following (PAJA, 2000:4):

An administrator undertaking procedurally fair administrative action must give adequate notice of the nature and purpose of the proposed administrative action:

- a reasonable opportunity to make representations;
- a clear statement of the administrative action;
- adequate notice of any right of review or internal appeal, where applicable; and
- adequate notice of the right to request reasons if they were not provided. In cases where an administrative action affects the rights of the public, an administrator, must decide whether to hold a public inquiry and therefore conduct the public inquiry or appoint a suitably qualified person to do so and determine the procedure for the public inquiry, which must:
 - include a public hearing and comply with the procedures to be followed in connection with public inquiries;
 - conduct the inquiry in accordance with that procedure; and
 - compile a written report on the inquiry and give reasons for any administrative action taken or recommended. If an administrator decides to follow a notice and comment procedure, the administrator must:
 - take appropriate steps to communicate the administrative action to those likely to be materially and adversely affected by it and call for comments from them;
 - consider any comments received; and
 - comply with the procedures to be followed in connection with notice; and
 - comment procedures

Any person whose rights have been materially and adversely affected by administrative action and who has not been given reasons for the action may, within 90 days after the date on which that person became aware of the action, request that the administrator concerned furnish written reasons for the action. The administrator to whom the request is made must, within 90 days after receiving the request, give that person adequate reason in writing for the administrative action.

5.2.15 National Environmental Management: Protected Areas Act (Act 57 of 2003) (NEMPAA)

NEMPAA provides for protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. The Act also supports the establishment of a national register of all national; provincial and local protected areas, for the management of those areas in accordance with national norms and standards, for intergovernmental cooperation and public consultation in matters concerning protected areas, for continued existence, governance and functions of South African National Parks and for matters in relation to protected areas.

The proposed development would traverse environmental sensitive areas (to be identified by biodiversity specialists during field work). Nonetheless, mitigation measures will be adhered to with regards to avoid and / or minimise detrimental impacts on the environmental sensitive areas.

EIA Regulations 2010 promulgated in terms of NEMA under Government Notice (GN) No. 543 outline the activities for which Basic Assessments or EIAs should apply.

Table 4:Activities listed within Government Notice No. R544, R545 and R546 applicable to this project (as per Numbering in the Government Notice)

Activity number and date of the relevant notice	Activity No (s) (in terms of the relevant notice)	Describe each listed activity as per project description
545, 18 June 2010	Activity 8: of listing notice 2 of 2010	The development would involve construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside and urban area or industrial complex.
545, 18 June 2010	Activity 3: of listing notice 2 of 2010	The construction of facilities or infrastructure for the storage or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of more than 500 cubic metres.

Activity number and date of the relevant notice	Activity No (s) (in terms of the relevant notice)	Describe each listed activity as per project description
		Storage of fuel may be required during the construction phase of the project.
544, 18 June 2010	Activity 22(ii) of listing notice 1 of 2010	The proposed development would involve construction of a road or multiple roads wider than 8m for access to the construction and maintenance of the proposed power line.
544, 18 June 2010	Activity 23(ii): of listing notice 1 of 2010.	Temporal transformation of land will be required by the construction team for placement of their construction camps in strategic positions along the power line.
544, 18 June 2010	Activity 24: of listing notice 1 of 2010.	A precursory assessment on the proposed areas for the proposed development indicated that some of the areas where the power line would be constructed are zoned agriculture. Therefore it will be important to change the zoning to accommodate the proposed development.
544, 18 June 2010	Activity 38: of listing notice 1 of 2010.	The proposed development would involve expansion of facilities for the transmission line
544, 18 June 2010	Activity 47: of listing notice 1 of 2010	The proposed development would require the construction of a road that would be used both in construction and operations of the proposed power line.
546, 18 June 2010	Activity 4(a)(d): of listing notice 3 of 2010	The proposed development would require the construction of a road that would be used both in construction and operations of the proposed power line.
546, 18 June 2010	Activity 9(a): of listing notice 3 of 2010	The proposed construction of a 765kV power line would inherently involve the use of above ground cable ways for electricity transmission between Aurora and Omega substations.
546, 18 June 2010	Activity 14(3)(a)(i): of listing notice 3 of 2010	The development will involved clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for <ul style="list-style-type: none"> i. purposes of agriculture or afforestation inside areas identified

Activity number and date of the relevant notice	Activity No (s) (in terms of the relevant notice)	Describe each listed activity as per project description
		<p>in spatial instruments adopted by the competent authority for agriculture or afforestation purposes</p> <p>ii. 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 the activity is regarded to be excluded from this list;</p> <p>iii. the undertaking of a linear activity falling below the thresholds in Notice 544 of 2010</p> <p>a) All areas outside urban areas.</p>

Bearing in mind the above Regulations and listed activities, and as has been discussed in proceeding sections of this report, the proposed development requires scoping and a full EIA processes before the compliance authority, DEA, makes the decision. Following the submission and acknowledgement of the EIA application by DEA (Reference No DEA: 14/12/16/3/3/2/443 and NEAS: DEA/EIA/0001573/2012, this Scoping study for the project was formulated in line with the applicable regulations to achieve the following:

- Conduct at least the public participation process set out in Regulation 54-57
- Give notice in writing of the proposed application to any organ of state which has jurisdiction in respect of any aspect of the activity
- Open and maintain a register of all interested and affected parties in respect of the application in accordance with Regulation 57
- Consider all objections and representations received from interested and affected parties following the public participation process
- Subject the application to scoping by identifying
- Issues that will be relevant for consideration of the application
- The potential environmental impacts of the proposed; and
- Alternatives to the proposed activity that are feasible and reasonable

