DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT

400KV DOUBLE CIRCUIT TRANSMISSION POWER LINE FROM THE EXISTING FIRGROVE SUBSTATION TO A PROPOSED MITCHELL'S PLAIN SUBSTATION AND THE MITCHELL'S PLAIN SUBSTATION

DEA REFERENCE NUMBER: 12/12/20/1867

June 2011

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TITLE	:	**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT FOR A 400KV DOUBLE CIRCUIT TRANSMISSION POWER LINE FROM THE EXISTING FIRGROVE SUBSTATION TO A PROPOSED MITCHELL'S PLAIN SUBSTATION AND THE MITCHELL'S PLAIN SUBSTATION**
Project Team	:	BKS Pty Ltd
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For BKS (PTY) LTD

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PURPOSE OF DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Eskom Holdings Limited commissioned an Environmental Impact Assessment (EIA) to investigate the potential environmental impacts for the proposed 400kV double circuit Transmission power line from Firgrove to Mitchell's Plain and the proposed Mitchell's Plain Substation (DEA Reference Number: 12/12/20/1867). The construction of the proposed 400kV single circuit Transmission power line from Mitchell's Plain to Philippi, however, forms part of another EIA process (DEA Reference Number 12/12/20/1868) and is thus excluded from this report, although both projects are undertaken in parallel and should be read as such. BKS (Pty) Ltd, as the independent Environmental Assessment Practitioner (EAP), is undertaking the EIA and is conducting it in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), and the EIA Regulations R385, R386 and R387 promulgated on 21 April 2006.

This EIA Report is required to address the potential impacts associated with the proposed project, and to provide an assessment of the project in terms of the biophysical, social and economic environments. This assessment aids both the environmental authorities (in this case, the national Department of Environmental Affairs (DEA)) and the Applicant (Eskom Holdings Limited) in making decisions regarding the future of the project.

The scoping phase has already been undertaken and acceptance of the Final Scoping Report was received from the DEA on 11 February 2011 (**Appendix A**~~**Appendix A**~~). The Scoping Report identified issues and concerns in order to focus the specialist studies during the EIA Phase and provide a framework within which to undertake the assessment. The EIA Report presents a summary of the findings of the specialist studies and provides recommendations on the mitigation measures that should be implemented in order to minimise the negative and maximise the positive impacts. The Environmental Management Plan (EMP), which forms part of the EIA Report, summarises the assessed impacts and lists the actions required by the applicant to assure that the mitigation measures are implemented during the design to decommissioning phases of the proposed development.

In keeping with environmental legislation, it is the responsibility of the EAP to ensure that the public is given the opportunity to participate meaningfully in the environmental investigation process. This includes the identification of issues and the review of reports. Accordingly, interested and affected parties (I&APs) were invited to review the Draft EIA Report and the Draft Site-Specific EMP from 5 July to 16 August 2011 and submit their comments to BKS or directly to the DEA. The comments received during the review period of the Draft EIA Report will be incorporated into the Final EIA Report, and submitted to the DEA for review and acceptance.

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EXECUTIVE SUMMARY

Eskom Holdings Limited applied for an environmental authorisation from the national Department of Environmental Affairs (DEA) for the proposed 400kV double circuit Transmission power line from Firgrove to Mitchell's Plain and the proposed Mitchell's Plain Substation (DEA Reference Number: 12/12/20/1867). The application for environmental authorisation and declaration of independence were submitted to the DEA on 26 March 2010. The DEA indicated that an EIA process must be undertaken in order to determine the environmental authorisation.

BKS (Pty) Ltd was appointed by Eskom Holdings Limited as the independent EAP to undertake the required EIA for the proposed project. BKS meets the requirements for the independent EAP in terms of GNR No. 385 of the EIA Regulations (2006).

OVERVIEW OF PROPOSED PROJECT

The Cape Peninsular customer load network of the Western Grid of the Western Cape Province requires strengthening. As such, Eskom Holdings Limited proposes the construction of the new Mitchell's Plain Substation and a 400kV double circuit Transmission power line from the same Mitchell's Plain Substation to one of the following locations:

- the existing Firgrove Substation;
- the existing Stikland Substation; or
- a proposed switching station close to the existing 400kV Transmission power line from the Palmiet Substation to the Stikland Substation to load from the latter into this project.

The study area for the project described above (the Firgrove-Mitchell's Plain project) traverses approximately 30km with a maximum of 1km on either side of the proposed alternative alignments. A servitude width of up to 55m for the Transmission power line needs to be acquired.

Another project forms part of the strategic overview of the Cape Peninsular customer load network of the Western Grid of the Western Cape Province. This project entails the construction of a 400kV single circuit Transmission power line from the proposed new Mitchell's Plain Substation indicated above to the existing Philippi Substation, for which an upgrade has been proposed (i.e. the Mitchell's Plain-Philippi project).

The Mitchell's Plain-Philippi project forms part of another EIA process, and is thus excluded from this EIA Report. The EIA processes for the Firgrove-Mitchell's Plain project and the Mitchell's Plain-Philippi project are, however, undertaken in parallel.

PROJECT ALTERNATIVES

The EIA process requires the identification and analysis of alternatives in order to satisfy the project's need. Therefore, the following items have been identified and are included as part of this EIA Report:

- Design alternatives;
- Route alignment alternatives for the proposed Transmission power line;
- Location alternatives for the proposed Mitchell's Plain Substation; and

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- The "do-nothing" alternative.

PUBLIC PARTICIPATION PROCESS

The Public Participation Process (PPP) included the distribution of documents by post and electronic mail, printed media, meetings with stakeholders and meetings held at the request of the DEA and I&APs. All the issues and concerns that have been raised by the I&APs, through the various channels during the EIA process to date, including I&AP registration forms, e-mail communications and the Public Open Days, were captured in an Issues and Response Report (IRR) (**Appendix F~~Appendix F~~**).

ENVIRONMENTAL SPECIALIST STUDIES

The following specialist studies were considered in the EIA Report:

- Geotechnical Assessment
- Soil and Agricultural Assessment
- Agricultural Economic Potential Assessment
- Ecological and Wetland Assessment
- Avifauna Assessment
- Social Assessment
- Heritage Assessment
- Visual Assessment

KEY FINDINGS OF THE EIA

This EIA process undertook unprecedented approaches to establish the pylon positions of the route alignment as well the recycling and multi-circuiting of Eskom pylon towers. The identification of the pylon positions is usually done after the DEA approves a (1km) corridor from the route alignment. However, as the study area is located in an urban environment, flexibility to place pylons within a wide corridor is reduced. Therefore, the EAP recommends positions for the pylons during the EIA phase. This ensures that specific sensitive areas are avoided, or where they can't be avoided, mitigation of the impacts is provided.

Areas of concern, which the proposed development should avoid, include the Driftsands Nature Reserve, Khayelitsha, proposed and existing developments along the N2 and Critical Biodiversity Areas. The following main issue is highlighted, i.e. in areas where resettlement would occur or where it cannot be avoided, a detailed Resettlement Action Plan (RAP) would have to be developed and detailed discussions would have to be held with all stakeholders involved (authorities, individuals and host communities). The RAP falls outside of the mandate of the DEA and this EIA process.

Specific mitigation measure requirements identified through the specialist studies and included in the Draft Site-Specific Environmental Management Plan (EMP) must be adhered to during the planning, design, construction, operational, rehabilitation, and eventual decommissioning phases of the proposed development.

CONCLUSION

The EIA has not identified any fatal flaws that cannot be adequately mitigated that should prevent the proposed Firgrove-Mitchell's Plain project from being developed. A number of significant issues have been highlighted and strict adherence to the Draft Site-Specific EMPr is necessary to ensure an

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environmentally sustainable development. It is thus recommended that the development be authorised on condition that the Draft Site-Specific EMP is implemented and that an independent Environmental Control Officer is contracted to undertake audits and oversee activities during the construction phase of the project.

The EAP recommends that the Double-Circuit 400kV Transmission power line from the new Mitchell's Plain Substation Alternative 1 via a recommended list of pylon positions along route alignments MS-C and MS-Db to the Switching Station located at the intersection of Polkedraai Road and Zewenwacht Link Road be authorised by the DEA and that the Draft Site-Specific EMP be made legally binding on the Applicant and their contractors. An independent Environmental Control Officer should be contracted to oversee and undertake monthly audits based on the EMP during the construction phase of the project.

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LIST OF ABBREVIATIONS

ACSA	Airports Company South Africa
amsl	above mean sea level
BID	Background Information Document
CBA	Critical Biodiversity Areas
CFR	Cape Floristic Biome
CLN	Customer Load Network
CoCT	City of Cape Town Metropolitan Municipality
CREW	Custodians of Rare and Endangered Wildflowers
CRS	Cross Rope Suspension
DEA	Department of Environmental Affairs
DEADP	Department of Environmental Affairs and Development Planning
DNR	Driftsands Nature Reserve
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
ECO	Environmental Conservation Officer
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
HDSA	Historically Disadvantaged South Africans
HIA	Heritage Impact Assessment
I&AP(s)	Interested and affected party (-ies)
IDP	Integrated Development Plan
IRR	Issues and Response Report
ISO	International Organisation of Standardisation
km	kilometre
kV	kiloVolt
m	metre
MRC	Medical Research Complex
MTS	Main Transmission Substation
MVA	Mega Volt Ampères
N2	N2 National Road

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NEM:WA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PoS	Plan of Study
PPP	Public Participation Process
QDGC	Quarter-Degree Grid Cells
RAP	Resettlement Action Plan
SABAP	Southern African Bird Atlas Project
SAHRA	South African Heritage Resource Agency
SANBI	South African National Botanical Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SDP	Spatial Development Plan
SIA	Social Impact Assessment
SMME	Small Medium and Micro Enterprise
SR	Scoping Report
VIA	Visual Impact Assessment

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1 INTRODUCTION

1.1 BACKGROUND

The Cape Peninsular customer load network of the Western Grid of the Western Cape Province requires strengthening. As such, Eskom Holdings Limited (hereafter referred to as Eskom) applied for an environmental authorisation from the national Department of Environmental Affairs (DEA) for a proposed development, herein referred to as the Firgrove-Mitchell's Plain project (DEA Reference Number 12/12/20/1867). The project entails the proposed construction of the new Mitchell's Plain Substation and a 400kV double circuit Transmission power line from the Mitchell's Plain Substation to one of the following locations:

- the existing Firgrove Substation;
- the existing Stikland Substation; or
- a proposed switching station close to the existing 400kV Transmission power line from Palmiet Substation to Stikland Substation to load from the latter into this project.

BKS (Pty) Ltd (hereafter referred to as BKS) was appointed by Eskom as the independent Environmental Assessment Practitioner (EAP) to undertake the required Environmental Impact Assessment (EIA) for the proposed project. BKS meets the requirements for the independent EAP in terms of GNR No. 385 of the EIA Regulations (2006).

The EIA process for the proposed development will be undertaken as per the conditions agreed to at a meeting attended by the DEA, Eskom and BKS on 19 April 2010. The conditions agreed to are attached in **Appendix A**~~**Appendix A**~~. An application for environmental authorisation and a declaration of independence for both projects were submitted simultaneously to the DEA on 26 March 2010.

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The study area extends from the Firgrove area in the east to the Mitchell's Plain area in the south and west and the Stikland area in the north within the City of Cape Town Metropolitan Municipality (CoCT). The study area for the project traverses approximately 30km in length and a maximum of 1km on either side of the proposed alternative alignments. A servitude width of up to 55m for the power line needs to be acquired. The location of the proposed Mitchell's Plain substation is to be determined from this EIA process.

BKS has also been appointed for another project that forms part of the strategic overview of the Cape Peninsular customer load network of the Western Grid of the Western Cape Province. The Mitchell's Plain-Philippi project entails the construction of a 400kV single circuit Transmission power line from the proposed new Mitchell's Plain Substation indicated above to the existing Philippi Substation, for which an upgrade is proposed. However, the Mitchell's Plain-Philippi project forms part of a separate EIA process in terms of a separate environmental application, and is thus excluded from this EIA Report. The EIA processes for the Firgrove-Mitchell's Plain project and the Mitchell's Plain-Philippi project are undertaken in parallel and as such, the EIA Reports must be read in parallel. **Figure 1-1**~~**Figure 1-1**~~ is a locality map that indicates both projects.

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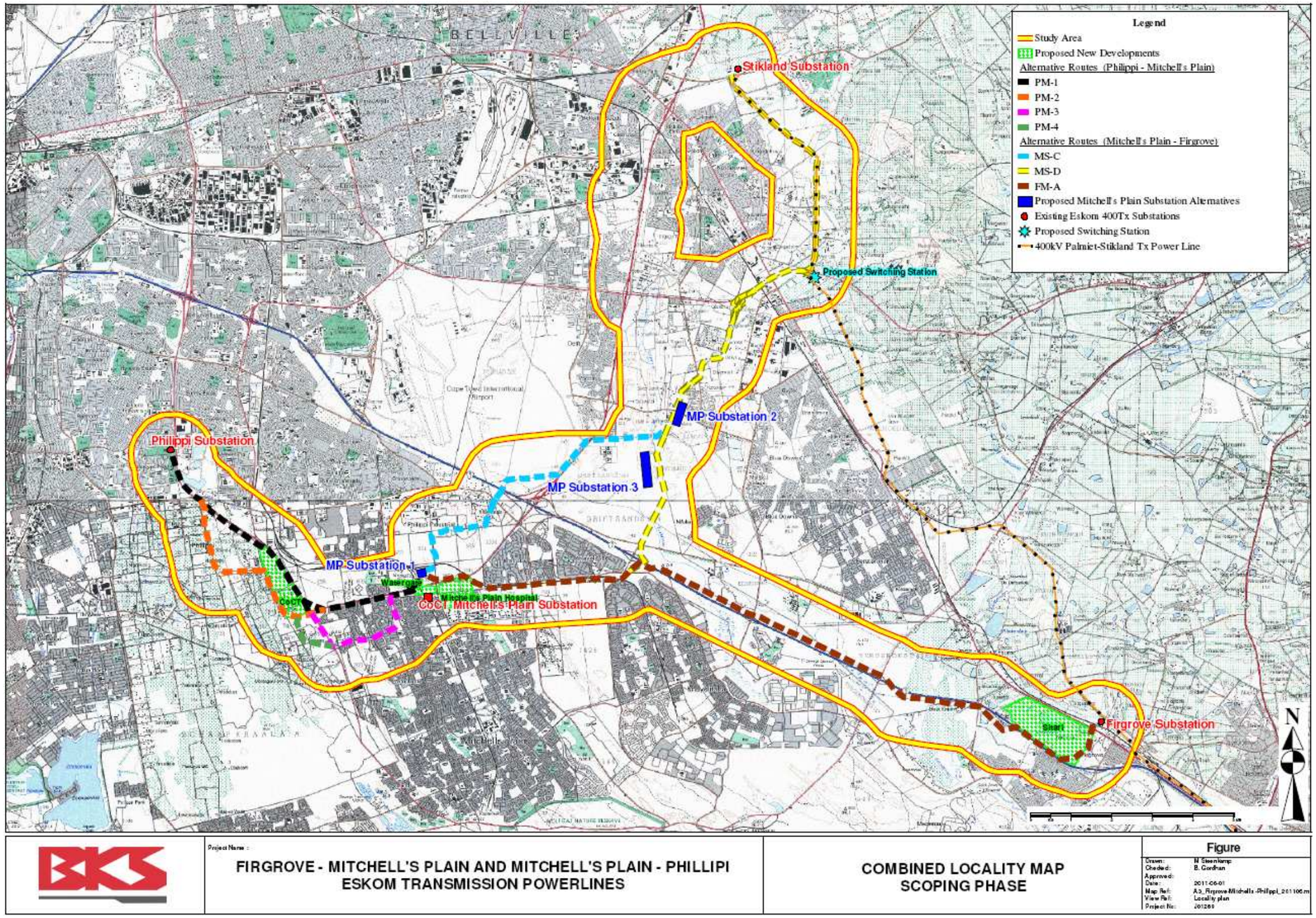

Figure 1-1: Locality Map of Combined Study Areas for Firgrove-Mitchell's Plain and Mitchell's Plain-Philippi Projects

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1.2 PURPOSE OF STUDY

An EIA is a planning and decision-making tool. It identifies potential negative and positive impacts the proposed project may have and recommends ways to enhance the positive impacts and minimise the negative ones. The EIA for this project will address the impacts associated with the project, and provide an assessment of the project in terms of the biophysical, social and economic environments to assist both the environmental authority (the DEA) and the applicant (Eskom) in making decisions regarding the implementation of the proposed project.

The proposed development falls under the ambit of the EIA Regulations (2006) published under the Government Notice Regulation (GNR) No. 385 of 21 April 2006 in terms of Section 24(2)(a) and (d) of NEMA (the National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended). Cognisance will also be taken of:

- NEM:WA – the National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008);
- NWA – the National Water Act, 1998 (Act No. 36 of 1998);
- Related guideline documents; and
- Other relevant legislation.

The EIA consists of three (3) phases:

- The Scoping Phase;
- The EIA Phase; and
- The Decision-Making Phase.

The Scoping Phase for this project (which has already been completed) identified and defined the issues that need to be addressed in the EIA Phase. In this regard, input from the technical team, the authorities and interested and affected parties (I&APs) were considered and integrated. BKS also assessed the possible environmentally friendly mitigation measures to prevent or minimise the possible impacts as a result of the proposed project.