- Prepare a scoping report in accordance with Regulation 28; and give all registered interested and affected parties an opportunity to comment on the scoping report in accordance with Regulation 57

5.3 Applicable local municipal spatial development frameworks

- Cape Town Spatial Development Framework - 2012 approved by Minister of Local Government, Environmental Affairs and Development Planning, Anton Bredell on 8th May 2012
- Blaauberg District Spatial Development Plan and Environmental Management Framework – 2012
- Integrated Development Plans for the Local Municipalities.
- Biodiversity GIS (BGIS) -Planning Initiatives, Cape Fine-Scale Biodiversity Plan and Succulent Karoo Ecosystem Plan

5.4 Eskom Guidelines

The following Eskom guidelines are also relevant to the proposed development:

- Air Quality Management Policy (ESKPBA3)
- The Control Of Dust Exposure Within Eskom (ESKADAAD6)
- Environmental Impact Assessment (ESKPVAAL7)
- Passive Fire Protection For Oil Filled Equipment In High Voltage Yards (FSGASAAQ8)
- Standard For Bush Clearance And The Maintenance Of Overhead Powerlines (ESKASABG3)
- Guidelines For Weed Eradication At Eskom Substations Using Herbicides (TRR/S.92/034)
- Oil Spill Clean-Up And Rehabilitation (ESKAGAAD7)

5.5 Best Practice Guidelines

The following Best Practice Guidelines will be taken into consideration:

- Pollution Prevention and minimisation of Waste (Department of Water Affairs)
- Water Re-use and Reclamation (Department of Water Affairs)

- Storm Water Management (Department of Water Affairs)
- Impact Prediction
- Water Management for Mine Residue Deposits
- Pollution Control Dams (Department of Water Affairs).

5.6 Existing Environmental Management System

5.6.1 Eskom ISO14001 Certified EMS

Eskom Holdings SOC Limited has developed and continues to implement an Environmental Management System (EMS) that is certified to the ISO14001 International Environmental Management Standard. This International Standard, as per SANAS ISO14001: 2004 Edition 2, Environmental Management Systems - Requirements with guidance for use, states that the Standard “specifies requirements for an environmental management system to enable an organisation to develop and implement a policy and objectives which take into account legal requirements and other requirements to which the organisation subscribes, and information about significant environmental aspects. It applies to those environmental aspects that the organisation identifies as those which it can control and those which it can influence. The system enables an organisation to develop an environmental policy, establish objectives and processes to achieve the policy commitments, take action as needed to improve its performance and demonstrate the conformity of the system to the requirements of the ISO14001 International Standard (also see Figure 3 below).

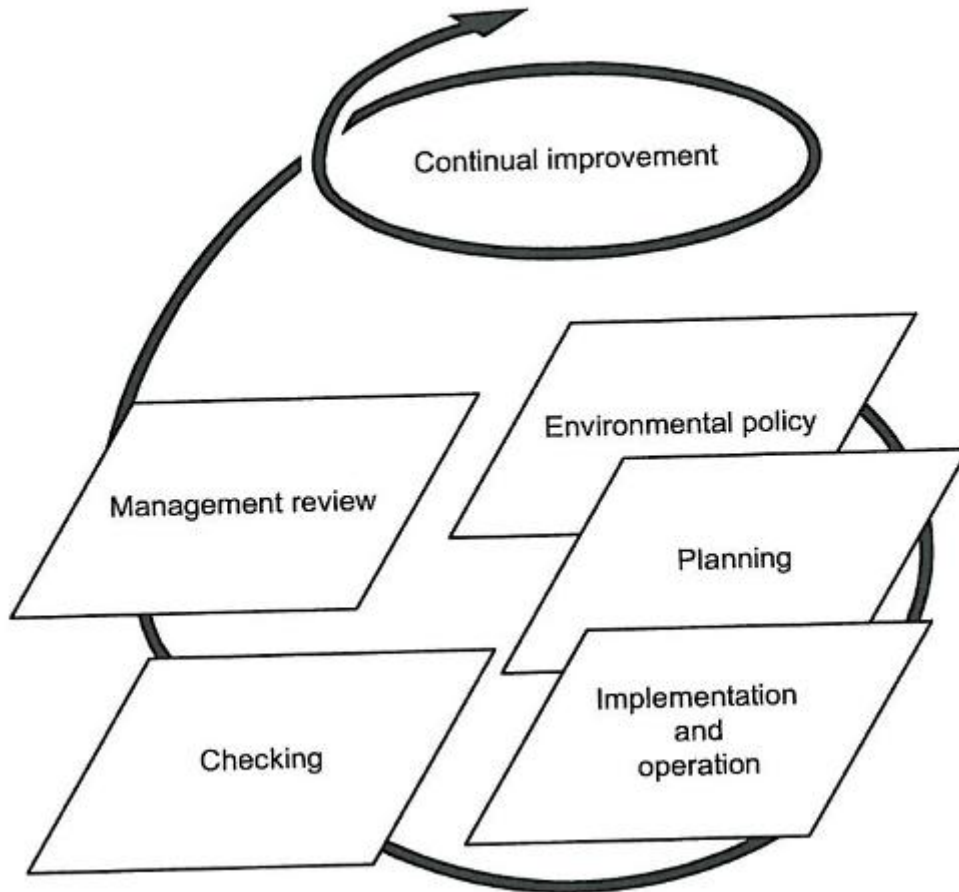


Figure 2: The ISO 14001 Approach for Eskom EMS.