The EIA Phase is undertaken with the goal of informing the Decision-Making Phase. In order to do so, the findings identified and assesed by the EAP and specialists ensure that appropriate mitigation measures are presented for the purpose of a sustainable development.

1.3 PURPOSE OF EIA REPORT

The purpose of this Draft EIA Report is to present a summary of the findings of the specialist studies and provide recommendations on how the project can be implemented in a way that minimises the negative and maximises the positive impacts. This Draft EIA Report is being made available to the public for comment from 5 July to 16 August 2011. Any comments received during this review period will be taken into consideration, prior to finalisation and submission to the DEA for decision-making, to afford them the opportunity to check that their comments and input were captured accurately and correctly understood.

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1.4 STRUCTURE OF EIA REPORT

The following information, in accordance with Regulation No. 32 of GNR No. 385 of the EIA Regulations (2006), is included in this report:

- Project team details (**Chapter** 2).
- A detailed description of the proposed project, including the justification of the project (**Chapter** 3).
- A description of the project alternatives (**Chapter** 4).
- Legislation and guidelines that pertain to the project (**Chapter** 5).
- A description of the EIA process including the PPP and any assumptions/limitations (**Chapter** 6).
- A description of the receiving environment (**Chapter** 7).
- A description of all environmental issues that were identified and an assessment of each significant impact (**Chapter 9**).
- A summary of the findings of the specialist studies (**Chapter** 10~~10~~).
- A comparative assessment of the alternatives considered (**Chapter** 11~~11~~).
- A description of the contents of the Draft Site-Specific Environmental Management Plan (**Chapter** 12~~12~~).
- Environmental impacts that are specific to NEMA listed activities (**Chapter 13**).
- Environmental Impact Statement (**Chapter 14**).
- Conclusions and Recommendations (**Chapter** 15~~15~~).

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2 PROJECT TEAM

2.1 APPLICANT

Details of the applicant are as follows:

Applicant	Eskom Holdings Limited Transmission Division: Land and Rights
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2.2 ENVIRONMENTAL CONSULTANT

Details of the Environmental Consultant are as follows:

Environmental Consultant	BKS (Pty) Ltd
Contact Person	Mr. Peter Teurlings
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Cell Phone	(083) 253 8322
E-mail Address	petert@bks.co.za

Bharat Gordhan, an Environmental Scientist from BKS, is responsible for managing this project and for compiling the EIA Report. Bharat holds a BSc (Geography and Environmental Management) and specialises in environmental assessment processes and the compilation of EMPs. He has been involved in numerous different types of EIA processes including Eskom Transmission power lines, residential developments, upgrading of roads, filling stations and pipelines in South Africa and Mauritius. He is currently involved in the proposed Bulk Sewage Pipeline Project from the Sekampaneng Reservoir to Sekampaneng Township in Pretoria, Gauteng and the Replacement of the Transnet Gas Pipeline crossing the Umvoti River in KwaDukuza, KwaZulu-Natal.

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Peter Teurlings, Departmental Head: Environmental Management of BKS is the Project Director and is responsible for reviewing the reports. Peter is registered as a Professional Natural Scientist (Registration No 400027/95) in the Environmental Science field of practice in terms of Section 18(1) of the Natural Scientific Professions Act (2003) and is also a member of the South African Chapter of the International Association of Impact Assessments (IAIA). Peter has an MSc (Biogeography) and specialises in environmental assessment processes and Project Management. He has been involved in numerous different types of EIA processes including residential developments, Transmission power lines, wastewater treatment projects, water supply projects, dams, roads and airports in Southern Africa.

Peter and Bharat are supported by other BKS personnel, as listed in Table 2-1~~Table 2-1~~. Input from Eskom Transmission has also been important for the completeness of the EIA process and accuracy of project related information.

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Table 2-1: Project Team

Name	Role on Team	Company
Peter Teurlings	Project Director, EAP and Professional Natural Scientist	BKS (Pty) Ltd
Bharat Gordhan	Project Manager: EIA and EMP	BKS (Pty) Ltd
Robin Swanepoel	EIA Assistance and EMP Specialist	BKS (Pty) Ltd
Simon von Witt	EIA Assistance	BKS (Pty) Ltd
Dr David de Waal	Public Participation Leader and Social Impact Assessment (SIA)	BKS (Pty) Ltd
Eddie Mashau	Public Participation Facilitator	BKS (Pty) Ltd
Marti Moolman	Public Participation Manager	BKS (Pty) Ltd
Mamokete Maimane	Public Participation Officer	BKS (Pty) Ltd
Elsje Greyling	Project Administrator	BKS (Pty) Ltd
Martin Steenkamp	GIS Coordinator	BKS (Pty) Ltd
Polly Sepeng	Graphic Designer	BKS (Pty) Ltd
Betsie le Roux	Ecological and Wetland Assessment	BKS (Pty) Ltd
SPECIALISTS		
Heather Davis	Geotechnical Investigation	BKS (Pty) Ltd
Mike Howard	Visual Impact Assessment	BKS (Pty) Ltd
Ingrid Snyman	SIA Assistance	Ingrid Snyman Development Consultants
Garry Patterson	Soil and Agricultural Potential Assessment	Agricultural Research Council
S G Ferreira	Agricultural Economic Potential Assessment	Agriconcept cc
Chris van Rooyen	Avifaunal Assessment	Chris van Rooyen Consulting cc
Tim Hart	Heritage Impact Assessment	University of Cape Town (UCT)
Nicke Helme	Fynbos Botanist	Nick Helme Botanical Surveys
Adv. Nicolai Massyn	Enviro-Legal Review	Green Gain Consulting (Pty) Ltd
ESKOM TRANSMISSION		
Kentridge Makhanya	Project Manager	Eskom Transmission
Arthur Burger	Line Design Engineer	Eskom Transmission
Jose Diez-Serrano	Engineer	Eskom Transmission
Thamsanqa Ngcobo	Senior Planner	Eskom Transmission
Dalton Matshidza	Planner	Eskom Transmission
Sipho Shabalala	Surveyor	Eskom Transmission
Phumza ~~G~~Jizana	Negotiator	Eskom Transmission

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Name	Role on Team	Company
Fred Grové	Geotechnical Engineer	Eskom Transmission

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3 OVERVIEW OF THE PROJECT

3.1 INTRODUCTION

The bulk supply of electricity cannot be stored. Therefore, power has to be generated and delivered over long distances at the moment it is required.

Eskom Holdings Limited is divided into three divisions Eskom Generation, Eskom Transmission and Eskom Distribution. Eskom Generation is responsible for the generation of electricity at power stations, while Eskom Transmission is responsible for the transmission of electricity from power stations at high voltages across the country to substations.

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

The nature of bulk supply of electricity in South Africa is illustrated in Figure 3-1~~Figure 3-1~~.

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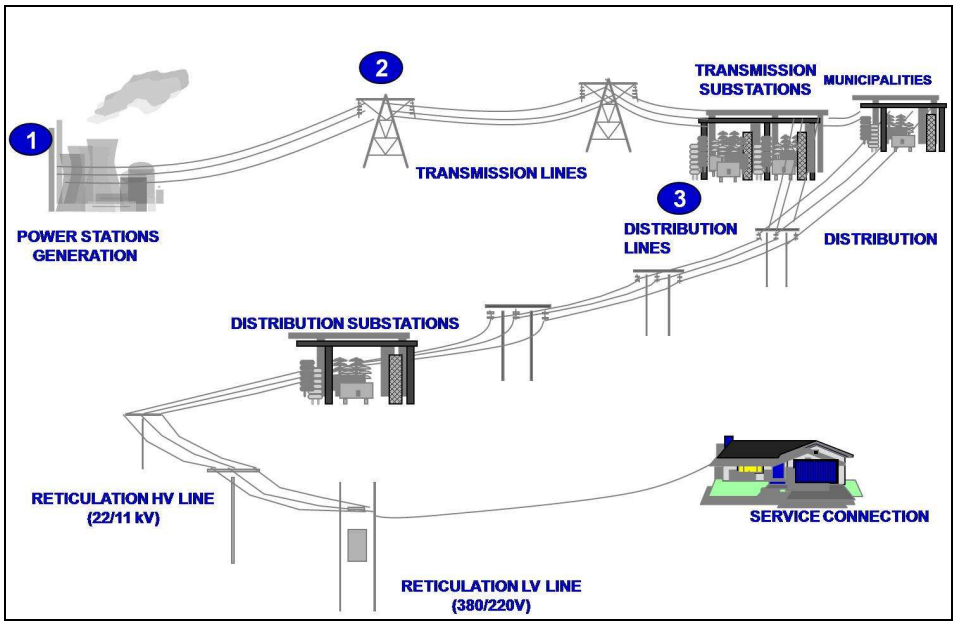

Figure 3-1: Nature of Bulk Electricity Supply

Eskom has a mandate to satisfy potential customer needs as an essential service, which implies certain responsibilities. One of the most significant of these is to find and maintain the balance between satisfying society's needs for electricity without having a detrimental effect on the environment. In order to achieve this, Eskom must continually re-assess its present infrastructure and take new developments into account to ensure that growing needs for electricity are satisfied, without significantly impacting on the environment.

Steel pylon towers will be constructed at intervals along the recommended route alignment typically spaced up to 350m apart. The height of pylon towers ranges from approximately 35-40m. Free-standing strain pylon towers will also be required for bends greater than 3° and/or in difficult terrain such as wetlands.

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3.2 JUSTIFICATION OF THE PROJECT

The Customer Load Networks (CLN) in the Western Grid of the Western Cape is divided into the Cape Peninsular, West Coast, Southern Cape and Namaqualand CLNs. The project area falls within the Cape Peninsular CLN, which consists of the following structures (also shown in ~~Figure 3-2~~Figure 3-2):

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- Main Transmission Substations (MTS): Acacia, Muldersvlei, Koeberg, Philippi and Stikland 400/132kV substations; and
- Power Stations: Koeberg, Acacia and Atlantis.

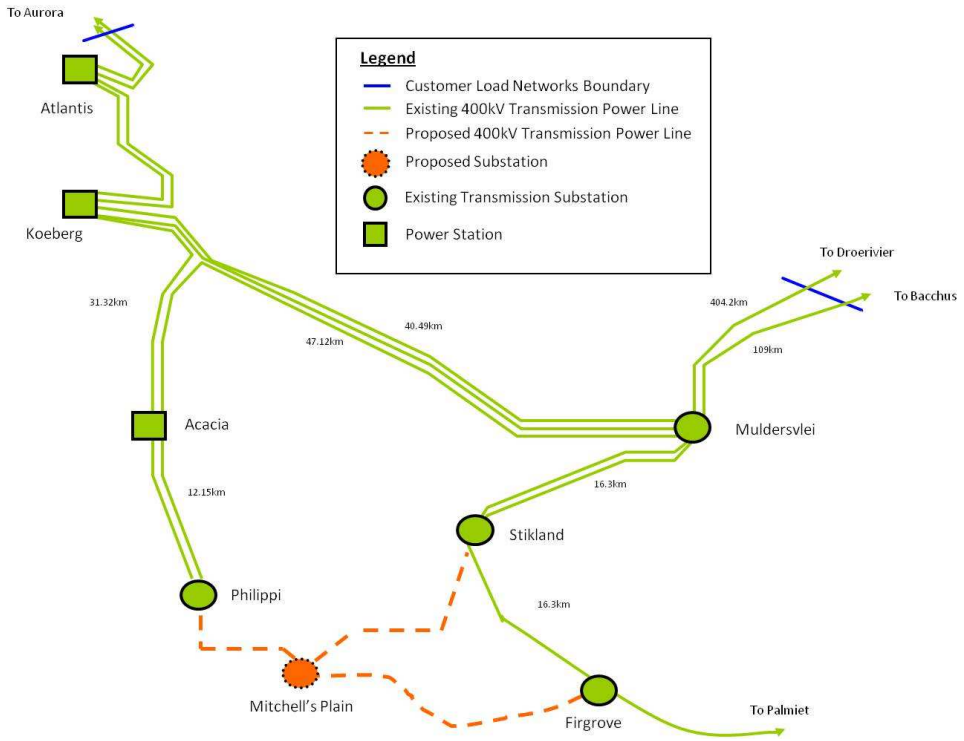

Figure 3-2: Cape Peninsular Customer Load Network

The Philippi MTS supplies the CoCT with electricity but has run out of a stable electricity supply capacity. Therefore, a project to upgrade the Philippi MTS is required to be operational as soon as practically possible. Further expansion of the Philippi intake point was determined to be technically unacceptable by the CoCT and a new intake point at Mitchell's Plain was identified to be the most technically appropriate solution. Without the new intake point, further load growth in the area of the Cape peninsula (Hout Bay, Wynberg, Mitchell's Plain and Cape Point) and new development would have to be stopped. This development is thus critically important to the continued security of the electricity supply within the CoCT. Demand-side management initiatives will moderate electricity demand to some extent but would not avoid the need for the additional intake point or the need to augment the existing bulk supply capacity.

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Due to the high density development surrounding the Philippi substation, the introduction of new feeder lines was not deemed feasible because:

- Fault levels in the area will increase beyond the equipment ratings including the cable network in the CoCT's network. Since the 132kV equipment at Philippi substation is a Gas Insulator Substation type, it will be very expensive to upgrade the equipment.
- The CoCT load is not concentrated around the Philippi area, but spreads as far as Simon's Town. Therefore, placing Transmission equipment at the Philippi MTS will force the CoCT to add 132kV long cables to the load.
- The area surrounding the Philippi Substation is densely developed and servitudes for many 132kV feeders will thus be extremely difficult to acquire.

Eskom thus proposed to construct a second 400kV injection to feed into the CoCT supply area at a new substation located in or surrounding Mitchell's Plain. In order to supply the Mitchell's Plain Substation with sufficient capacity Eskom proposed that the supply come from one of the following sources:

- the existing Firgrove Substation;
- the existing Stikland Substation; or
- a proposed switching station close to the existing 400kV Transmission power line from Palmiet Substation to Stikland Substation to load from the latter into this project.

3.3 TECHNICAL DETAILS

3.3.1 Proposed Mitchell's Plain Substation

The Mitchell's Plain Substation will be approximately 350m × 350m (or 12.25 ha) in size. Alternative sites 2 and 3 were assessed on a 1km wide corridor to allow for different placing positions of the Mitchell's Plain Substation. The Mitchell's Plain Substation will contain the following infrastructure:

- 2×500MVA MTS.
- 2×400kV Line bays.
- Step down from 400kV to 132kV MTS in order supply the CoCT and Eskom Distribution.
- Telecommunication high mast.
- Administration building and security guard house structure.
- Approximately 3.5m high fencing around the substation site.
- Access road from Stock Road and internal roads not wider than 4m.

The CoCT's Mitchell's Plain Distribution Substation would need to link with the proposed Eskom Mitchell's Plain Substation. But, the linkage with the CoCT Mitchell's Plain Substation does not form part of this EIA process.

3.3.2 Existing Firgrove Substation Upgrade

The Firgrove Substation, an Air Insulation Substation (see **Section 4.3.4~~4.3.4~~**), will be upgraded. However, this proposed development does not form part of this EIA process. The EIA process for this upgrade is being undertaken by another EAP (Enkanyini Projects).

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3.3.3 Existing Stikland Substation Upgrade

The proposed upgrade to the existing Stikland Substation, an Air Insulation Substation (see **Section 4.3.4~~4.3.4~~**), entails the addition of a line bay within the boundaries of the site to accommodate the proposed Transmission power line from the Mitchell's Plain Substation. The footprint of the site will not be extended.

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3.3.4 Switching Station

A switching station is a substation that does not contain transformers[1] (i.e. there is no transformation of electricity taking place) and operates at a single voltage level, in this instance, 400kV.

Switching stations are used as collector and distribution stations. Power from a source (Stikland Substation as in this instance, or a generator) is brought to a common busbar and distributed to other substations through Transmission or Distribution power lines.

A switching station can be used where the source is a distance from the load substations. The purpose of the switching station is to reduce the number of power lines to be built between load substations and the source.

The switching station for this project is proposed to be established along the existing 400kV single-circuit Transmission power line from Stikland to Palmiet. This high voltage yard for the switching station would be 300m × 300m (9 hectares) in size, which will accommodate any planned future expansion. The proposed switching station (**Figure 3-3~~Figure 3-3~~**) is to be located south and adjacent to the intersection of Stellenbosch Arterial Road (also known as Polkedraai Road) and Zewenwacht Link Road at the point where the 400kV Palmiet-Stikland Transmission power line crosses the former road. The property description is Portion 66 of the Farm Saxenburg No. 419, Stellenbosch (33°57'1.5"S; 18°42'20"E).

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No additional alternative locations will be investigated as this location is a suitable distance from the 400kV Palmiet-Stikland Transmission power line and does not allow any further deviation from the proposed route alignment of Alternative D from Stikland to the proposed Mitchell's Plain Substation.

Gantry bays will need to be placed a maximum 80m from each other in order to guide the proposed 400kV Firgrove-Mitchell's Plain Transmission power line under the existing power lines and into the switching station.

1 Electricity is transformed between high and low voltages using transformers. Electricity may flow through many substations between the generating plant and the end-consumer, and may be changed in voltage in several steps, i.e. 765kV to 400kV to 275kV to 132kV and *vice versa*. A substation that has a step-up transformer increases the voltage while decreasing the current, while a step-down transformer decreases the voltage while increasing the current for domestic and commercial distribution.

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Figure 3-3: Proposed site for switching station

3.3.5 Transmission Power Lines

This project intends establishing a 400kV double-circuit Transmission power line from the proposed Mitchell's Plain Substation to the existing Firgrove or Stikland Substations, or a proposed Switching Station as described previously. A single-circuit Transmission power line has one energised power line on a pylon, whereas a double circuit Transmission power line has two energised power lines on a pylon. Refer to **Section 11.2~~11.2~~** for the alternative designs for the pylon structures to be used. The pylons have a maximum footprint on the ground of approximately 15m × 15m (225m^2) when built.

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3.3.6 Electric and Magnetic Fields

The electric field is invisible and is generated by the voltage on a conductor. The field is at its maximum close to the conductor. The magnetic field, also invisible, is generated by the current flowing in the conductor. Its intensity drops the further one moves away from the conductor.

Apart from the magnitude of the voltage and current applied to a conductor, the intensity of the electric and magnetic fields (EMF) depends on the height of the conductors above ground and, in the case of a three-phase Transmission power line, also the spacing between the conductors. A power line that is energised at a certain voltage but does not carry a load current will generate an electric field, but no magnetic field[2].

Every power line has a certain impact in terms of electric and magnetic fields (non-ionised) and some ionised effects, such as audible noise and radio noise. The focus is on the behavior of the field effects caused by the conductors at the lowest positions of spans, which are mainly situated in the middle between consecutive suspension pylons. The voltage, power line loading, and the location of the Transmission power line as well as ambient climatic factors are considered during the analysis of parameters.

2 This is a similar situation to where a lamp is plugged in and switched on at the wall, but the lamp itself is not switched on. Because no current is flowing, the lamp is not burning and no magnetic field will exist in its vicinity. When home appliances are in an operating state, electric and magnetic fields will be generated in the close vicinity of the appliance and its power cord.

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Eskom Transmission has adopted a maximum L50 wet audible noise limit of 53.1 audible decibels (dBA) at the edge of the 55m servitude and a value of 42dBA as the L50 fair weather limit at the servitude boundaries.

The following parameters are involved in the specification of radio noise limits:

- The minimum signal to be protected.
- The minimum acceptable signal-to-noise ratio.
- The reference noise level, 20m from the nearest conductor, during prescribed weather conditions.
- The protected distance – the minimum distance from the Transmission power line at which the signal can be satisfactorily received.

If any 3 parameters are specified, the fourth can be determined.

In line with international approaches, the guidelines for public and occupational exposure to electric and magnetic fields noted by the International Commission on Non-Ionizing Radiation (ICNIRP) are given on **Table 3-1**~~Table 3-1~~. ICNIRP guidelines [5] are endorsed by the South African Department of Health. A basic restriction needs to be adhered to while applying these electric and magnetic field guideline levels. This restriction was set at no more than 2mA/m^2 current density to be induced in the body of a human being, either as a result of the electric field, the magnetic field or as a result of the combination of the electric and magnetic fields.

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Table 3-1: Electric and Magnetic Fields exposure reference levels (ICNIRP, 2006*)

EXPOSURE CHARACTERISTICS	ELECTRIC FIELD STRENGTH (kV/m) r.m.s	MAGNETIC FLUX DENSITY (µT) r.m.s
Occupational	10	500
General Public	5	100

** Please note that ICNIRP suggested changes in 2010, which Eskom is still studying before deciding what would be the best practice that would be acceptable from an international point of view (other utilities, World Health Organization, South African Health Dept). A joint workshop is schedule in 2011.*

The corona and EMF limits observed by Eskom Transmission are summarised in **Table 3-2**~~Table 3-2~~. These limits are based on the assumption that the servitudes will be free from any dwellings or industrial sites.

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Table 3-2: Observed Corona and EMF Limits

AUDIBLE NOISE	42dBA at the servitude boundaries for an L50 dry conductor at 1.8m above ground.
	53.1dBA at the servitude boundaries for an L50 wet conductor at 1.8m above ground.
RADIO NOISE	72dB above 1µV at 500kHz at the servitude boundaries for an L50 wet conductor.
ELECTRIC FIELD	10kV/m at 1.8m above ground level but within the servitude boundaries; 5kV/m at the servitude boundaries.
MAGNETIC FIELD	No Eskom limit; the ICNIRP recommendation of emitting less than 100µT at the servitude boundaries at 1.8m above ground is observed.

According to Empetus CC (2006), electric fields created in the vicinity of overhead power lines depend on the voltage on the line, the tower configuration and the conductor height above ground. Magnetic fields created in the vicinity of overhead power lines depend on the current flowing on the line, the tower configuration and the conductor height above ground.

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Typical electric and magnetic field profiles associated with these designs are indicated in ~~Figure 3-4~~Figure 3-4 and ~~Figure 3-5~~Figure 3-5. For the EMF calculations, the lowest conductor was kept at 13m above ground for all configurations considered.

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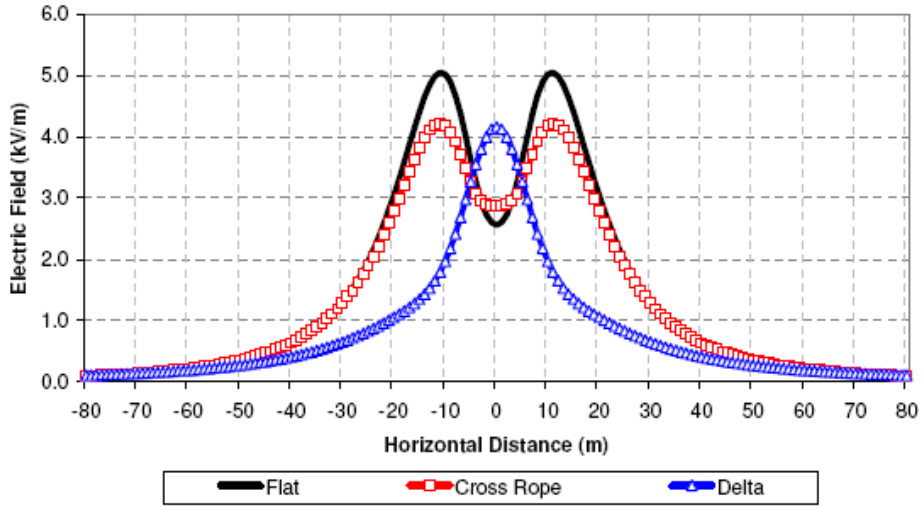

Figure 3-4: Typical Electric Field Profile for a 400kV Transmission Power Line

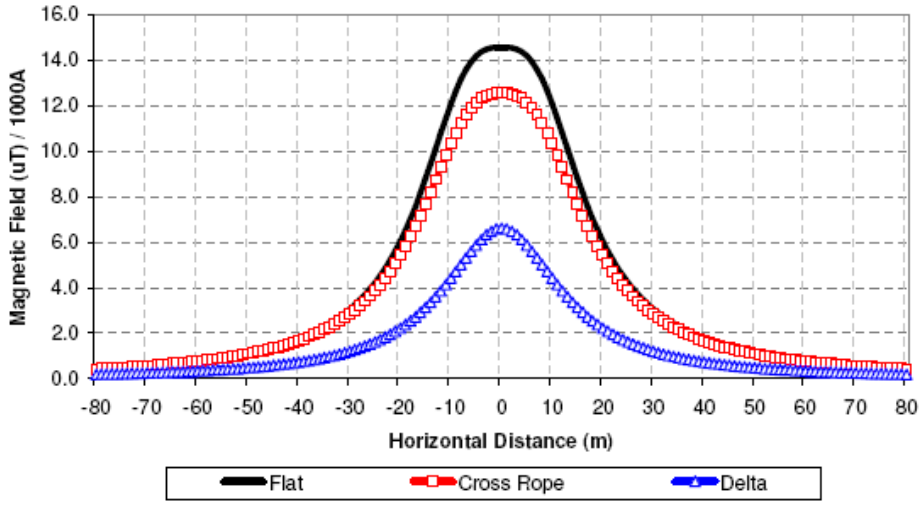

Figure 3-5: Typical Magnetic Field Profile for a 400kV Transmission Power Line

The magnetic field profiles in all cases were calculated for a power line current of 1 000A. Because the magnetic field is directly proportional to the line current, the field value can easily be scaled up or down for different loads on the Transmission power line. The zero metre mark (0m) indicates the centre of the Transmission power line.

Different tower configurations present different field profiles. Thus, this is used as a technique in the design of overhead Transmission power lines to arrive at the lowest and desired field levels in the vicinity of a Transmission power line. It should be noted that

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electric and magnetic field levels are not the main consideration in the design of an overhead power line, but that other parameters related to the geometry (conductor type, placement of shield wires and phase spacing, for example) play a significant part in the design of the Transmission power line in order to optimise its electrical performance and to minimise cost.

3.4 SERVITUDE AGREEMENT

The servitude width required to accommodate the towers on which the Transmission power line will be strung varies from 40m to 55m wide, depending on the type of pylon tower required. The servitude is required in order to ensure safe construction, maintenance and operation of the Transmission power line and Eskom will be entitled to unrestricted access.

For safety reasons, the Transmission power line requires minimum clearance distances, which are summarised as:

- The horizontal clearance to cater for Transmission power line swinging in adverse climatic conditions.
- The minimum vertical clearance distance between the ground and the Transmission power lines is 15m.
- The minimum vertical clearance to any fixed structure that does not form part of the Transmission power line is 0.4-11m.
- The maximum operational height under the tower conductors is 5.5m.
- Most farming activities can be carried out under the conductors, provided that there is adherence to safe working clearances, building restrictions and restrictions to certain crop types, e.g. tree crops.

Comment [BG1]: Kentridge, we still don't know how much clearance is required

Registration of the servitude gives Eskom the right to erect, operate and maintain the Transmission power lines and access the land to carry out such activities, but it does not constitute full ownership of the land. In turn, access and the activities must be carried out with due respect to the affected landowners. The servitude required for the project will be registered at the Deeds Office and will form part of the title deed of the relevant properties once the environmental authorisation has been obtained.

In areas where there is existing Eskom (Transmission or Distribution) infrastructure, the servitudes will be recycled to a maximum 55m width, depending on the type of pylon tower required.

3.5 LAND OWNER CONSENT

According to Section 16(1) of the EIA Regulations (2006), consent must be obtained from the land owner, where the applicant does not own that land. However, only notification is required for the landowners that are affected by a linear development. Therefore, a land owner consent form must be obtained for the alternative locations of the Mitchell's Plain Substation.

Land owner consent is thus required from the following stakeholders:

- Mitchell's Plain Substation Alternative 1 – Stock Road Community Trust.

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- Mitchell's Plain Substation Alternative 2 – Shoprite.
- Mitchell's Plain Substation Alternative 3 – Western Cape Department of Public Works and Transport.
- Switching Station – Power Cape Developments (Pty) Ltd.

4. Landowner Consent forms has been received for the Switching Station and Mitchell's Plain Substation Alternative 3 properties (see Appendix G). However, numerous attempts have been made to obtain landowner consent forms for the Mitchell's Plain Substation Alternatives 1 and 2. Refer to Appendix G for proof of these attempts. It is understood that the EIA Regulations (2010) require that the landowners are contacted and made aware of the EIA process for the proposed project. Therefore, even though this EIA process is undertaken in terms of EIA Regulations (2006), the landowners have been contacted and made aware of the EIA process (see Pre-Application Meeting with the DEA
5. Post-Application Meeting with the DEA
6. Approval of the Scoping Phase

Appendix B~~Appendix B~~ for the respective landowners).

3.6 STUDY AREA OF PROJECT

The original study area of the project extends from the existing Firgrove substation (near Somerset West) to the proposed location of the Mitchell's Plain substation. The central focus of the infrastructure in the study area is the N2 National Road (N2) from the Macassar off-ramp to the Mews Way off-ramp.

At a public open day held in Firgrove on 7 May 2010, an I&AP suggested a further route alignment alternative that was not part of the original study area. The additional study area is from the proposed Mitchell's Plain Substation Alternative 1 (north of Mitchell's Plain) to the existing Stikland Substation as opposed to the proposed route to the existing Firgrove Substation (see **Figure 3-6**~~**Figure 3-4**~~). After further analysis on the technical feasibility of the route, the expanded study area was added to this on-going EIA process. See **Figure 3-7**~~**Figure 3-5**~~ for the locality map of the expanded study area.

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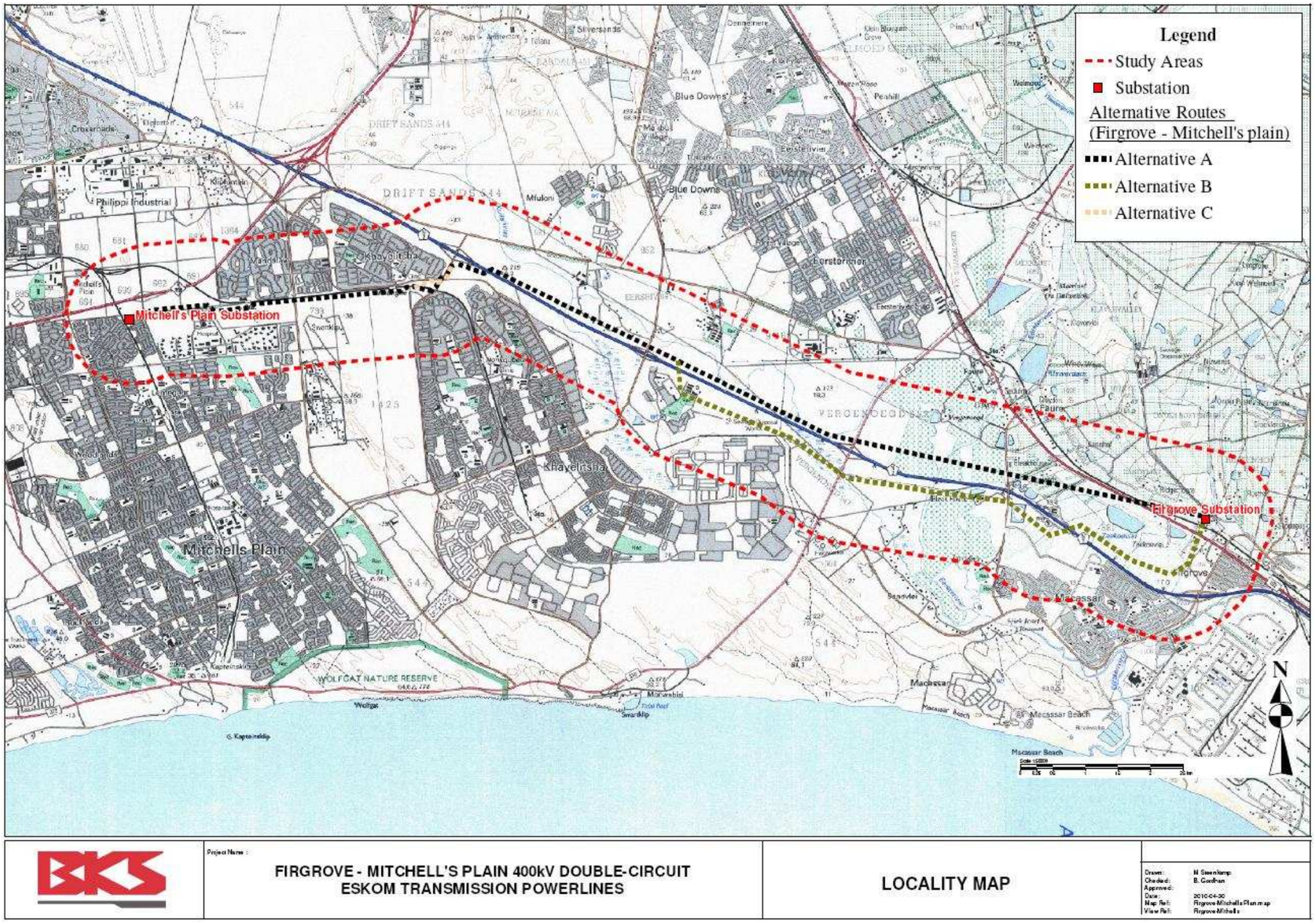

Figure 3-6: Locality Map of the original study area for the Firgrove-Mitchell's Plain project