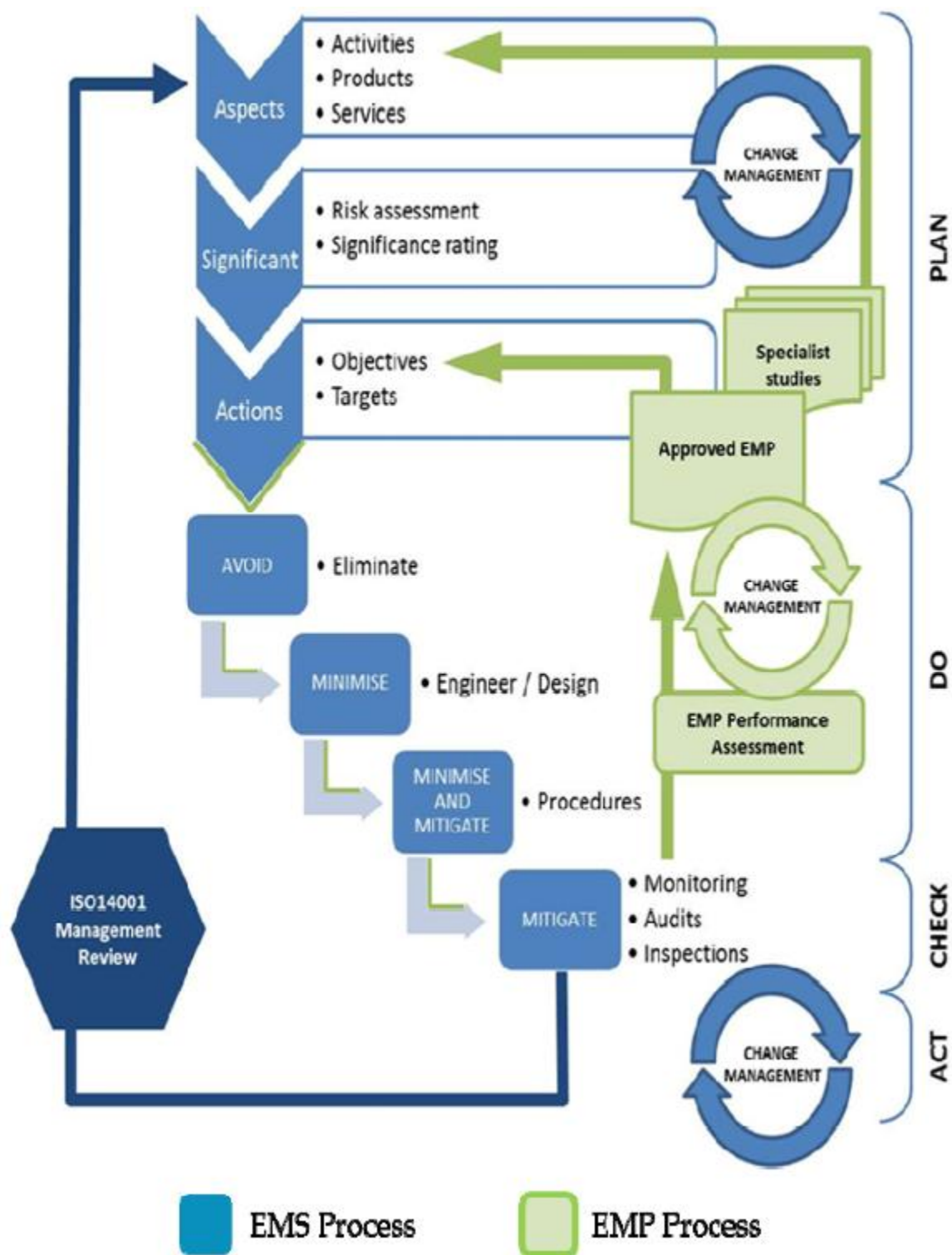


Figure 3: Proposed Implementation of EMP via the Eskom EMS.

“The ISO14001 Standard is based on the methodology known as Plan-Do-Check-Act, which is described as follows:

- Plan: establish the objectives and processes necessary to deliver results in accordance with the organisation's environmental policy;
- Do: implement the processes;

- Check: monitor and measure processes against environmental policy, objectives, targets, legal and other requirements, and report the results; and
- Act: take actions to continually improve performance of the environmental management system."
- (SANAS ISO14001: 2004 Edition 2, Environmental Management Systems - Requirements with guidance for use).

6 DESCRIPTION OF STUDY AREA

6.1 Introduction

This section discusses the characteristics of the biophysical and human environmental aspects of the project-receiving environment. The information pertaining to the receiving environment has been complemented by information from desktop studies. During the EIA stage, the biophysical and human environmental aspects would be supplemented with results from the various specialist impact assessments comprising of Vegetation, Avifauna; Wetland; Agricultural Land Capability; Visual; Heritage; Tourism, Paleontology, and Socio-economic impact assessments studies.

6.2 Biodiversity

The Western Cape hosts the Cape Floristic Region (CFR) and Succulent Karoo hotspots, which make South Africa rank the third most diverse country. CFR has about 9000 species half of which is found nowhere else on earth. Succulent Karoo has 40% of more than 6300 plant species that are endemic in the region. The said biodiversity in the province plays an important role in maintaining and improving quality of lives of province through ecosystem services. Services provided are in fishing, grazing, tourism, clean water. The Western Cape province have driving forces and pressures that influence biodiversity which include land-cover change, agricultural expansion, urban sprawl, alien invasive species amongst others. This section is adopted from Western Cape Government, 2005.