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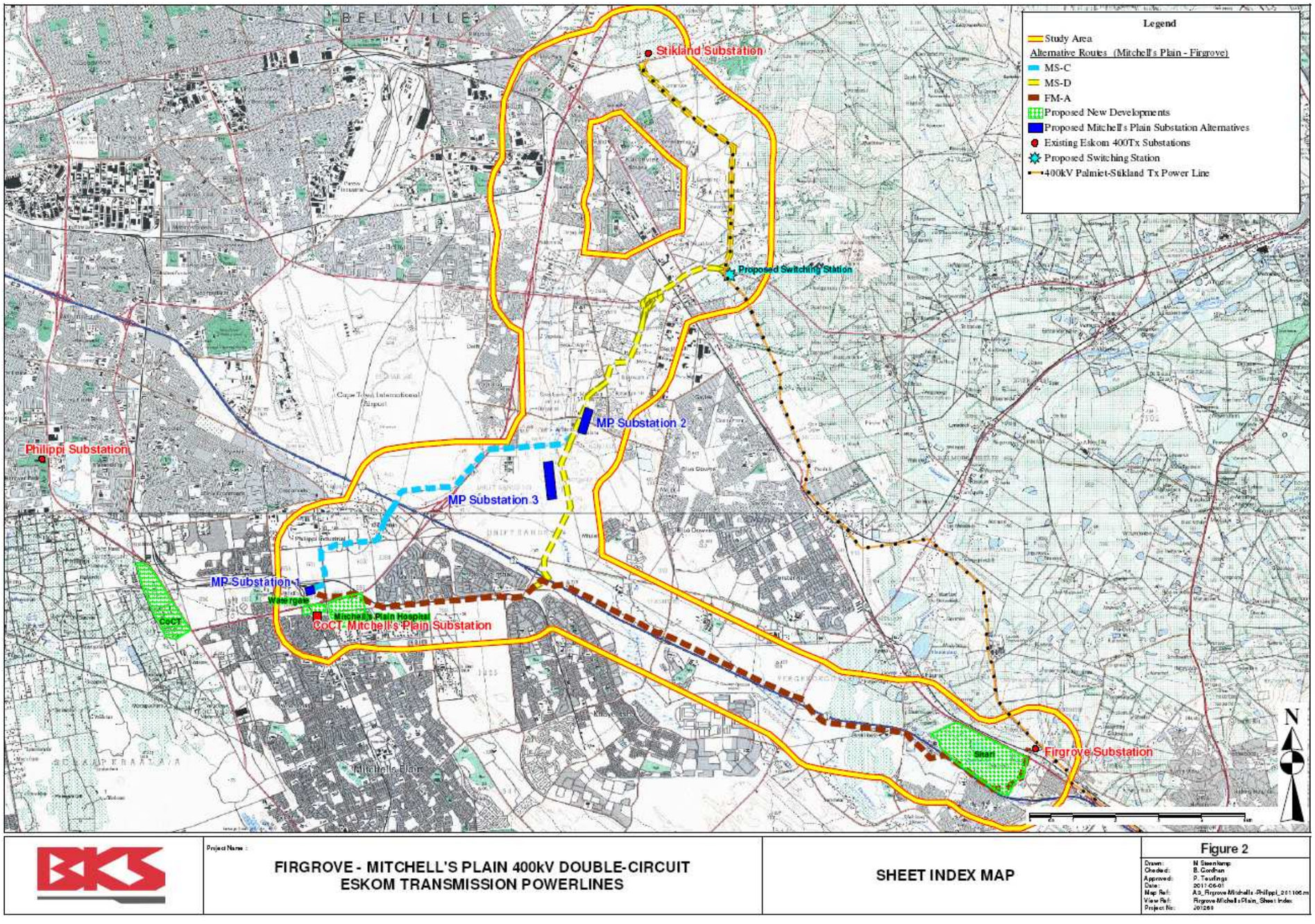

Figure 3-7: Locality Map of Expanded Study Area for Firgrove-Mitchell's Plain Project

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3.7 CONSTRUCTION PROCESS

3.7.1 Construction Camp

The Contractor will require a site office/yard for the duration of the contract period. The entire construction workforce is unlikely to be accommodated in a construction camp that will be situated at a point along the recommended route alignment (Figure 3-8~~Figure 3-6~~). Aspects such as access to the construction site, access to services and access to materials will be considered for the location of the construction camp.

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The Contractor's site camp shall be located within the development footprint, or on a site appropriately zoned and/or authorised for such use and approved by the ECO. The Contractor shall select a location that has easy access and which has already been cleared or disturbed by previous human activity (e.g. previous construction camps or stockpile areas). All construction activities, materials, equipment and personnel will be restricted to within the area specified. The site camp may not be located on any of the environmentally sensitive areas, such as nature reserves, Critical Biodiversity Areas (CBAs) or wetlands.

The various teams will travel from the construction camp to the construction site each day, which means that the teams may have to travel further to the site as they move along the alignment, if the site is situated in the middle of the recommended route alignment. All materials are stored at the construction camp, with the exception of concrete and the steel towers (which may come direct from the factory).

Generally, in a rural area there is one construction camp per 100km of Transmission power line. Therefore, only **one construction camp** will be used for the construction of this proposed project and the Mitchell's Plain-Philippi project.

Figure 3-8: Typical Construction Camps

3.7.2 Construction Process for Transmission Power Line

The construction process in Table 3-3~~Table 3-1~~ will be followed for the entire route of the new Transmission power line. Activities will be done in steps so that, at any point, an observer will see a chain of events with different working teams involved. At any time, some or all of the different teams may be working at different points along the line. Construction of this line will take approximately 12 months to complete, and is anticipated to begin before the end of 2012.

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Table 3-3: Construction Process for Transmission Power Lines

	ACTIVITY	APPROXIMATE TEAM SIZE	APPROXIMATE DURATION OF ACTIVITY
1	Survey of the route	By air	-
2	Determination of the conductor type and selection of best-suited conductor, towers, insulators and foundations • Define final centre line • Determine the co-ordinates of each bend in the line • Undertake an aerial survey to obtain an accurate profile of the area • Identify optimal tower sizes and positions	-	-
3	Final design of power line	-	2-3 months
4	Issuing of tenders and award of contract to construction companies	-	3-6 months
5	Find suitable location for the Construction Camp	-	1 week
6	Vegetation clearance centre line (light vehicle access is required) • Clear shrubs and trees (as determined by the Environmental Management Plan) along the centre line, with the aid of a surveyor • Undertake vegetation clearing (only trees and shrubs will be cleared – grass and forbs will not be cleared in order to minimise further disturbance and potential erosion) in accordance with the minimum standards to be used for vegetation clearing for the construction of the proposed Transmission power lines	5-15	1-2 days, depending on local conditions
7	Centre line pegging and identification of requirements and locations for the new gate (light vehicle access required)	3	1 day
8	Access negotiations (light vehicle access is required) • Develop and agree on an access plan (Eskom, Contractor and landowners) • Agree to rehabilitation process • Take photographs of pre-construction conditions off-site • Establish access roads (where required)	1	1 day
9	New gate installation (light vehicle access is required)	5	1 day
10	Vegetation clearance (tower positions) • Clear four strips (40m × 40m square for Cross Rope Suspension (CRS) towers and a 20m × 20m area for the self supporting towers) for assembly and erection at each marked tower position	5-15	1-2 days depending on local site conditions
11	Foundation nominations for main structure and anchors (heavy vehicle access is required) • Check soil types to determine foundation requirements • Dig trial pits at main foundation points (usually using mechanical back-actor/auger methods, although manual labour may be used)	5	2 days
12	Excavation of foundations (heavy vehicle access is required) • Excavate foundations of up to 4m × 4m and up to 4m deep per pylon footing, depending on soil conditions (mechanically where access to tower sites is readily available, and by hand where access is poor)	15	2 days

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ACTIVITY	APPROXIMATE TEAM SIZE	APPROXIMATE DURATION OF ACTIVITY
• Cover or fence-off the foundation pit until foundation is poured (see ~~Figure 3-10~~~~Figure 3-8~~).		
13 Foundation steelwork – reinforcing (heavy vehicle access is required) • Make up steelwork at base camp and transport it to site by truck • Do fitting and wiring on site (limited welding on-site)	10	2 days
14 Foundation (concrete) pouring (heavy vehicle access is required) • Shuttering • Use of standard concrete truck • Where there are access problems, mix concrete on site • A 28-day period is required after concrete has been laid • Heavy usage of access/service roads during this stage	20	2 days
15 Delivery of tower steelwork (heavy vehicle access; extra long trucks used) • Deliver steelwork in sections and assemble on site (see ~~Figure 3-11~~~~Figure 3-9~~) • Clearly mark access roads to ensure the correct tower is delivered to each site (towers are designed as unique for each location)	5	1 day
16 Assembly team/punching and painting (light vehicle access is required) • Assemble steelwork on the ground • Punch nuts and paint with non-corrosive paint	10	3 days
17 Erection (abnormal-load-vehicle access is required) • Final assembly of towers by cranes (minimum of 50 tons) – see ~~Figure 3-12~~~~Figure 3-10~~.	20	2 days
18 Stringing (abnormal load vehicle access required) • Place cable drums within the servitude • Undertake stringing in both directions (5-10km can be strung from one station) • The working area at each drum will be as long as 130m, but will be within the servitude area • Intensive vehicle activity within the working area is likely • Pilot tractor will lay cable on the ground • Pull up cable using a pulley • Ensure conductors never touch the ground	50	7 days
19 Sag and tension (heavy vehicle access is required) • Tension the line from each station to ensure minimum ground-clearance heights are achieved (8,4m for 400kV Transmission power lines)	10	3 days
20 Rehabilitation (heavy and light vehicle access is required) • Continuous process throughout the construction phase • Typically only commences after the first 100 towers are constructed but, in this instance, will commence after all the towers are constructed • There is a one-year guarantee on the contractor's work, during which rehabilitation must be concluded	5-15	2-10 days depending on local site conditions

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Figure 3-9: Foundation Drilling

Figure 3-10: Cover over Foundations

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Figure 3-11: On-Site Erection of Towers

Figure 3-12: Erection of Towers by Crane

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3.7.3 Construction Process for Proposed Mitchell's Plain Substation

The proposed Mitchell's Plain Substation will be constructed using the following simplified sequence of activities:

Step 1: *Determine technically feasible alternatives*

Step 2: *EIA input into alternative locations for substation and route alignments for the Transmission power line into the substation*

Step 3: *Negotiate with affected landowners*

Step 4: *Survey the site*

Step 5: *Design the substation*

Step 6: *Issue of tenders and award of the contract*

Step 7: *Clear vegetation and construct access roads (where required)*

Step 8: *Construct terrace and foundations, including the Transmission oil pond*

Step 9: *Assemble and erect equipment*

Step 10: *Connect conductors to equipment*

Step 11: *Rehabilitate any disturbed areas and protect erosion-sensitive areas*

Step 12: *Test and commission*

Step 13: *Continue maintenance*

a) Timing

Construction of the proposed Mitchell's Plain Substation will be undertaken over a period of at least 12 months.

b) Access/Service Roads

Eskom requires access/service roads for the construction and maintenance phases. Access to the proposed Mitchell's Plain Substation area and up to the other alternative substations/switching station will be via existing road infrastructure in an urban environment, resulting in no new access roads required for this project.

c) On-going Maintenance

The standard life-span of a Transmission substation and its associated components is approximately 25 years. During this period, on-going maintenance is carried out, and components are replaced, which significantly extends the life-span beyond 25 years.

3.8 ESKOM AGRICULTURAL POLICY

Eskom's Vegetation Management under Power Lines (Vosloo, 2009) has elements that relate to the exercising of agricultural activities under Transmission power lines, and is therefore applicable to this project. There is no specific guidline document that relates directly to the latter.

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Agricultural activities are allowed to be practiced under Eskom Transmission power lines as long as the agricultural crops and equipment do not interfere with the power line infrastructure. Therefore, minimum ground clearance and minimum safe distance to trees/structures according to the particular voltages is presented in Table 3-4~~Table 3-2~~.

Table 3-4: Safe Distance Specifications of Transmission Power Lines (Vosloo, 2009)

VOLTAGE	SERVITUDE WIDTH (M)	GROUND CLEARANCE (m)	SAFE DISTANCE TO TREES (m)
132Kv	31 to 36	6,3	3,8
220Kv	47	6,7	4,2
275Kv	47	7,2	4,7
400Kv	40 to 55	8,1	5,6
765Kv	80	10,4	8,5

Although it could not yet be confirmed, it is doubtful whether Eskom will allow overhead irrigation under Transmission power lines. It would not be possible to do pivot irrigation if the Transmission power line intersects the pivot circle. It is possible that drip and micro irrigation can be exercised under the Transmission power line, but Eskom needs to confirm this in the servitude agreement with the respective landowner (see **Section** 6.6.1~~6.5~~ for the Servitude Negotiation Process).

The servitude width required to accommodate the towers on which the Transmission power line will be strung varies from 40m to 55m wide, depending on the type of pylon tower required. The servitude is required in order to ensure safe construction, maintenance and operation of the Transmission power line and Eskom will be entitled to unrestricted access.

Eskom will need to use existing access/service roads for the construction and maintenance of the Transmission power lines. However, where the former does not exist, the access/service road will be negotiated with the specific landowner.

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4 DESCRIPTION OF ALTERNATIVES

4.1 INTRODUCTION

> *"Alternatives are different means of meeting the general purpose and need of a proposed activity. The identification, description, evaluation and comparison of alternatives are important for ensuring the objectivity of the assessment process. In cases where there is no objective and thorough assessment of alternatives, the EIA process usually only confirms a chosen activity and the value of the assessment as an input to a decision-making may be compromised"*
>
> (DEAT Guideline 5, 2006c).

The various alternatives have been determined and screened based on specialist planning, environmental, social, engineering and economical inputs during the Scoping Phase.

The following alternatives will be assessed:

- Macro Alternatives
  - No Development
  - Demand Side Management
- Design Alternatives
  - Underground Transmission Power Lines
  - Recycling Of Existing Servitudes
  - Pylon Structure Types
  - Substation Designs
- Technical Alternatives
  - Location Alternatives
  - Route Alternatives

4.2 MACRO ALTERNATIVES

4.2.1 The "Do Nothing" Approach

The DEA stresses that the "Do Nothing" approach should be considered in cases where the proposed activity will have a significant negative impact that cannot be avoided and/or effectively or satisfactorily mitigated.

The "Do Nothing" approach necessitates that the construction of the proposed Mitchell's Plain-Philippi project should not be undertaken. If the aforementioned scenario transpires, there will not be a link between the new Mitchell's Plain Substation and the existing Philippi Substation, resulting in Eskom being unable to feed the CoCT with a second 400kV injection to its supply network. The Philippi Substation will come under additional strain to feed the CoCT, and will not have additional space available to upgrade its infrastructure. Without the new intake point, further load growth in the area of the Cape Peninsula, encompassed by Hout Bay, Wynberg, Mitchell's Plain and Cape Point and any new development would have to be stopped. The current approved SDF and IDP would have to

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be re-investigated with a limited electricity supply and would probably have to exclude the proposed new developments, such as the development proposed adjacent to Vanguard Drive, and infill areas (e.g. at the corner of Highlands Drive and Eisleben Avenue. The development proposed in this EIA is thus critically important to the continued security of the electricity supply within the CoCT.

Demand side management initiatives (**Section 4.2.2**) will moderate electricity demand to some extent but would not avoid the need for the additional intake point or the need to augment the existing bulk supply capacity.

As a cumulative effect, the air quality of the study area may decrease as a result of the populace of CoCT that live in low-income communities within the study area being forced to seek alternative and often less-sustainable means of acquiring light and warmth. This could lead to a further decrease in the social fabric of the study area as a residual effect. The reduced capacity of the CoCT to distribute electricity within the area would result in more industries within the area being without power, further reducing the economic activities and potential growth of the area.

The "Do Nothing" approach will illustrate the implications of the proposed activity not being authorised and will be used as a *status quo*, against which the other alternatives will be assessed.

4.2.2 Demand Side Management

Demand side management is a task undertaken by Eskom in order to reduce the amount of electricity used during peak periods. This can be attained by the reduction of peak demand and "load shedding". However, this alternative cannot be assessed further as load shedding is already undertaken by Eskom since 2008, and this would not be able to provide the Cape Peninsular CLN with the necessary power supply as described in **Section 3.2~~3.2~~**.

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4.3 DESIGN ALTERNATIVES

4.3.1 Underground Transmission Power Lines

A design alternative of burying Transmission power lines as opposed to overhead power lines in excess of 132kV is currently technically not feasible in South Africa. This would entail an excavation as wide as a 12-lane highway and 1.5m deep to allow for the spacing required to avoid overheating. Trees or shrubs would also be prohibited on or within a specified buffer due to root invasion. Excavation in the servitude would be restricted to 0.5m deep. In addition to a significantly greater impact (except visual intrusion), underground power lines are significantly more costly to construct and maintain. Refer to **Appendix D~~Appendix D~~** for more information on this subject.

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4.3.2 Recycling of Existing Servitude

This design alternative was only identified during the EIA process. It had become evident that there was not much space available for the acquisition of a new servitude. Therefore, the re-use of existing servitudes was considered.

Eskom Transmission could share the servitude with Eskom Distribution, and was considered as part of this EIA process. The sharing of servitudes with the City of Cape Town and other

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non-electricity providers (such as SANRAL, Provincial and Local Department of Roads) was not considered. The negotiations between Eskom Transmission and these entities would need to happen outside of this EIA process.

This design alternative entails the re-use of the existing power line servitude (owned by Eskom Transmission and Eskom Distribution) for the proposed Firgrove-Mitchell's Plain project. This would ensure that a completely new servitude would not be required but rather the expansion of the existing servitude of the required 40m-55m, depending on the type of pylon. It is understood that the minimum existing servitude width is 15.5m for 66kV Distribution power lines. These will need to be expanded in order to accommodate a multiple circuit line.

In order to recycle the existing power lines, a temporary by-pass would need to be constructed to place the existing power lines on. Once the new pylons (that caters for the latter as well) are constructed, the existing power lines will be placed on the new pylons and energised accordingly. This ensures that the existing power line routes will not be switched off for required period of construction of the proposed 400kV Transmission power line pylon towers.

4.3.3 Pylon Tower Structures

Different types of pylon towers shall be considered for the proposed development. Different pylon tower types have different impacts on the land use. The following alternative pylon structures (**Appendix C~~Appendix C~~** contains detailed drawings) were considered:

- Self-supporting Tower (**Figure 4-1~~Figure 4-1~~**);
- Braced Post Monopole (**Figure 4-2~~Figure 4-2~~**).
- Conventional V-String Monopole (**Figure 4-3~~Figure 4-3~~**).
- Braced Post Twin (Vertical) Pole (**Figure 4-4~~Figure 4-4~~**).
- Twin (vertical) Pole with Flat Circuit Configuration (**Figure 4-5~~Figure 4-5~~**).
- Twin (inclined) Pole with Flat Circuit Configuration (**Figure 4-6~~Figure 4-6~~**).

The types of pylon towers to be used along the recommended route alignment of the Transmission power line are determined based on the following criteria:

- Space available to construct and maintain the servitude for a 400kV Transmission power line.
- Horizontal distance between two pylon towers.
- The type of pylon towers adjacent to its horizontal axis.
- The angle created on its horizontal axis by the adjacent pylon towers.

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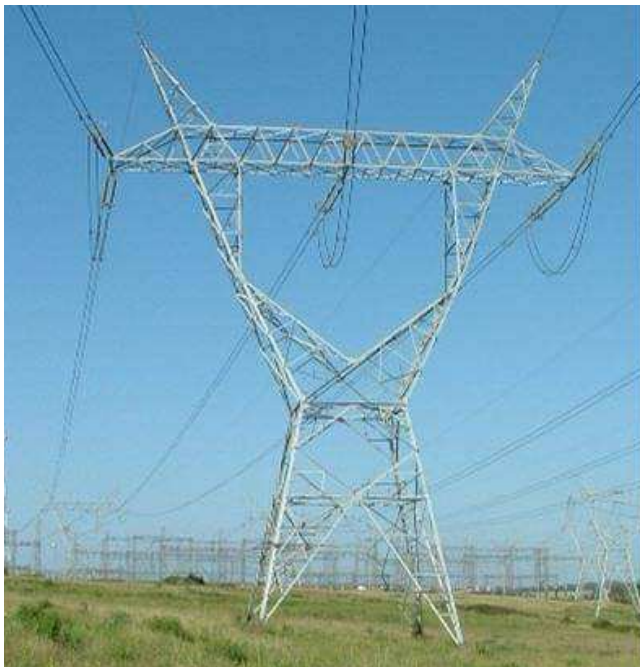

Figure 4-1: Self-supporting Tower

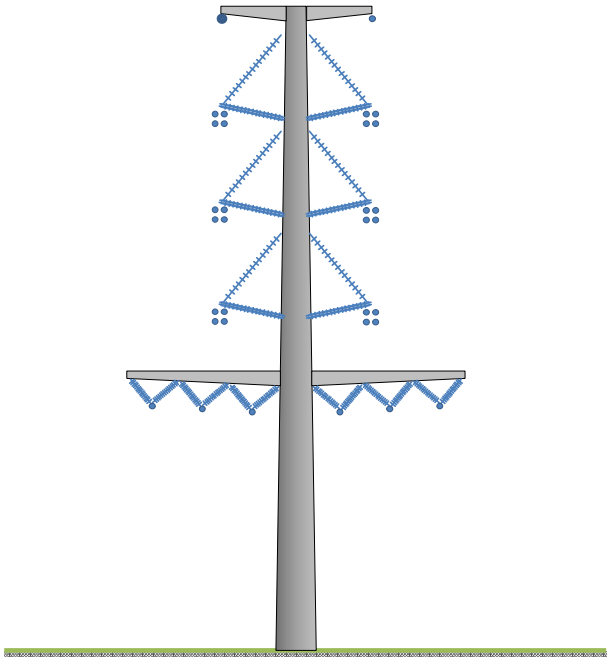

Figure 4-2: Braced Post Monopole

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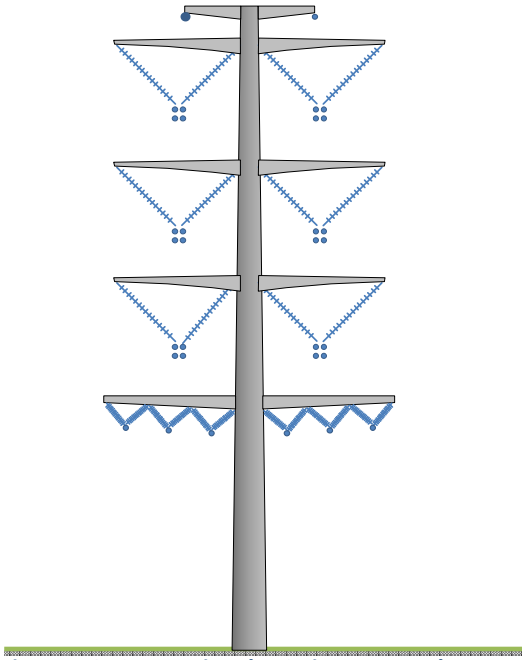

Figure 4-3: Conventional V-String Monopole

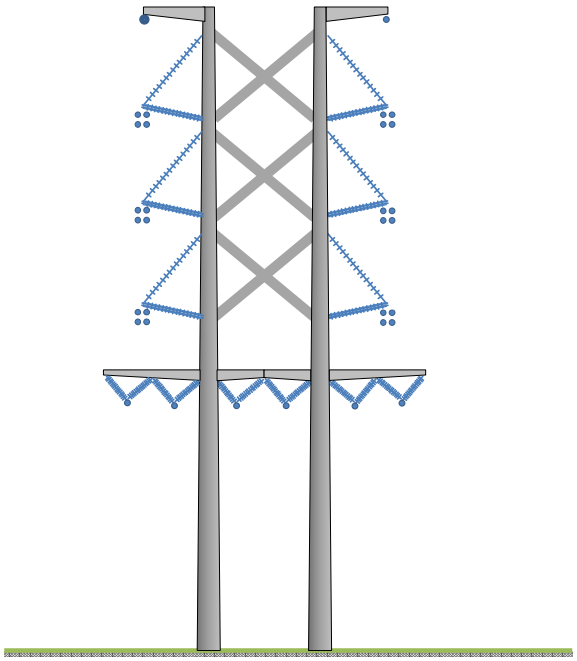

Figure 4-4: Braced Post Twin (Vertical) Pole

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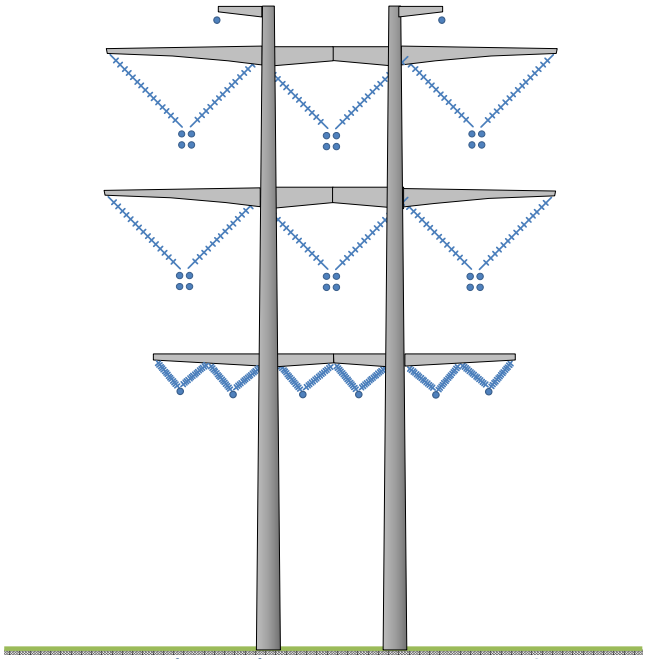

Figure 4-5: Twin (vertical) Pole with Flat Circuit Configuration

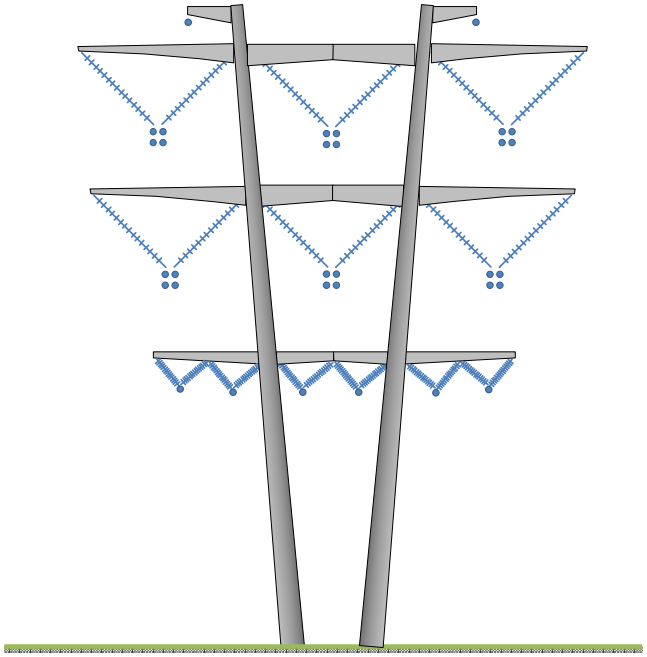

Figure 4-6: Twin (inclined) Pole with Flat Circuit Configuration

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4.3.4 Substation Designs

Substations are classified according to the type of insulation medium. Eskom widely uses the following types of substations:

- Air Insulated Substations.
- Gas Insulated Substations, with sulphur hexafluoride (SF_6).

a) Air Insulated Substation

Air Insulated Substations' components use air as an insulation medium. Air has inferior dielectric strength compared to Gas Insulated Substations and, as a result, the clearances between the active parts and non-active parts are very large compared to Gas Insulated Substations. The components used to build an Air Insulated Substation are exposed to open air and pollution. An example of a typical Air Insulated Substation is shown in Figure 4-7~~Figure 4-7~~.

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Figure 4-7: A Typical Air Insulated Substation

b) Gas Insulated Substation

A Gas Insulated Substation is a compact, multi-component assembly enclosed in a ground metallic housing, where the primary insulating medium is compressed SF_6 gas. SF_6 has superior dielectric characteristics compared to air. This reduces the clearance distance between active and non-active parts of a Gas Insulated Substation. The gas is compressed in ducts at a certain pressure. A Gas Insulated Substation is assembled from standard equipment components, which are much smaller than the same components for an Air Insulated Substation and, as a result, uses less space. It generally consists of the following components:

- Busbars
- Circuit Breakers
- Disconnecting switches
- Earthing switches

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- Current transformers
- Voltage transformers
- Cable

An example of a typical Gas Insulated Substation is shown in ~~Figure 4-8~~~~Figure 4-8~~ and the typical layout of the single phase modules used to assemble the Gas Insulated Substation is shown in ~~Figure 4-9~~~~Figure 4-9~~.

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Figure 4-8: A Typical Gas Insulated Substation

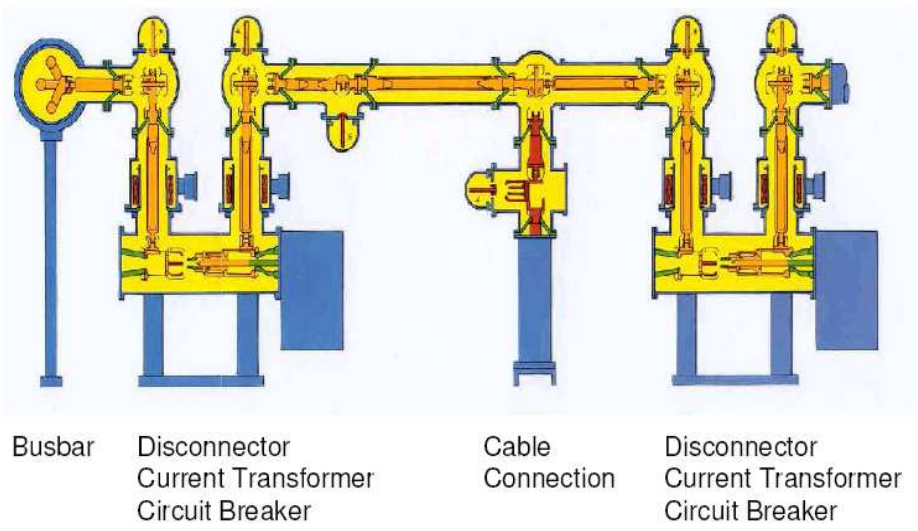

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Figure 4-9: Typical Single Phase Modules Used to Assemble a Gas Insulated Substation

4.4 TECHNICAL ALTERNATIVES

4.4.1 Location Alternatives

This section will detail the alternative proposed sites for the location of the Mitchell's Plain Substation, as shown in the locality map (Figure 3-7~~Figure 3-5~~).

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a) Mitchell's Plain Substation Alternative 1

Figure 4-10~~Figure 4-10~~ shows the location of the Mitchell's Plain Substation Alternative 1. The site is located on Portion 10 of the Cape Farm 693. This 14ha site is bounded by railway lines to the north and west, by Stock Road to its east and the R300 to its south. In addition, the existing CoCT Mitchell's Plain Substation is located to the south of the R300, opposite the proposed Eskom Mitchell's Plain Substation.

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Figure 4-10: Mitchell's Plain Substation Alternative 1

b) Mitchell's Plain Substation Alternative 2

Alternative 2 for the proposed Mitchell's Plain Substation is north of the Driftsands Nature Reserve (DNR) (Figure 3-6~~Figure 3-4~~). The area under investigation for the location of the Mitchell's Plain Substation Alternative 2 (shown in Figure 4-11~~Figure 4-11~~) is situated west of the suburb of Silversands on either side of Hindle Road. The Silversands Primary School is situated north of the area under investigation. The site is located on Portion 6 of the Farm Bardale 451.

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Figure 4-11: Mitchell's Plain Substation Alternative 2

c) Mitchell's Plain Substation Alternative 3

Alternative 3 for the proposed Mitchell's Plain Substation is within the DNR (Figure 3-6~~Figure 3-4~~) along its northern boundary. The area under investigation for the location of the Mitchell's Plain Substation Alternative 3 (as shown in Figure 4-12~~Figure 4-12~~) is opposite the Mfuleni settlement and to the west of the Kuils River. The site is located on the remaining extent of Portion 1 of the Farm Driftsands 544.

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Figure 4-12: Mitchell's Plain Substation Alternative 3 (north)

Due to developmental pressures along the R300, it is assumed that the DNR will be used for residential development in the foreseeable future. In addition to the fringes of the site being partially degraded, it is part of limited open undeveloped land within the study area.

As part of the earlier investigations, two sites within this area of investigation were earmarked to be separate alternative locations for the Mitchell's Plain Substation. However, due to their proximity to each other and the required size of a substation site (350m × 350m, or 12.25ha), they were merged into a single area of investigation.

Therefore, the second location alternative within Alternative 3 (see Figure 4-13~~Figure 4-13~~) was eliminated for further consideration in the EIA Phase. Consideration will be given to movement of the proposed site closer to the Medical Research Facility along its northern boundary.

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Figure 4-13: Mitchell's Plain Substation Alternative 3 (south)

d) Mitchell's Plain Substation Alternative 4

Alternative 4 of the proposed Mitchell's Plain Substation is located on a 6.73ha open space area south of the R300, and is enclosed on all other borders by low-income formal residential settlement. ~~Figure 4-14~~~~Figure 4-14~~ is taken from the alternative area's northern boundary, which is along the R300.

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Figure 4-14: Mitchell's Plain Substation Alternative 4

Due to the space constraints at this proposed site for the construction of the substation, as well as the placement of the power lines entering and exiting the substation, this alternative position was dismissed as unfeasible from a technical point of view. In addition, there seemed to be an isolated wetland system and a habitat for avifaunal activity, which was spotted during the site visit in March 2010.

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4.4.2 Route Alternatives

Three route alternatives were investigated for the Firgrove-Mitchell's Plain project route alignments, namely:

1. **Route alignment FM-A** runs from the existing Firgrove Substation, adjacent to and north of the N2 for a distance of approximately 12.5km to the point where the R300 intersects the N2 (referred to as FM-Ab), then follows the railway line to the Mitchell's plain substation for approximately 6km through the Khayelitsha area (referred to as FM-Aa). **Route alignment FM-A is shown as a brown dashed line in Figure 3-6~~Figure 3-4~~.**
2. **Route alignment MS-C** starts at the proposed Mitchell's Plain Substation Alternative 1, crosses the N2 to the west of the intersection with the R300, traverses through an existing electricity servitude through the Delft area, traverses the northern boundary of the Driftsands Nature Reserve (DNR) and connects with the Mitchell's Plain Substation alternatives 2 and 3. Thereafter, the alignment traverses northward to the existing Stikland Substation passing along the Kuils River wetland and to the west of the Kuils River suburb. There is a deviation proposed for this alignment in order to connect to Route Alignment MS-D along the Stellenbosch Arterial Road, which will form part of this investigation. **Route alignment MS-C is shown as a blue dashed line in Figure 3-6~~Figure 3-4~~.**
3. **Route alignment MS-D** starts as a deviation from route alignment FM-A at the Mew Way interchange. The proposed alignment connects with the Mitchell's Plain Substation alternatives 2 and 3 and route alignment MS-C (referred to as MS-Da). Thereafter, the alignment traverses northward to the proposed Switching Station (referred to as MS-Db). The alignment from the switching station to the existing Stikland Substation passes to the east of the Kuils River suburb and the Zevenwacht farm (referred to as MS-Dc). **Route alignment MS-D is shown as a yellow dashed line in Figure 3-6~~Figure 3-4~~.**

The following changes to the route alignments were proposed during the EIA Phase:

- Route alignment B, was a deviation proposed from route alignment FM-A of approximately 4km to the south of the N2. The deviation started to the east of the Baden Powell interchange and crossed the N2 to join route alignment FM-A to east of the filling stations located on either side of the N2. This alignment was presented to avoid the Vergenoegd Wine Estate, agricultural lands, vineyards and proposed developments to the north of the N2 in this area. Route alignment B was shown as a green dashed line in **Figure 3-7~~Figure 3-5~~**.
- Route alignment MS-C went through the DNR. Therefore, the deviation proposed that this route alignment follows existing power line servitudes in order to avoid the core area of the DNR. Therefore, the re-aligned alignment now crosses the R300 approximately 1km north from the original crossing and runs along the north of the boundary of the DNR.
- The western section of the study area from the Mitchell's Plain Substation Alternative 2 to the existing Stikland Substation has severe space constraints. Therefore, the route alignment MS-C that runs from the Mitchell's Plain Substation Alternative 2, across the Kuils River, Hindle Road and Stellenbosch Arterial Road, along the R300 and meets up

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with the Stikland Substation along Bottelary Road, has not been considered further in this EIA Report.