6.2.1 Flora

The development lies predominantly within the Karoo biome, which is the largest biome in region. The arid interior is dominated by Karoo drought-resistant shrubbery. The West Coast and Little Karoo are semi-arid regions and are typified by many species of succulents and drought-resistant shrubs and acacia trees. Two vegetation types characterize the Karoo: the majority of the area is Robertson Karoo and a small area consists of Breede Shale Renosterveld. This natural area provides a haven for many species. It is characterized by a succulent Karoo, which occupies the arid zone between the winter rainfall fynbos Biome and the summer rainfall Nama Karoo Biome (SA National Biodiversity Institute, 2012). The Karoo exhibits grassy ground layer and a distinct upper layer of bushy plants (trees and shrubs). The environmental factors delimiting the Karoo biome are complex and include altitude, rainfall, geology and soil types, with limited rainfall being the major delimiting factor. Fire and grazing also keep the grassy and shrub layer dominant. The undulating topography of the area resulted in a mosaic of habitats differing in soil types. In spite of these differences, however, the Karoo vegetation is quite homogenous as far as species composition is concerned, although the density of the vegetation and frequency of a species may subtly differ in different localities. More details on the vegetation of the project area will be explored in the EIA phase and specialists studies.

1961 red data species occur in CFR. 42 species were extinct. There is 31% increase of threatened species in the Protea family and 12% in Geophytes family



Plate 3&4 :Vegetation close to the West coast along R27 near alternative

6.2.2 Fauna

The primary vegetation type of the Western Cape is fynbos, a term derived from Dutch and Afrikaans words meaning "fine bush," which typically grows on fairly nutrient-depleted mostly sandstone-derived acidic soils and is dominated by sclerophyllous, that is, evergreen, hard-leaved, flowering shrubs, many of which are proteas, ericas, cape reeds (*Restios*), and geophytes (bulbed plants). Fynbos is technically described as vegetation that has more than a 5% cover of *Restios* and exists in a fire-controlled ecosystem characterized by significant winter rainfall, nutrient.

Poor soils, and exceptional floristic richness and endemism. While two basic types of fynbos, mountain fynbos and lowland fynbos, have been described, references are often made to coastal fynbos on sandy alkaline soils and limestone fynbos. In

fact, one authority has categorized fynbos into five separate vegetative types, and there is no doubt that fynbos communities in different areas are not exactly the same depending on season, soil, slope, altitude and rainfall. However, although they may not contain precisely the same species, they are structurally very similar. Lowland fynbos has perhaps more annuals and grass species, and is limited for the most part to sandy, clay or limestone soils. In addition to sandstone-derived soils, mountain fynbos may grow where rainfall is sufficiently high on leached soils derived from granites or even shales. Trees are relatively rare in mountain fynbos but some that do grow there are the Clanwilliam cedar, the silver tree, the wild olive and the mountain cypress. It is certainly to be suspected that the distinction between these two vegetative types is to some extent an artificial one, and obviously one can keep dividing areas into smaller and smaller sub-units almost indefinitely. Fynbos makes up about 80% of all the vegetation of the Cape Floral Kingdom, and it clearly bears a striking similarity to Southern California's chaparral, but due to the relatively poor quality of the soil, the shrubs are generally smaller and spaced farther apart, making it easier to move through than is the case with chaparral. Like our chaparral, this vegetative type is well adapted to fires, and even requires a cycle of fires of from six to forty-five years to prevent the plants from aging and degenerating, and allowing the invasion of thicket and forest. It is not necessary here nor will I attempt to delineate any differences between the various fynbos types or plant communities, but let it suffice to say that of the approximately 8,600 species in the Cape region, some 7,000 of them are present in the fynbos biome. Thus the relationship between the fynbos biome and the Cape Floral Kingdom is sufficiently great that they can be forgiven who associate the two as one. Details on the fauna of the region will be presented in the EIA specialist study reports

Details on the fauna of the region will be presented in the EIA specialist study reports.

6.2.3 Birds

Eskom Holdings has a commitment to avifaunal conservation and has established an Environmental Division to investigate problems related to the possible

interactions between wildlife and electrical equipment (Ledger, 1988). Therefore, one of Eskom's responsibilities is to cause as little destruction to bird life as possible, whether by electrocution, collision or any other cause. A particular concern is the mortality of endangered and vulnerable birds that may be the result of interactions with transmission lines. The death of such birds due to collisions with an Eskom Line is a serious loss to these small populations. A number of bird species are to be found along the banks of the rivercourse and the wooded ravines on either side of the river. Black Storks will undoubtedly use the banks of the river or wetlands as foraging areas (Beater, 2007). Some of the prominent bird species in the general project area include the Gymnogene (*Polyboroidestypus*); Klaas Cuckoo (*Chrysococcyxklaas*) and the Cape Francolin (*Pternistescapensis*). An assessment on avifauna will be conducted during the EIA phase to identify potential impacts and mitigation measures on any identified species that may occur in the study area.

6.2.4 Pollinators

The most important animals in the Karoo region are the little ones like the bees, beetles, butterflies and the small sunbirds. These pollinators make it possible to give the region a spectacular display of flowers year after year.

6.3 Climate

The Western Cape has warm temperature with hot dry summers and cold winters, late summer and constant rainfall regimes, the Karoo which is situated in the interior of the Western Cape experiences the severest conditions, and ranges in rainfall from as low as 100mm on the west coast to 300mm in the East. The interior Karoo has a semi-arid climate with cold, frosty winters and hot summers with occasional thunderstorms. The number of rain days in the Karoo is less than the rest of the province. The provinces rainfall pattern, high temperatures and high severe drought period is described as a period in which the annual rainfall is less than 60% of the average annual total. During severe drought periods, soil moisture becomes insufficient for continued plant growth over large parts of the province.

The Western Cape is a region in South Africa, which experiences the highest moisture losses in terms of potential evaporation rates. Due to high temperatures, low rainfall patterns and the high mean annual evaporation rates experienced, some areas in the Western Cape Province experience a non moisture-growing season which means that the agricultural production in these affected areas are dependent on irrigation.

6.4 Land Use

There are multiple land characteristics and associated land uses in the project area traversing from the Western Cape including natural landscapes such as mountains, cultural landscape, farms, homesteads, scenic routes, agricultural lands, declared nature areas and conservancies. Most of the Karroo landscape is used for grazing and agriculture. Livestock farming, including dairy cattle, sheep, ostriches and karakul make up 43% of land use in the Western Cape. Most agricultural activities in the region depended on irrigation supported by infrastructures such as dams and transformed river valleys. A further 36% of land use is made up of crops, which consist of wheat, citrus, deciduous fruit, and indigenous crops. The cultivation of grapes, citrus, tobacco, alfalfa and vegetables is practiced along the project area. Several small historical towns such as Hope field, Darling, are situated on the valley floor through which section of the proposed powerline would traverse. Detailed agricultural land use capability study will be conducted during the EIA phase.



Plate 4: Wind turbine along the coast and R27 (Photography: H.Mlotshwa 2013)

6.5 Geology and Soils

The Soil, and soil parent material granulometry and mineral composition, tend to reflect source area geology, possibly even dating back to earlier cycles of rock formation, erosion, sorting, and deposition. Similarly, the evolution of macroclimates reflects the effects of continental drift on the location and relative distribution of continents, ocean basins and ocean currents relative to the poles and to global atmospheric circulation patterns. In the Western Cape, changing climates, at times associated with ocean ridge- or ice-related changes in sea level measurable in tens, and occasionally hundreds of metres, and in drainage base levels, have affected weathering patterns, landscape form, soil parent materials and pedogenesis (Hendey, 1983; Lambrechts, 1983; Schloms, Ellis & Lambrechts, 1983). In effect, geological processes create the physical settings within which

terroirs may come to be demarcated. Since the range of processes is considerable, most terroirs will have geological histories, and combinations of landscape, climatic and soil factors, that are uniquely their own, as is the case for the vineyard. Apart from the visual impact of its location and scenery, this terroir is uniquely defined by factors which include altitude, aspect, slope, mesoclimate, including exposure to sea breezes, soil characteristics and, in a temporal sense, by its geological history.

6.6 Agriculture

Western Cape Government (2005) says Western Cape Province has 22.5% of South Africans working within agricultural sector. There is a total of 20% of total income earned by the sector in the country from Western Cape. The province also has high debt in farming. This highlights the importance and vulnerability of agriculture in Western Cape Province. The weathering from Malmesbury Group rocks supports winter wheat farming. Agriculture is the most important employer with production of deciduous fruit grapes, vines and citrus.



Plate 6:View of Canola plants on the project area(Photography: H.Mlotshwa 2013)



Plate 7:View of fruits in the Projects area (Photography: H.Mlotshwa 2013)

The IDP (2012-2016) for West Coast District Municipality indicates that the district primarily produces wheat, canola, rooibos tea, fruits, and grape wine. Animal products contribute 45.3% of the agricultural income and include poultry, fresh milk and dairy products, beef, mutton, lamb and pork products.

6.7 Existing Infrastructure

The proposed development seeks to install a 765kV powerline along an area that has sections that are either sparsely developed and heavy developed built up areas such as urban centres. The study area has existing infrastructure that include the existing Eskom 400 kV, and substations. In addition to these powerline networks, there are several lines of distribution powerlines traversing the entire project area and affected servitude. Sections run parallel to existing 400kV transmission line. Several Farmhouses were observed in close vicinity of the proposed alternative sites on the farms. Reconnaissance survey also recorded a number of guesthouses and tourism facilities in the vicinity of the powerline servitude section.



Plate 8:View of existing substation Aurora (Photography: H.Mlotshwa 2013)

6.8 Tourism

Tourism is the fastest growing industry in South Africa and Western Cape Province. In Western Cape most tourism is dependent on natural environment, and conservation plays an important role in sustaining biophysical environment potential to attract tourists (Western Cape Government, 2005).

West Coast District Municipality is a unique cultural experience along the coastline. It has a vast, wind-swept and sun-drenched landscape. The West Coast is said to be well suited for wind farms and solar powered infrastructure investment for regional and national electricity needs.

6.9 Noise

The main source of high noise level associated with the proposed project area derives from traffic from the local farmers, and also from agricultural machinery and activities. The environment in which the proposed development is located has the topography of an undulating landscape interspersed with some hills in the closer vicinity of the powerline servitude. Furthermore, there are unatural landscapes combined with natural landscapes. Activities within different provide significant screening against the propagation of noise. More specific data on noise pollution in the region will be derived during the EIA stage.

6.10 Water features

The construction of structures close to rivers can potentially impact on water resources through sedimentation and pollution during the construction phase. These potential impacts can be minimised through the implementation of appropriate mitigation and management measures. It is not considered technically feasible by Eskom to locate towers within a floodplain. Therefore, the impact on surface water as a result of the construction and operation of the transmission power lines is anticipated to be negligible, provided adequate mitigation measures are implemented specifically during the construction phase. Potential impacts on the surface water are, therefore, expected to be of low significance and limited to the construction phase. Impacts are expected to be similar for both alternatives under consideration. Detailed study on which rivers will be crossed will be done on the EIA phase.

6.11 Air quality

The existing powerlines are not currently considered as a source of air pollution. The nature of the proposed development entails that it is unlikely that there will be any activities during the operational phase of the development, which would generate any emissions. As such, apart from temporary construction vehicular

pollution, the operation of the proposed powerline is highly unlikely to cause air pollution in the surrounding area.