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5 LEGISLATION AND GUIDELINE DOCUMENTS

5.1 INTRODUCTION

Section 24(C) of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, indicates that the

"*Minister of Water and Environmental Affairs, or an organ of state with delegated powers, is the Competent Authority in the following circumstances and should be submitted to national DEA for review:*

- *Implications for national environmental policy or international environmental commitments or relations.*
- *Takes place within an area where South Africa has international environmental obligations, such as international conventions, except for any area falling within the sea-shore, a conservancy, a protected natural environment, a proclaimed private nature reserve, a natural heritage site, or the buffer zone or transitional area of a biosphere reserve or a world heritage site.*
- *Affects an area that crosses either provincial or national boundaries.*
- *Is undertaken, or is to be undertaken, by:*
  - *A national department;*
  - *A provincial department responsible for environmental affairs;*
  - *A statutory body, excluding any municipality, which has been delegated the authority from either a national or provincial department to be responsible for a specific activity or set of activities; or*
  - *Will take place within a national proclaimed protected area or other conservation area under control of a national authority.*
- *When a need for arbitration due to issues specific with respect to a difference or disagreement regarding the protection of the environment in terms of the specific project is considered appropriate."*

Since the applicant (Eskom Holdings Ltd) is a parastatal, the application for a Scoping/EIA process has been submitted to the DEA as the approving authority. The Western Cape Provincial Department of Environmental Affairs and Development Planning (DEADP), the national Department of Water Affairs (DWA) and the Western Cape's Cape Nature will serve as commenting authorities in the EIA process.

5.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management Act, 1998 (Act No. 107 of 1998) [NEMA], as amended, provides a framework for the integration of the environmental management activities of various spheres of government. It promotes integrated management to ensure sustainable resource utilisation and development and requires that the DEA be the lead agent in ensuring effective custodianship of the environment. It also provides that sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning

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procedures, especially where subjected to significant human resource usage and development pressure.

The NEMA principles clearly emphasise the need to protect threatened ecosystems and are binding on all organs of state, including local authorities.

An application for development has to conform to the requirements of the NEMA and the regulations promulgated in terms of Section 24(1) thereof. The regulations promulgated under Section 24(1) are currently listed in GNR No. 385, GNR No. 386 and GNR No. 387 of 6 June 2006. All applications listed in the abovementioned regulations shall be subject to a Scoping/EIA process and will require Environmental Authorisation from the DEA. Section 24(c) of the NEMA prohibits the undertaking of identified activities except by virtue of a competent authority.

Section 23 of NEMA further determines that Integrated Environmental Management should be employed when any policies, programmes, plans or projects are drawn up to minimise the impact on the environment. The duty of municipal officials to prevent pollution and ecological degradation, to promote conservation and secure ecologically sustainable development and use of natural resources, originates from the Constitution and the NEMA.

When the approving authority (the DEA) is satisfied with the proposed development in terms of the NEMA and the EIA Regulations (2006), it issues an Environmental Authorisation for the development. This Environmental Authorisation may include a list of conditions that must be complied with. These conditions must be strictly adhered to, as they are compiled specifically to ensure that adequate mitigating measures will be taken to minimise the negative effects of the development.

The conditions imposed by the Environmental Authorisation would generally include:

- measures to prevent, manage and mitigate environmental impacts to acceptable levels;
- prevention of pollution of water bodies and groundwater;
- a rehabilitation programme for disturbed natural and/or heritage areas;
- appointment of an independent Environmental Control Officer (ECO) to oversee the construction phase and to ensure that the development phase is conducted in an environmentally responsible manner;
- conservation management and visitor management plans; and
- requirements of other authorities, such as the DWA, the Department of Energy, the Department of Mineral Resources and the South African Heritage Resources Agency (SAHRA) and/or relevant provincial authorities.

5.2.1 Activities Applicable to National Environmental Management Act

The construction of the Firgrove-Mitchell's Plain 400kV double circuit Transmission power line, Mitchell's Plain substation and associated infrastructure falls within the ambit of the list of activities (**Table 5-1~~Table 5-1~~**) identified in terms of sections 24(2)(a) and (d) of the NEMA.

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Table 5-1: Listed Activities in Terms of NEMA

NUMBER AND DATE OF THE RELEVANT NOTICE	ACTIVITY NO(S)	DESCRIPTION OF EACH LISTED ACTIVITY
BASIC ASSESSMENT PROCESS		
Section 24 (5) of the National Environmental Management Act, 2006, published under Government Notice No. R. 386, 21 April 2006	1(m)	The construction of facilities or infrastructure, including associated structures or infrastructure for any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including canals; channels; bridges; dams; and weirs.
	4	The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland.
Section 24 (5) of the National Environmental Management Act, 2006, published under Government Notice No. R. 386, 21 April 2006	7	The above-ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site.
	12	The transformation or removal of indigenous vegetation of 3 hectares or more, or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).
	14	The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding - (a) masts of 15 metres and lower exclusively used: (i) by radio amateurs; or ~~(i)~~(ii) for lighting purposes (b) flag poles; and ~~(b)~~(c) lightning conductor poles.
	15	The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity (e.g. national roads) or which are access roads of less than 30 metres long.
	16	The transformation of undeveloped, vacant or derelict land to – (a) establish infill development covering an area of 5 hectares or more, but less than 20 hectares; or (b) residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare
	18	The subdivision of portions of land 9 hectares or larger into portions of 5 hectares or less.
	20	The transformation of an area zoned for use as public open space or for a conservation purpose to another use.
	25	The expansion of or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of emissions, pollution, effluent.

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NUMBER AND DATE OF THE RELEVANT NOTICE	ACTIVITY NO(S)	DESCRIPTION OF EACH LISTED ACTIVITY
SCOPING/EIA PROCESS		
Section 24 (5) of the National Environmental Management Act, 2006, published under Government Notice No. R. 387, 21 April 2006	1(e)	The construction of facilities or infrastructure, including associated structures or infrastructure, for any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in Government Notice No. R. 386 of 2006
	1(l)	The construction of facilities or infrastructure, including associated structures or infrastructure, for the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more.
	2	Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.

Although the Basic Assessment process and Scoping/EIA process are applicable to the proposed development, it has been proposed that a Scoping/EIA process be undertaken. The proposed activity may not commence without an Environmental Authorisation from the DEA.

5.2.2 Applicability of EIA Regulations (2010)

The EIA Regulations (2010) were published in terms of the NEMA and came into effect on 2 August 2010. Sections 75 and 76 of the EIA Regulations (2010) state that an application submitted in terms of the EIA Regulations (2006), and which is pending when the EIA Regulations (2010) take effect, must, despite the repeal of the former, be dispensed with in terms of the former as if they were not repealed. Therefore, the EIA Regulations (2010) are not applicable to this application.

In addition, if an activity that is listed under EIA Regulations (2006) does not form part of the EIA Regulations (2010), the DEA will consider the activity to be withdrawn from the application. As such, the following activities of GNR No 386 of the EIA Regulations (2006) will no longer form part of this application, and will not be carried through to the EIA Phase:

18 The subdivision of portions of land 9 hectares or larger into portions of 5 hectares or less.

20 The transformation of an area zoned for use as public open space or for a conservation purpose to another use.

5.3 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT

5.3.1 Introduction

The National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (NEM:WA) regulates waste management in order to protect human and environmental health by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development. It also provides for national norms and standards for regulating the management of waste by all spheres of government, providing for specific waste management measures for licensing and the control of waste

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management and remediation activities associated with contaminated land. This legislation provides for compliance and enforcement of the above requirements.

An application for development has to conform to the requirements of the NEM:WA and the regulations promulgated in terms of Section 19(1) thereof. The regulations promulgated under Section 19(1) are currently listed in GNR No. 718.

All activities listed in the abovementioned regulations are subject to a Basic Assessment Process for Category A activities, or a Scoping/EIA Process for Category B activities, and require a Waste Management Licence.

Section 20(b) of the NEM:WA prohibits undertaking identified waste management activities except by virtue of a licensing authority. A Waste Management Licence is managed and authorised by the Waste Management Department within the DEA. As such, one integrated EIA Process is undertaken, as prescribed by the NEM:WA, which will also include the waste management activities.

5.3.2 Activities Applicable to National Environmental Management: Waste Act

The construction of the power lines could lead to the relocation of settlements, resulting in the demolition of building structures, which would create building rubble that may require temporary storage of waste on-site. This waste-generating activity could fall within the ambit of the listed activity in Table 5-2~~Table 5-2~~, identified in terms of Section 20 (b) of the NEM:WA.

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Table 5-2: Listed Activities in Terms of NEM: WA

NUMBER AND DATE OF THE RELEVANT NOTICE	ACTIVITY NO(S)	DESCRIPTION OF EACH LISTED ACTIVITY
National Environmental Management: Waste Act (Act No. 59 of 2008): List of waste management activities that have, or are likely to have a detrimental effect on the environment, published under Government Notice 718 of 3 July 2008.	Category A (3) (1)	The storage, including the temporary storage, of general waste at a facility that has the capacity to store in excess of 100m^3 of general waste at any one time, excluding the storage of waste in lagoons.

The Waste Management Licence will only be required if the building rubble amounts to more than 100m^3 and if it is stored in one area for more than 90 days.

Based on the number of properties that may require resettlement (in terms of the recommended route alignment), the amount of rubble may exceed these capacities. However, it will be recommended that the rubble may not be stored in one area for more than 90days. Therefore, this activity will not be applicable to the proposed development, and an application for a Waste Management Licence will not be submitted to the DEA.

5.4 NATIONAL WATER ACT

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) states that water from a water resource may be used by any person for reasonable domestic use; continue using with an existing water use or may use such water in terms of a general authorisation or license issued in terms of the Act. Such water use is broadly defined, and for the purposes of this report, includes the altering of a watercourse, streamflow reduction activities, waste

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discharges and disposals and the removing of water found underground for certain purposes.

The NWA provides for tiered regulatory control over 11 water uses, as identified in Section 21 of the NWA. After providing for the Ecological Reserve and international obligations, the basis for granting authorisation to use the available water quantity and/or quality in an area will be the achievement of beneficial use in the public interest. This is also referred to as optimum use, i.e. use which achieves the most desirable combination of social, economic and environmental objectives, irrespective of whether such use is consumptive or non-consumptive. This includes the erection of towers and related construction activities within riverine and wetland environments.

Thus, a person who wishes to use or who uses water in a manner that is not covered under Schedule 1, General Authorisations, 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 Water Use Licence.

The General Authorisations replaces the need for a water user to apply for a licence in terms of the NWA for the identified water uses provided that the water use is within the limits and conditions in the General Authorisation. These General Authorisations are catchment and water-use specific and should be dealt with on a case-by-case basis.

The NWA also provides for pollution prevention measures, with particular emphasis on water resource pollution. In accordance, the licensee shall ensure that activities impacting upon water resources and effluent releases are monitored for compliance with the applicable regulations. Emergency incidents involving water resources are included in the Act, requiring the polluter to remediate and mitigate the impacts of such an emergency incident.

5.4.1 Water Use Licence Application Process

The Generic Licensing Process highlights seven stages of a Water Use Licence Application. It is a phased approach, which is essential to consider and follow, ensuring that an applicant for a Water Use Licence is assured of the correct process to follow, determines the validity of the application, and the level of detail required for motivation of the water use. Without the phased approach, the applicant runs the risk of expending unnecessary time and effort on aspects not required, or worse, certain critical aspects are missed.

a) Application

Pre-application liaison should take place with the relevant departmental officials and a lead regional office and officer should be identified (in this instance, the Western Cape Regional Offices). Furthermore, the initial formal Water Use Licence application forms must be completed and payment of R114.00 must be made to the relevant regional office to initiate the tracking process for the application.

b) Validation

During the initial contact with the regional office and after submitting the formal Water Use Licence application forms the validity of the application against legal requirements, determining the type of water use authorisation, and checking the completeness of provided information, is also undertaken and confirmed.

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c) Pre-position Information

During this stage, an evaluation is made of the available information and whether this information is sufficient to support the motivation and justification of the water uses applied for.

The above phases are normally captured in an Initial Assessment Report that is submitted to the DWA. The applicant only continues with the next phases after confirmation is received from the DWA.

Based on the feedback from the DWA (and the regional office), a final Integrated Water Use Licence Application can be submitted, incorporating the results of detailed investigations of the potential impacts that the proposed water use could have on the water resources, including Section 27 requirements. If they have changed, the revised formal Water Use Licence application forms should be re-submitted.

5.4.2 Section 27(1) Requirements

The NWA includes considerations set out in section 27(1) that must be applied in the assessment of licence applications for water use. Although the Act states that this is the DWA's responsibility, the applicant should supply at least the minimum information required in terms of section 27(1) to allow the Department to evaluate the application, i.e.:

- The Applicant's Current Water Use Entitlements
- A Description of the Race and Gender Ownership and Control of the Water Use License Applied for
- An Explanation of the Efficient and Beneficial Use of Water in the Public Interest
- A Description of the Socio-Economic Impact of the Issuing or Refusal of the License
- The Strategic Importance of the Water Use to be Authorised
- A Description of the Investments Related to the Water Use Already Made or to be Made
- An Explanation of the Duration of the Undertaking for which the License is Required
- Adherence to the Broad-Based Black Economic Empowerment (BBBEE) Guideline for Section 27 Evaluation

5.4.3 Technical Information in Support of Integrated Water Use Licence Application

To enable the DWA to prepare a Water Use Licence, specific water use details are required. This information should be captured in the formal Water-Use Licence application forms and elaborated on in the initial assessment and final reports. Information such as title deed numbers on which the water use takes place, water abstraction points (co-ordinates), water discharge points (co-ordinates), volume of water abstracted per day as an average and a peak quantity on any day, and water quality of final effluent to be discharged.

Not only should the consumptive use of water be described, but the general management of stormwater, storage of raw materials, disposal of waste material from the construction site and drilling liquid should be described. Best practice should be used as a norm for these management measures.

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5.4.4 Activities Applicable to National Water Act

Construction-related activities will impact upon water resources, thereby requiring the issue of a licence for such activities in accordance to Section 21 of the NWA. The listed activities in terms of the NWA are shown in ~~Table 5-3~~Table 5-3.

Table 5-3: Listed Activities in Terms of NWA

NUMBER AND DATE OF THE RELEVANT NOTICE	ACTIVITY NO(S)	DESCRIPTION OF EACH LISTED ACTIVITY
General Authorisations in Terms of Section 39 of the National Water Act, under Government Notice 26187 of 26 March 2004	21 (c)	Impeding or diverting the flow of water in a watercourse.
	21 (f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit.
	21 (i)	Altering the bed, banks, course or characteristics of a watercourse.
	21 (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.

5.5 National Heritage Resources Act

The National Heritage Resources Act, 1999 (Act No. 25 of 1999) [NHRA] directs the protection and management of the heritage resources in South Africa. This legislation serves as a guideline to the heritage resource management authorities in South Africa, according to which developers and other authorities must exercise discretion or take decisions in terms of this Act. The NHRA applies to the actions of the State, local authorities and private individuals.

National Estate includes, but is not limited to places, buildings, structures and equipment of cultural significance, places to which oral traditions are attached or which are associated with living heritage; historical settlements and townscapes, landscapes and natural features of cultural significance, geological sites of scientific or cultural importance, archaeological and paleontological sites, graves and burial grounds, sites of significance relating to South African history and movable objects.

A variety of formal protection measures, ranging from national and provincial heritage sites, protected areas, provisional protection, inclusion on the heritage register of a province, heritage areas and heritage objects have been included in the NHRA. A number of other protection measures, including the legal protection of paleontological and archaeological sites (including rock art) and meteorites, burial grounds and graves, structures older than 60 years and public monuments and memorials are also in place.

Applicants must contact the South African Heritage Resource Agency (SAHRA) or the relevant authorised provincial agency, Heritage Western Cape (HWC), to ascertain which properties and objects are formally protected by the Act and how any future development would impact on these heritage resources. Applicants should note that formal permit applications or authorisations would be required from the relevant heritage resource management authority to make changes to these heritage resources.