The only potential source of air pollution for sensitive receptors in the project area from the proposed development would be dust that may be generated during the construction phase. Dust levels depend on the type and level of construction activity being undertaken as well as the prevailing meteorological conditions. Dust excavation for new development is likely to generate dust, which may travel into surrounding areas.

However mitigation measures, which will be put in place during the construction phase, are likely to prevent dust from affecting areas beyond the boundaries of the site. The Environmental Management Plan will specify measures to prevent dust travel.

6.12 Human Environment

The project area falls within the Western Cape Province. The Western Cape is the second largest economic active province in contribution to the national GDP. The individual local municipalities (affected by the proposed project) have demographic features that resemble the districts in which they are located. The following socio-economic characteristics have been gathered from the following local Municipalities: West Coast District Municipality, Saldanha Bay Local Municipality, Swartland Local Municipality, Integrated Development Plans (IDPs).

According to the Census 2001, Western Cape accommodated 10.1 % of South African population. Almost 69% reside in Cape Town. There is 55% of Coloured and /or Asians in Western Cape. Females are 52% in province. (SRK, 2004)

In 2004, the access to health care facilities and services was still not equitable across the population. Although there was substantial health care infrastructure in the Western Cape, it was not always appropriately located relative to the population(SRK, 2004).According to Census 2011, Western Cape had 96% of

literacy levelling 1996. Amongst other facts this makes people in Western Cape to have better access to the services and facilities. Schooling levels are better when compares within provinces, but it is still poor. (SRK, 2004)

The main economic activities are commercial agriculture, manufacturing, wholesale and retail and tourism (SRK, 2004).The levels of income in the municipalities are also low based on the fact that unemployment is high. Access to water, lighting and refuse removal in the rural areas are other challenges. Furthermore, the construction of the transmission powerlines and substations could lead to a change in the number and composition of people within any given community, due to employment opportunities during construction of powerline and others could be relocated though not this is not a preferred option. The production of powerline in turn could lead to economic, land use, and socio-cultural change processes.

A question that is regularly raised by interested and affected parties is whether the installation of powerlines will have a detrimental medical effect on those living in close proximity of the powerlines. In 2006, Eskom commissioned an independent study conducted by Empetus Close Corporation to assess the effect of electric and magnetic fields (EMF) on the surrounding environment. The report, and several others from international researchers and experts, highlights that all household appliances and other electrical equipment generate electrical and magnetic fields (EMF). Therefore people are generally exposed to varying levels of EMF in their daily lives at work and at home. EMF is always created, in varying levels, with the generation of electricity and the frequency of the electrical power system. Overhead powerlines generate electric and magnetic fields but not any different from what people are already exposed to from other sources in their daily lives. (Refer to Electrical and magnetic Fields from Overhead Powerlines in Appendix F).

Table 5: Summary of typical electric field levels measured in the vicinity of the Eskom Powerlines (Empetus Close Corporation).

VOLTAGE (kV)	MAX ELECTRIC Field (V/m)	ELECTRIC FIELD AT SERVITUDE (V/m)	SERVITUDE WIDTH (m)
--------------	--------------------------	-----------------------------------	---------------------

132	1,300	500	15,5
275	3,000	500	23,5
400	4,700	1,500	23,5
765	7,00	2,500	40,0

Table 6: Summary of magnetic field in the vicinity of the Eskom Powerlines (Empetus Close Corporation).

Voltage (kV)	Current	Max Magnetic field	Magnetic field at Servitude Boundary	Servitude Width
132	150	4,0	1,0	15,5
275	350	6,0	1,0	23,5
400	650	10,5	2,5	23,5
765	560	6,0	1,5	40,0

The above tables (Table 5 and Table 6) illustrate that the electric and magnetic fields fall to lower levels with an increase in distance from the line. The main concern that is raised with regard to powerlines is that they are thought to increase chances of cancer. No evidence of a causal relationship between magnetic field exposure and childhood leukaemia or breast cancer has been found and no dose-response relationship has been shown to exist between EMF exposure and biological effects (Ibid).

The Empetus Report concluded that according to findings of studies on the effects of electric and magnetic fields on plants with levels typical of a powerline environment, complying with the requirements for proper servitude management as prescribed by the electric utility, are unlikely to affect plants in terms of growth, germination and crop production. (Empetus, 2006)

The guidelines for electric and magnetic field exposure set by the International Commission for Non- ionising Radiation Protection (ICNIRP 2000) receives world wide support and are endorsed by the Department of Health in South Africa (2006). Calculations of electric and magnetic field levels created by overhead powerlines have shown that areas where members of the public may be exposed

at the servitude boundary and further away from the line are well within the ICNIRP guidelines. Where field levels exceed the ICNIRP guidelines within the servitude, Eskom is experienced and has advanced techniques that exist to reduce the field levels.

The proposed development may traverse through section where it is near the west coast National park and/town areas such as Atlantis, Darling and Hope field however it is not anticipated to result in prohibitive and high significant or unmitigatable impacts. Any issues relating to the human environment will be explored further during the EIA phase.

Nonetheless, one class of impact that has been identified relates to heritage resources, such as historical buildings and settlements in areas such as near the substation Omega and Scenic routes associated within the proposed servitudes. These are usually fixed and Eskom will have to consider applicable mitigation or apply avoidance measure where applicable should the line be cleared to proceed as planned. Detailed study of the built environment and cultural landscape will form part of the Heritage Impact Assessment Specialist Studies during the EIA stage.

6.13 Heritage

The proposed project may impact on a range of heritage resources as defined in Section 3 of the National Heritage Resources Act (No. 25 of 1999) including places and buildings of cultural and historical significance, archaeological sites, graves and burial grounds. Stone artefacts found scattered on the surface of the earth mark archaeological sites such as Stone Age sites or that form part of the deposits in caves and rock shelters. The Stone Age is divided into the Early Stone Age (ESA) (from 2.5 million years ago to 250 000 years ago), the Middle Stone Age (MSA) (from 250 000 years ago to 22 000 years ago) and the Late Stone Age (LSA) (from 22 000 years ago to about 2 000 years ago). The same categories of Iron Age archaeological sites are available in the project area. A detailed Heritage Impact

Assessment will however be undertaken during the EIA phase.



Plate 9: View of old buildings near Omega substation

6.14 Visual Landscape

The visual impact of powerlines depends on the complex relationship between the visual environment (landscape), the development (object), and the observer (e.g. local residents or farmers). To further elaborate; the visual environment (landscape) is a combination of landform and land cover. It determines whether the object will be visible to observers and whether the landscape provides any significant visual absorption capacity. It also determines the extent of visual compatibility of the object with its immediate surroundings and the background to the object (Eyethu Engineers, 2000).

In general, the visual character of the study area is largely a mixture of built human and natural environments. Man-made interventions include the existing main roads and road servitudes, existing power lines, as well as the infrastructure and buildings associated with the farmsteads, rural and urban settlements and also nature reserves such as the Karoo Mountains (Beater, 2007). A visual impact study will be

conducted, as the proposed transmission line would traverse in natural scenic landscapes, agricultural areas, rural regions potentially impacting on their sense of place, as well as impacts on tourists and motorists.

7 DISCUSSION OF THE PROJECT ALTERNATIVES

This section considers the three alternative routes for the proposed powerline. There is no current preferred route for the proposed powerline. All routes will be studied thoroughly by scientists and specialists in the EIR process leading to selection of the preferred route. Explanations and discussions on each alternative option are presented below. This section includes strategic, technical, site, route and no go option alternatives.

7.1 Strategic alternatives

As part of the planning exercise, the division of Eskom Holdings SOC Limited responsible for Transmission investigated different alternatives to the preferred powerline. They identified the preferred technical, design and cost effective options for the proposed development. The power line will be approximately +/- 85 km long traversing through terrain ranging from the uniform Karoo landscape to the mountains and hills across the region. Hence, preference is given to developing a power line running directly from and to the proposed substations at Aurora and Omega Sites. The shortest possible route will also ensure minimum impact on the receiving environment.

7.1.1 Renewable Energy

Renewable energy (Solar and Wind) are still at a very early stage of development in South Africa. The government IRP2010 (Integrated Resource Plan) indicated that Renewable energy penetration will only be at 3% by year 2030. The peak demand for the country cannot be supported by renewables as it occur in the absence of sunlight, leaving only wind, also dependent on the availability at the time of system peak.

7.2 Technical and Process Alternatives

7.2.1 Overhead Powerlines

From engineering, planning and financial perspectives, overhead lines are less costly to construct than underground lines. They are also less destructive on the ground compared to underground cabling. Therefore, the preference with overhead lines is mainly on the grounds of costs and intrusive nature.

Overhead lines allow high voltage operations and the surrounding air provides the necessary electrical insulation to earth. Further, the surrounding air-cools the conductors that produce heat due to lost energy (Swingler *et al*, 2006). The overall weather conditions in the Western Cape Province are less likely to cause damage and faults on the proposed overhead transmission powerline. Nonetheless, if a fault occurs, it can be found either quickly by visual means using a manual line patrol or, in urgent cases, by helicopter patrol. Repair to overhead lines is relatively simple in most cases and the line can usually be put back into service within a few days.

In terms of impacts caused by the proposed development, factors such as visual intrusion and threats to sensitive habitat are not generally the same along the whole route.

7.2.2 Upgrade Existing Transmission Power Lines by using Bigger Conductors

In the first instance, this option requires the existing 400kV lines to be permanently off while being upgraded to thicker conductors. This will put the existing and future load at the risk of a partial blackout should the remaining 400kV power lines trip. The upgrade option would result in the physical load on the existing towers increasing substantially, hence sagging. To mitigate against sagging, more towers will have to be constructed within the existing line servitudes being upgraded. Furthermore, it would not be possible to remove one transmission power line from service to

perform the upgrading work, as the remaining supply lines would not be able to supply the electrical loads in the transmission system. In addition, this option would not allow for the power from the Koeberg-2 Power Station to be evacuated to the load centres without causing dynamic instability in the Eskom network. This could result in black-outs. This option would not improve the reliability of the Transmission system nor be sustainable.

7.3 Design Alternatives

7.3.1 Tower design

There are various types of tower design that has different implication in terms of cost for implementation. The need for selection of a tower type will be determined by Eskom engineering team that will consider the tower type that is more feasible and can still be less risk in terms of collision with birds. Self-supporting suspension tower is the one that will be suitable in most places of the Aurora -Omega 85 km transmission powerline and also depending on the terrain and also suggestions from different specialists.

7.3.2 Self-supporting suspension

Self-supporting suspension is typical of most single circuit structures in use at the time, having been developed to support Eskom introduction of 765kv lines to the national grid. It typically carries twin Dinosaur conductor a relatively light configuration. The use of a V-string assembly allows for compaction of phase spacing which in turn results in both structural and electrical efficiency. In terms of the economical feasibility of this tower, it was found that self-supporting suspension towers are more costly compared to others towers. The impetus to opt this tower design it is expensive but does not require more land as compared to other ones, as shown on Appendix F.



Plate 10: Self Supporting suspense tower (H. Mlotshwa, 2013)

7.3.3 Cross rope suspension tower

This tower is more suitable for long distance powerline whereby most part goes straight and doesn't have lots of bends and turning. This is more preferred design that is suitable for birds in relation to powerline impact on Birds. It requires a lot of land as compared to other towers.