Applicants must note that the provisions of Section 38 of the NHRA provide that they are responsible for contacting the SAHRA at the very earliest stages of initiating a development

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and for furnishing the SAHRA with details relating to the proposed development in order for the SAHRA to determine if a Heritage Impact Assessment (HIA) is required. See **Section 10.6~~10.6~~** for the findings of the HIA. The following activities listed in Section 38 of the NHRA apply to the proposed development:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(c) any development or other activity which will change the character of a site (i) exceeding 5 000m^2 in extent.

5.6 HAZARDOUS SUBSTANCES ACT

The Hazardous Substances Act, 1973 (Act 15 of 1973) provides for the control of substances which may cause injury, ill-health or death to humans by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure, thereby, in certain circumstances, and for the control of certain electronic products. The Hazardous Substance Act further provides for the division of such substances or products into groups in relation to their degree of danger. The Act also provides for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products.

5.7 APPLICABLE ENVIRONMENTAL LEGISLATION

A limited scoping of relevant legislation was undertaken in order to identify only the key legal issues related to the proposed project. Applicable key environmental legislation, which must be considered by Eskom during the implementation of the proposed project is summarised in **Table 5-4~~Table 5-4~~**.

Table 5-4: Summary of Applicable Legislation

LEGISLATION	SECTIONS	RELATES TO:
The Constitution Act (No 108 of 1996)	Chapter 2	Bill of Rights
	Section 24	Environmental rights
	Section 25	Rights in property
	Section 32	Administrative justice
	Section 33	Access to information
National Environmental Management Act (No 107 of 1998) as amended[3]	Section 2	Defines the strategic environmental management goals, principles and objectives of the government. Applies throughout the Republic to the actions of all organs of state that may significantly affect the environment
	Section 24	Provides for the prohibition, restriction and control of activities that are likely to have a detrimental effect on the environment.

3 The EIA Regulations (2010) R543, R544, R545 and R546 may be relevant for certain construction and maintenance activities, such as those that may need to take place in or close to water resources.

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LEGISLATION	SECTIONS	RELATES TO:
	Section 28	Duty of care and remediation of environmental damage. The scheme owner has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care. The duty of care has been amended to include significant pollution or degradation that occurred before the commencement of the NEMA that arises or is likely to arise at a different time from the actual activity that caused the contamination or that arises through an act or activity of a person that results in a change to pre-existing contamination.
	Section 30	Control of emergency incidents. Responsible person's duties relating to reporting and remediation actions regarding emergency incidents. A criminal sanction may be imposed on the responsible person for failure to comply with the reporting requirements and obligations to address any emergency incidents.
Environment Conservation Act (Act 73 of 1989) and regulations	The Act has been substantially repealed by the NEMA. However, there are certain regulations under the Act which are still in operation, such as the National Noise Control Regulations.	
National Environmental Management: Protected Areas Act (No 57 of 2003)	The Act came into operation on 1 November 2004. The aim of the Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes. In 2004, the National Environmental Management: Protected Areas Amendment Act 31 of 2004 was promulgated to amend Act 57 of 2003 with regard to the application of that Act to national parks and marine protected areas. The NEM: Protected Areas Amendment Act was published for public information on 11 February 2005 and came into operation on 01 November 2005. The NEM: Protected Areas Act, as amended by the NEM: Protected Areas Act 31 of 2004 repeals sections 16, 17 & 18 of the ECA as well as the National Parks Act with the exception of section 2(1) and Schedule 1.	
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA)	Sections 65-69	These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species.
	Sections 71 and 73	These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.
Conservation of Agricultural Resources Act (No 43 of 1983) and regulations	Section 5, 6	Implementation of control measures for alien and invasive plant species
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution
	Section 20	Control of emergency incidents
	Section 21	DWA will require water use licences for various construction-related activities.
	Section 26 and 34	Registration of water use regarding the discharging of waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit and disposing of waste in a manner that may detrimentally impact on a water resource.
National Heritage Resources Act (No 25 of 1999)	Section 35	No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site.

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LEGISLATION	SECTIONS	RELATES TO:
	Section 36	No person may, without a permit issued by the South African Heritage Resource Agency (SAHRA) or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority. "Grave" is widely defined in the Act to include the contents, headstone or other marker of such a place, and any other structure on or associated with such a place.
	Section 38	This section provides for Heritage Impact Assessments (HIA), which are not covered under the ECA. The HIA will be approved by the DEA, which is required to take SAHRA's comments into account prior to making a decision on the HIA.
Removal of Graves and Dead Bodies Ordinance 7 of 1925	Authorisation for exhumation and reinternment of human remains must be obtained from the relevant local authority where the grave is situated, as well as where the grave is being relocated to.	
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust
	Section 34	Control of noise
	Section 35	Control of offensive odours
	Chapter 5	Licensing of listed activities
	Schedule 2	Ambient air quality standards
National Environmental Management: Waste Act (No. 59 of 2008)	Section 16	General duty in terms of waste management
	Section 17	Reduction, re-use, recycling and recovery of waste
	Section 20	No person may commence, undertake or conduct a waste management activity, except in accordance with: • the requirements or standards prescribed by said Act and regulations; and • a waste management licence issued in respect of that activity, if a licence is required.
	Section 26	Prohibition of unauthorised disposal of waste
	Section 27	Littering
Minimum requirements for storage, handling and disposal of hazardous waste, DWAF guidelines, 1998	Section 10	Temporary hazardous waste storage: time, volume and other requirements
South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998): **1. Damaging of a National Road**	Section 46(3)	The owners or occupiers of land adjoining any national road must: • take all measures on their land that are reasonably necessary to prevent the occurrence of any damage to the national road concerned. • Refrain from doing or permitting anything on or below the surface of that land which is likely to cause damage to that national road.
	Section 46(4)	The owner or occupier of any land adjoining a national road will be held liable for any damage to the national road which was or reasonably should have been foreseen.
	Section 5(a) and (b)	The Agency may issue a written notice demanding that the owner or occupier prevents or stops any activity that may cause damage to a national road. The demand may include, among others, the removal, filling in, alteration, relocation or establishment of any dam, canal, trench, wall, sluice, pipe, excavation, structure or other works, or the cessation of such an act, on the land.

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LEGISLATION	SECTIONS	RELATES TO:
South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998): **3. Structures and other works on, over or below national roads or certain other land**	Section 48(1)	No person may do any of the following without the Agency's permission: • On or over, or below the surface of, a national road erect, construct or lay, or establish any structure. • Make any structural alteration or addition to a structure situated on or over, or below the surface of a national road. • Give permission for either (a) or (b).
	Section 48(5)	The Agency may give written notice for the removal of any such structure, or may remove the structure and recover the costs from that person.
	Section 48(8)	Any person who contravenes this section is guilty of an offence and liable to one year in prison and/or a fine.
Explosives Act (Act 15 of 2003) and regulations	Provisions for the control of explosives in terms of use, disposal, storage, transportation, dealing, importation, exportation and packaging of explosives.	
Occupational Health and Safety Act (No 85 of 1993) and regulations	General Administration Regulations GN R1449 (Section 7)	Material Safety Data Sheets must be made available at the request of any interested or affected party.
	Section 8	General duties of employers to their employees
	Section 9	General duties of employers and self-employed persons to persons other than their employees
Fencing Act (No 31 of 1963)	Section 17	Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to the protection of flora.
Hazardous Substances Act (No 15 of 1973) and regulations	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances	
Fertilisers, Farm Feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947) and regulations	Sections 3-10	Control of the use of registered pesticides, herbicides (weed killers) and fertilisers. Special precautions must be taken to prevent workers from being exposed to chemical substances in this regard. Workers handling these remedies must also be registered in terms of the Act.
National Road Traffic Act (No 93 of 1996) and regulations	Section 54	Transportation of dangerous goods
National Veld and Forest Fire Act (No 101 of 1998)	Chapter 2	Promotes and regulates the formation of fire protection associations which aim to manage and coordinate fire protection and fire services in an area.
	Chapters 4 & 5	Organisations are required to make and maintain firebreaks and fire-fighting equipment and personnel should a risk exist that a fire may start or spread from the premises.
DEA Integrated Environmental Management	DEA Integrated Environmental Management Information Series (2004): Environmental Management Plans: DEA Guideline on compiling EMPs.	
SANS 1929	Ambient air quality – limits for common pollutants4	

4 Replaced by R1210

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LEGISLATION	SECTIONS	RELATES TO:
SANS 10103	The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication.	
SANS 10128	Bunding of fuel storage tanks	

5.8 APPLICABLE BY-LAWS

~~Table 5-5~~Table 5-5 lists the CoCT by-laws that may be applicable to the proposed development.

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Table 5-5: Applicable By-laws

LEGISLATION	SECTION	RELATES TO
CoCT Air Pollution Control By-Law, GG5979, LA 12649, 4 February 2003	Duty of Care	This section calls upon everybody to exercise duty of care to prevent air pollution from occurring. Pollution must be mitigated to remedy air pollution. Failure to do this may empower the Council to take serious actions against that person.
	Declaration of Air Pollution Control Zone	The whole area within the jurisdiction of the Council is declared an air pollution control zone. The Council has power within the control zone to issue notices in the provincial gazette to prohibit and restrict activities that may pollute air.
	Smoke emissions from premises other than dwellings	Dark smoke may not be emitted for an aggregate period exceeding three minutes during a continuous period of 30 minutes. Installation, alteration, extension or replacing of fuel burning equipment must be authorised by the Council. Operation of fuel burning equipment without the Council's authorisation is an offence. The owner or occupier of premises may be required to install at own costs, the obscuration measuring equipment. Records and monitoring results must be kept and maintained.
	Emissions caused by open burning	Open burning of any material without a written authorisation by the Council is an offence.
	Emissions from compressed ignition powered vehicles	Vehicles using compressed ignition power and emitting dark smoke may not be used.
	Emissions that cause a nuisance	Emissions that cause a nuisance are an offence. An abatement notice may be served on any person who is or is likely to cause air pollution to abate the nuisance, prevent it and comply with conditions set in the notice.
CoCT Water By-Law, Gazette No. 6378, 1 September 2006	Section 10	**Duties of the public** All members of the public, upon becoming aware of any emergency or situation that may give rise to wastage of water or water pollution must, immediately inform the Director: Water.
	Section 14	**Offences and penalties** Any person who contravenes or fails to comply with any provision of these by-laws will be guilty of an offence and may be liable, upon conviction, to a fine.
	Section 18	**Unauthorised use of water** No person may use water from the water supply system without an agreement with the municipality and only through a communication pipe and metered water supply point installed by the municipality.
	Section 42	**Wastage of water** No person may cause or permit the wastage of water such as permitting leaking pipes or insufficient use of water.
	Section 43	**Water conservation and demand management** All consumers of water must comply with good water conservation and

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LEGISLATION	SECTION	RELATES TO
		demand management practices.
CoCT Water By-Law, Gazette No. 6378, 1 September 2006	Section 59	**Prevention of pollution of water** An occupier of premises must prevent the entry of any substance which may be a danger to health or adversely affect the potability of water into the water supply system or any part of the water installation on his/her property.
	Section 62	**Wells, wellpoints, boreholes and excavations** An owner of premises on which there is a well, wellpoint, borehole or any other excavation must ensure that it does not create a health nuisance or is filled in a way or with material which may cause an adjacent well, borehole or underground source of water to become polluted.
	Section 64	**Supply of non-potable water by the municipality** Non-potable water supplied by the municipality may not be used for domestic purposes or any other purpose which may give rise to a health hazard.
	Section 66	**Warning notices** Sources of non-potable water must be clearly marked with a weatherproof notice.
CoCT Fire Safety By-Laws, 28 February 2002	Section 26	Combustible waste and refuse
	Section 34	Combustible material fire hazards
	Section 37	Storage and use of flammables
	Section 48	Reporting of accidents
CoCT Environmental Health By-Laws, LA13333, 30 June 2003	• Land open to the public may not be used for the purpose of storing and stacking or for keeping any material likely to cause a health nuisance. • No premises may be allowed to be overgrown with bush, weeds or grass to such an extent that it may be used as a shelter by vagrants, wild animals or vermin which may threaten public health or safety. • The sanitation system on any premises may not be of such nature or condition that it may cause a health nuisance. • No person may commit any act which may cause a public health nuisance. • No person shall occupy any premises for habitable purposes so as to be a health nuisance. • No factory or trade premises may cause or give rise to smells that will cause a health nuisance. • The occupier of premises must take all possible measures to prevent the occurrence of mosquitoes, flies, fleas, bugs, cockroaches or other vermin or pests. • Filth, rubbish, refuse, manure or any material likely to be a health nuisance may not be kept or deposited on any premises. • Any person who fails to comply with or contravenes any provision of Section 1 of these by-laws will be guilty of an offence and may be liable to a fine. • Medical waste must be handled and stored in a safe manner that poses no threat to human health or the environment. • Any person convicted of an offence under these by-laws shall be liable to a penalty.	
CoCT Stormwater Management By-Laws, LA 31420, 23 September 2005	Prohibited discharges	No person may discharge anything but stormwater into the stormwater system without written consent from the Council.
	Protection of stormwater system	No person may commit any act which may damage, endanger or destroy the stormwater system or interfere with the operation thereof or contaminate or pollute the water therein without the written consent from the Council.
	Prevention of flood risk	No person may undertake any activity which may cause an increase in flood levels or create a potential flood risk without the written consent from the Council.
	Studies and	The Council may require that an environmental impact study may be done

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LEGISLATION	SECTION	RELATES TO
	assessments	for an activity named in Sections 3, 4 and 5.
CoCT Stormwater Management By-Laws, LA 31420, 23 September 2005	Water pollution incidents	Should a stormwater pollution incident occur, the owner of the property on which the incident took place or the person responsible for the incident must inform the Council of the incident immediately and take all reasonable measures to minimise the effects of the pollution.
	Stormwater systems on private land	No owner of property on which a private stormwater system is located may carry out an activity which may cause the system not to function properly. The owner must also keep such stormwater system functioning properly.
	Offences and penalties	Any person who contravenes or fails to comply with any provision of these by-laws will be guilty of an offence and may be liable, upon conviction, to a penalty.
CoCT Public Places and Nuisances By-Laws	Section 2	**Prohibited behaviour** No person may intentionally block or interfere with the safe and free passage of a pedestrian or vehicle.
	Section 6	**Trees causing an interference or obstruction** The City may give notice to the owner or occupier of any property on which there is any tree or other growth which interferes with overhead wires or is a source of danger or nuisance to persons using a public road to prune or remove the tree or growth.
	Section 8	**Goods, building materials, motor vehicle wrecks and dangerous objects** No person may cause any broken glass or other potentially dangerous objects to be placed in a public place.
	Section 23	**Offences and penalties** Any person who contravenes or fails to comply with any provision of these by-laws will be guilty of an offence and may be liable, upon conviction, to a fine.
CoCT Wastewater and Industrial Effluent By-Laws GN 6378, 1 September 2006	Section 2	**Duties of owners of properties** Owners of premises must construct their own private sewer installations on their premises.
	Section 3	**Protection of municipal sewers** No person may interfere with the municipal sewer system in any way or discharge into the system any substance other than sewage without the approval of the council.

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LEGISLATION	SECTION	RELATES TO
CoCT Integrated Waste Management By-Law, 2009	Section 4	**Obligations of Waste Generators** A waste generator must: • avoid the generation of waste or where it cannot be avoided minimise the toxicity and amounts of waste generated; • re-use, recycle or recover waste where possible; • manage waste so that it does not endanger health or the environment or create a nuisance; • maintain suitable cleanliness and hygiene standards on their premises as required by the City's Environmental Health By-law; • conclude a contract with the City, its service provider or an accredited service provider, as the case may be, for the storage and collection of waste. A waste generator generating industrial waste shall submit an integrated waste management plan to the City and comply with the terms and conditions set out by the City for the generation, minimisation, storage, recycling, collection and disposal of such waste. Any person who directly or indirectly generates building waste or the owner of the property on which such building waste is generated shall not store such waste in containers provided by the City for residential waste and shall remove and dispose of it at a licensed crushing plant or landfill site or any other licensed building waste disposal facility. The waste generator or the owner of the property on which waste is generated who deposits or stores waste on property of the City may be fined for failure to have or produce a permit for such deposit or storage.
	Section 7	**Priority Waste** Where special measures are required for management of waste because it poses a significant threat to health or the environment, it is not biodegradable, contains or could foster pathogens or communicable diseases or has been declared a priority waste in terms of other applicable legislation it can be prioritised according to this By-law.
	Section 12	**Storage and Transportation of Waste** Any person who stores or transports waste must ensure that: • suitable measures are in place to prevent accidental spillage or leakage; • the waste cannot be blown away; • nuisances such as odour, visual impacts do not arise; and • pollution of the environment and harm to health are prevented.
		Prohibition of Unauthorised Disposal of Waste No person may: • dispose of waste in a manner likely to cause pollution or have a negative impact on the environment or to be harmful to health; • dispose of waste other than in accordance with this By-law or National and Provincial legislation; • burn waste, especially hazardous waste except in approved incinerators; • deal with waste in a manner that causes dust, spillage or litter.

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5.9 POLICIES AND EIA GUIDELINES

A section of the proposed study area is intersected by the CoCT Scenic Route Study (MCA Urban & Environmental Planners, 2002). The affected section is from the intersection of Baden Powell Drive along the N2 to Firgrove Substation. Table 5-6~~Table 5-6~~ lists the concerns and recommended policies for utility service within the study area that is affected by the Scenic Route Study, more specifically, the electrical infrastructure.