7.3.4 Compact cross rope suspension tower

The cross rope tower concept was modified in a unique design, which introduces an inverted delta configuration, in which all phases are approximately equally spaced.

This configuration results in greater electrical efficiency over long distances links, and also enables the reduction of related substation equipment costs.



Plate 11: Compact cross rope suspension tower (Pallett, 2009)

7.3.5 Guyed Vee Suspension Tower Voltage

Eskom developed this structure for optimal use with the quad Zebra configuration. The guyed vee towers have one large foundation and four guys therefore four smaller foundation. Guyed vee towers provide the best protection from lightning impulses due to the ground wire and cross arm configuration. Tower cross bar helps with the live line maintenance. Problems with guyed vee towers are that they are limited to relatively flat terrain. The Guyed vee towers are known to be less visually intrusive.



Plate 12: Guyed vee suspension tower (Photography: H. Mlotshwa, 2013)

7.4 Route Alternatives

For this study, three alternative routes are being considered estimated to be 85km long with a 2000m wide corridor being considered. However, the approved servitude corridor would be reduced to the appropriate width according to the draft engineering designs and approvals by the DEA.

Omega substation is next to a heritage site and has existing powerlines. There are Cape Dutch houses. The co-ordinates for the substation is S33° 42' 14.71" E18°30' 47.01".

The different route options are detailed in Section 3.1 above. From the analysis of the various alternatives to satisfy the need for additional power transmission

capacity, Eskom Transmission determined that the introduction of the Aurora Omega was the most feasible and cost-effective solution in order to add capacity in Western Cape. This project involves construction of the following:

- Construction of **a 765kv transmission power lines** between the HV-yard at the **Aurora and the Omega Substation**, a distance of approximately 85 km.
- **Associated works** to integrate the new transmission line into the substation.

The following technical requirements were considered in the identification of feasible corridors for the establishment of the required transmission power lines:

- Technically viable and cost effective corridors of approximately 2km in width were identified.
- As far as possible, the servitude lengths between power supply and load points should be minimised.
- As far as possible, the number and magnitude of angles along the line should be minimised in order to allow the use of less expensive and visually less-intrusive tower types.
- Crossing over of existing major power lines should be avoided as far as possible as this increases the potential for technical incidents during operation.
- The alignment should cater for known topographical/terrain constraints of the tower types to be used, and soil conditions for the foundations in terms of geotechnical suitability and costs.
- The proposed alignment should provide for the need of appropriate access roads to the servitude and tower positions for the both construction and maintenance/operation phases.
- Care should be taken to avoid the following as far as tower positioning and access road construction are concerned:
 - extensive rock outcrops;
 - rugged terrain, hills and mountains;
 - active clay soil, vleis and floodplains;

- potential unstable side-slope terrain; and
- eroded and unstable areas.

Other issues which technically affect the location of a transmission power line include:

- agricultural lands, in particular those under irrigation;
- water bodies;
- crossing points with roads, rail and telecommunication lines at off-set angles less than 60°.

The following environmental issues should be taken into consideration

- human settlements and communities;
- land use (where possible);
- passing between water bodies (bird flight paths usually extend between water bodies);
- ecologically sensitive areas;
- scenic areas with high visual/aesthetic quality; and
- untransformed indigenous vegetation.

Three alternative power line corridors have been identified between Aurora and Omega substations. These power line development corridors are considered to be technically feasible, and have therefore been identified for investigation within the EIA process.

7.5 Demand alternatives

Demand can generally be defined as the activities performed by the electricity supply utility, which are designed to produce the desired changes in the load shape through influencing customer usage of electricity and to reduce overall demand by more efficient use. These efforts are intended to produce a flat load duration curve to ensure the most efficient use of installed network capacity.

By reducing peak demand and shifting load from high load to low load periods, reductions in capital expenditure (for network capacity expansion) and operating costs can be achieved. Some of the basic tools are the price signals (such as time of use tariffs) given by the utility and direct load management. This option is practised to a certain extent. No other alternative energy sources have been identified at this stage.

7.6 No-go option

The “do nothing” Alternative is the option of not undertaking the proposed development, which implies that the 765kV powerline would not be constructed. Retention of the status quo would mean that it would not be possible to meet the growing electricity demands in the Cape area and other surrounding towns.

This option is not economically feasible because electricity users such as developers, farmers and domestic users would be unable to avoid interruptions. The Western Cape Province would be unable to avoid interruptions. Based on Eskom's demand and supply calculations, Western Cape would face critical power supply shortage by 2020 if transmission solution is implemented. Consequently, without the proposed new power line there is an increasing possibility that outages and ultimate grid collapse could occur. This could result in economic collapse wide spread across the Western Cape Province.

Based on the identified need for the proposed development to proceed and the fact that although there could be negative impacts associated with the proposed development, there are several possible and effective mitigating measures that could be implemented to minimise or eliminate negative impacts, where possible, associated with the construction and operational /maintenance phases for power line developments.

With reference to the above discussion, it should be noted that it is important to identify potential impacts in the early development process in order for timely influence on power alignment, the position of power line, technical designs criteria and budget allocations for effective implementation of mitigation measures.

The most prominent envisaged outcome of the proposed activity would be the provision of electricity. Electricity supply developments are generally intended to promote economic and social development and improve the social welfare of communities, industries and overall economy of the region and country at large. A steady growth in electricity demand is expected to continue in South Africa for some time because required electrification of housing projects and developments such roads, schools and railway lines and other industrial developments such as mining and mining beneficiation industries are planned by provincial and national governments.