Table 5-6: Scenic Drive Management Policy for Utility Services*

CONCERN	ASSESSMENT	RECOMMENDED POLICY GUIDELINES
The location and routing of electrical pylons and substations which form part of the national grid frequently have adverse visual impacts.	It is evident that the location of these activities takes advantage of excessive road reserves and that space availability, rather than visual criteria, determine their location.	Electrical overhead cables should be relocated underground.
		The policy and management guidelines identified for scenic routes should be taken into consideration when the required EIAs are prepared for large-scale space extensive and highly visible utility facilities.

** MCA Urban & Environmental Planners (2002)*

A synthesis of the issues identified as part of the CoCT Scenic Route Study (MCA Urban & Environmental Planners, 2002) states that this section of the study area is a significant scenic route and is an important access route into Cape Town. The filling station along the N2 is visually intrusive and this is exacerbated by the out-of scale brand name sign boards.

The following projects have been proposed as part of the CoCT Scenic Route Study (MCA Urban & Environmental Planners, 2002):

- Investigate alternative measures to provide safe pedestrian facilities for crossing the N2 at Macassar and Firgrove.
- Consider measures to counter potential safety threats posed by the proximity of the trees to the road at Macassar.

A Biodiversity Network is established to enable the conservation of Critical Biodiversity Areas (CBAs) (SANBI, 2004). These areas represent the minimum amount of terrestrial and freshwater habitat that is required to meet the CoCT's biodiversity conservation targets (see **Section** 7.9.5~~7.9.6~~).

The EIA process also takes into consideration the Western Cape Provincial Spatial Development Framework (2005) of the DEADP.

The following guideline documents were considered during the process:

- DEAT (2006a) Guideline 3: General Guide to Environmental Impact assessment Regulations 2006, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- DEAT (2006b) Guideline 4: Public Participation, in support of the EIA Regulations 2006, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.
- DEAT (2006c) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Assessment Regulations 2006, Integrated Environmental

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Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

- Brownlie, S (2005) Guidelines for involving biodiversity specialists in EIA. Edition 1. CSIR Report No ENV-S-C 2005 053 C. Provincial Government of Western Cape: Department of Environmental Affairs and Development Planning. Cape Town.
- De Villiers C., Driver A., Clark B., Euston-Brown D., Day L., Job N., Helme N., Holmes P., Brownlie S. And Rebelo T. (2005) Fynbos Forum Ecosystem Guidelines for Environmental Assessment in the Western Cape. Fynbos Forum and Botanical Society of South Africa: Kirstenbosch. Cape Town.

5.10 AUTHORITY INCEPTION MEETING

An inception meeting was held with Mr. Reggie Nkosi and Ms. Tebogo Mapinga from the DEA on 9 March 2010 (see **Appendix A**~~**Appendix A**~~ for the minutes). The purpose of this meeting was to provide background to the proposed projects and to discuss the EIA requirements, specifically the separation of the EIA process with a common PPP. The latter necessitated the initial separate submission of the application forms, from where the appointed DEA case officer would determine the acceptance of a single EIA report or separate EIA reports for the project.

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5.11 POST APPLICATION MEETING

A post application meeting was held with Mr. Takalani Maswime, Ms. Gabisilie Hlogwane and Ms. Tebogo Mapinga from the DEA on 19 April 2010 (see **Appendix A**~~**Appendix A**~~ for the minutes). The purpose of this meeting was to clarify issues identified for the proposed projects and to discuss issues associated with the project. It was decided that separate EIA Reports must be submitted for each project. However, the PPP could be conducted in parallel, in order to avoid confusion by I&APs.

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6 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

6.1 STUDY APPROACH

The EIA process is a planning and decision making tool that identifies the potential negative and positive impacts of a proposed development. It also recommends ways, as described in the EMP, to enhance the positive impacts and minimise the negative ones.

The environmental studies that have been undertaken have addressed the impacts associated with the proposed development and provided an assessment in terms of the biophysical, social, cultural-historical and economic environments. This will assist the DEA and Eskom in making decisions regarding the implementation of the proposed development.

The environmental assessment will be undertaken in compliance with the NEMA, specifically EIA Regulations GNR Nos. 385, 386 and 387 of 21 April 2006. Cognisance has also been taken of related guideline documents and other relevant legislation.

The EIA process consists of three phases: the scoping phase, the impact assessment phase, and the decision-making phase.

6.2 SCOPING PHASE

The aim of the scoping phase of the project was to identify and define the issues that need to be addressed in the impact assessment phase.

During the PPP, the interested and affected parties (I&APs) were identified and were given the opportunity to identify issues and concerns that relate to the study area. The first round of public participation was undertaken as documented in **Section** 0.

The Draft Scoping Report (SR) was made available to I&APs for review and the Final SR incorporated all comments that were received before submission to the DEA for consideration. The DEA issued an acceptance of the Scoping Phase and permission to continue with the EIA Phase on 11 February 2011.

6.2.1 Public Participation Process in Scoping Phase

The PPP is an integral requirement of the NEMA. Under the supervision and guidance of the DEA, BKS conducted the PPP for the proposed development, as prescribed by Section 56 of the EIA Regulations (2006). This is due to the scale, nature and affected footprint of the proposed project.

a) Objectives and General Approach

The main objectives of the PPP are to:

- inform identified I&APs of and provide sufficient background and technical information on the proposed development;
- create networks and feedback mechanisms so I&APs could participate and raise their viewpoints (issues, comments and concerns) on the proposed development; and
- assist in identifying potential environmental (biophysical, cultural-historical, social and economic) impacts using on-the-ground information through the I&APs' available experience.

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The PPP thus ensures that I&APs' views are reflected and considered by the applicant.

The approach to any PPP depends on the details of the project, as each project has a particular geographic and technical nature. Thus, the PPP should be structured accordingly. Where possible, and within the required statutory frameworks, such a process should be structured to address the needs of I&APs.

All I&APs were given equal opportunity to comment and raise any issues relating to the impact of the proposed development on the biophysical, social and economic environment.

b) Identification and Registration of I&APs on a Database

Under the DEA's guidance and supervision, the following key stakeholders were identified for engagement on any issues that may transpire during the EIA process for the proposed development:

- Registered I&APs;
- Western Cape Provincial Departments:
  - Department of Agriculture;
  - Department of Community Safety;
  - Department of Economic Development and Tourism;
  - Department of Environmental Affairs and Development Planning (DEADP);
  - Department of Health;
  - Department of Human Settlements;
  - Department of Local Government;
  - Department of Public Works and Transport;
- City of Cape Town Metropolitan Municipality (CoCT):
  - Biodiversity Branch;
  - Catchment, Stormwater and River Management;
  - City Parks;
  - Electricity Services;
  - Environmental Resource Management Branch;
  - Housing, Land and Forward Planning;
  - Land Use and Planning;
  - Property Management;
  - Solid Waste Department;
  - Spatial Planning and Urban Design Department;
  - Transport: Eastern Region District;
  - Water and Sanitation: Bulk Water;
  - Water and Sanitation: Reticulation
- National Department of Water Affairs (DWA);
- South African Heritage Resources Agency (SAHRA);
- Heritage Western Cape; and
- Cape Nature.

A database has been compiled and will be updated throughout the EIA process, in case additional stakeholders are identified (see **Pre-Application Meeting** with the DEA

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7. Post-Application Meeting with the DEA
8. Approval of the Scoping Phase

Appendix B~~Appendix B~~ for further details).

c) Project Announcement Phase

Phase 1 of the PPP entailed the announcement of the project to the identified key stakeholders during the designated timeframe. The project announcement phase for the original study area was from 22 April to 27 May 2010. Consultations with I&APs and relevant stakeholders were according to the following methods (see **Pre-Application Meeting** with the DEA

9. Post-Application Meeting with the DEA
10. Approval of the Scoping Phase

Appendix B~~Appendix B~~ for further details):

- Advertisements in the following newspapers:
  - Die Burger (Provincial);
  - Cape Times (Provincial);
  - The People's Post (Local);
  - The Plainsman Newspaper (Local); and
  - The Vukani (Local).
- A Background Information Document (BID) was circulated to I&APs and stakeholders that registered and were identified for registration.
- Site notices were placed at 35 strategic locations (see **Pre-Application Meeting** with the DEA

11. Post-Application Meeting with the DEA
12. Approval of the Scoping Phase

- Appendix B~~Appendix B~~) along the study area.
- Flyers were distributed in the study area.
- Public open days were scheduled as listed in **Table 6-1**~~**Table 6-1**~~.

Table 6-1: Public Open Days in Scoping Phase for Original Study Area

AFFECTED SUBURB	DATE	TIME	VENUE
Mitchell's Plain & Philippi	Thursday, 6 May 2010	10:00 – 14:00	Manenberg Community Centre 2 Swakop Road, Manenberg
Firgrove & Macassar	Friday, 7 May 2010	11:00 – 18:00	Firgrove Primary School 7th Street, Firgrove
Khayelitsha Township	Saturday, 8 May 2010	09:00 – 13:00	Matthew Goniwe High School Nyathi Street, Site B, Khayelitsha

The expansion of the study area resulted in a repeat of the project announcement phase, but it was limited to the expanded study area. Therefore, the revised timeframe to announce the expanded study area the project to the I&APs was from 26 August to 8 September 2010. Similar to the methodology stated earlier in this document, the following tasks were undertaken (see **Pre-Application Meeting** with the DEA

13. Post-Application Meeting with the DEA

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14. Approval of the Scoping Phase

Appendix B~~Appendix B~~ for more details):

- Advertisements in the following newspapers:
  - Die Burger (Provincial);
  - Cape Times (Provincial);
  - The Daily Sun (Local); and
  - Die Son (Local).
- The BID was revised and circulated to I&APs and stakeholders that registered and were identified for registration.
- Site notices were placed at 13 strategic locations (see **Pre-Application Meeting** with the DEA

15. Post-Application Meeting with the DEA

16. Approval of the Scoping Phase

- Appendix B~~Appendix B~~) in the study area.
- Flyers were distributed in the study area.
- Public open days were scheduled as per **Table 6-2**~~**Table 6-2**~~.

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Table 6-2: Public Open Days in Scoping Phase for Expanded Study Area

AFFECTED SUBURB	DATE	TIME	VENUE
Kuils River	Monday, 6 September 2010	09:00 – 12:00	Kuils River Public Library
Khayelitsha	Monday, 6 September 2010	15:00 – 18:00	Oliver Tambo Sports Centre
Delft Township	Tuesday, 7 September 2010	09:00 – 12:00	Delft Public Library
Silversands	Tuesday, 7 September 2010	14:00 – 17:00	Silversands Secondary School

6.2.2 Draft Scoping Report Review

The purpose of the Draft SR was to enable the registered I&APs to verify that their contributions had been captured, understood and interpreted correctly. The Draft SR was available for review by registered I&APs from 30 September 2010 to 10 November 2010. Advertisements were placed in local and regional/national newspapers to announce the availability of the Draft SR for review. I&APs were allowed to register during this period; but only the comments and issues raised up to 10 November 2010 were incorporated into the Final SR, for submission to the DEA. Comments and issues raised after the end date were taken into consideration during the EIA Phase.

I&APs comment on the Draft SR in various ways, such as by completing the comment sheet, submitting individual comments in writing, sending comments via facsimile or e-mail and through one-on-one discussions with members of the Project team during meetings.

6.2.3 Final Scoping Report Review

The SR was finalised based on the comments and issues raised during the review of the Draft SR. The Final SR was subsequently submitted to the DEA for their consideration and acceptance. Registered I&APs were also notified of the availability of the Final SR to ensure

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that the same information submitted to the DEA was made available to them. Comments and issues raised by the I&APs were then incorporated during the EIA Phase.

6.2.4 Results of Scoping Process

The scoping process was based on the alternative route alignments of the proposed 400kV Transmission power line. The study area used was based on a 1km corridor from each alternative alignment. However, it was determined that it would not be prudent to recommend a 1km corridor in a congested urban environment, as the area of influence affects the significance rating of the impacts within the corridor drastically (e.g. if a route alignment had to shift 100m to either side, it could affect settlements, critical biodiversity areas or wetlands adversely). Therefore, it was proposed that the EIA Report should recommend/propose the pylon positions that need to be placed. Alternative pylon positions are proposed as well to provide the DEA and thereafter Eskom with some flexibility to approve and thereafter plan the optimum route alignment.

6.3 ENVIRONMENTAL IMPACT ASSESSMENT PHASE

The EIA Phase is being conducted in accordance with the process described in Sections 27-36 of GNR No. 385 of the EIA Regulations (2006). The EIA Report, which is compiled according to Section (32 (2) of GNR No. 385 of the EIA Regulations (2006), includes:

- A description of the EAP that prepared the report;
- An updated detailed description of the proposed activity;
- An updated description of the environment that may be affected;
- A description of the PPP that was undertaken during the EIA Phase;
- An updated description of the need and desirability for the project and details of the alternatives that were investigated;
- Findings and recommendations of the specialist studies and EAP;
- An indication of the method used to identify significance;
- A comparative assessment of all alternatives (including the do-nothing alternative);
- An assessment of each potentially significant impact;
- An opinion on whether the activity should be authorised or not and, if it should be authorised, any conditions that should be made in terms of the authorisation;
- An Environmental Impact Statement; and
- A draft Environmental Management Plan for the planning, design, construction, operation and maintenance of the proposed activity. Rehabilitation and decommissioning will also be addressed.

6.3.1 Methodology of Specialist Studies

a) Geotechnical Investigation

The Geotechnical Investigation was undertaken by Heather Davis, geotechnical engineer at BKS.

The Geotechnical Investigation was investigated on a desktop level, mapped on GIS and integrated with the other specialist studies. This study informed the recommended and alternative route alignments of the Transmission power lines.

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The purpose of the investigation was to provide technical advice on:

- The expected bedrock geology and soil cover within the study area, based on the available data;
- Recommendations on the foundation trench stability, founding masts and poles, and seismicity; and
- Information on excavation potential together with the presence of active soil layers and any slope stability problems.

b) Soil and Agricultural Potential Assessment

The Soil Assessment was undertaken by Garry Paterson of the Agricultural Research Council.

Most of the study area occurs within the boundary of the coverage by 1:50 000 scale soil maps (Jacobs, Oosthuizen and Stehr, 2003). In the 1:50 000 scale survey, soil mapping units were established according to dominant and sub-dominant soil forms, which could then be allocated to a class of general agricultural potential. However, the portion of the routes that occur on the 1:50 000 map sheet 3418BB Somerset West has not yet been finalised and has consequently not yet been digitised and added to the rest of the survey. In order to incorporate this information in the final map, the provisional information was checked and correlated so that lines could be drawn and the map was then digitised to produce the version included in **Section 7.5~~7.5~~**.

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The 1:50,000 scale soil maps were analysed to determine the soil information for the study area. The soils were then classified according to the South African Soil Classification System. The classification of the different soils would represent the dominant soil within the specific land type that is identified. This information is presented in a GIS format map (see **Section 7.5~~7.5~~**).

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c) Agricultural Economic Potential

The Agricultural Economic Potential of the study area was undertaken by SG (Junior) Ferreira of Agriconcept cc. The landcover of the study area was analysed using the Enpat Environmental database and distinctions were made between town developments, agriculture, natural bush areas, vegetation, and soil potential. Images from Google Earth (12 February 2009) were also used. Groundwater data was obtained from the DWA.

Farmers in the project area were contacted to confirm the applicability of this data. Landowners in the study area were also contacted to confirm cropping programmes, yields and water sources.

d) Ecological and Wetland Assessment

The Ecological and Wetland Assessment was undertaken by Betsie le Roux of BKS. Due to the uniqueness and complexities of the Fynbos biome, the CoCT requested that a local fynbos specialist be appointed for the ecological studies. Nick Helme of Nick Helme Botanical Surveys, a Fynbos specialist from Cape Town, was appointed, following consultation with Cape Nature, to assist with the finalisation of the ecological assessment during the EIA phase.

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Various literature sources were consulted to determine the Red Data Listed (RDL) species likely to occur within the study area. Nick Helme also ensured that the rare plants database of Custodians of Rare and Endangered Wildflowers (CREW), based at SANBI, Kirstenbosch, was also consulted. Reference was made to standard sources, including the following standard documents:

- SA Vegetation Map (Mucina & Rutherford, 2006).
- City of Cape Town Wetlands Map (Snaddon *et al*, 2009).
- City of Cape Town Biodiversity Network Map (Stipinovich & Holmes, 2009).

The ecological assessment included field surveys in March and August 2010 to:

- Identify the land uses currently operating on the site.
- Identify major plant communities (i.e. river systems, wetlands, ridges and grasslands) which were described. Due to the timing of the field survey, which was conducted in winter 2010, the vegetation was either desiccated or burned and sub-communities within each of these major communities could not be identified.
- Determine the level of degradation.
- Identify features of conservation importance or environmental significance (e.g. RDL species or species of conservation concern, ridges and rocky outcrops).
- Provide a description of the current status of these identified features.
- Provide measures/recommendations for the appropriate management of such features.
- Recommend actions that should be taken to restore disturbed vegetation or ecological processes once construction has been concluded (i.e. measures for rehabilitation).

Site visits were undertaken on 11-12 March and 12-13 August 2010, resulting in the division of the study area into plant communities based on the species composition and vegetation structure.

During the field survey, the presence of wetlands indicated by the CoCT Wetlands Map (Snaddon *et al*, 2009) was groundtruthed and any differences to the map were recorded. The ecological status of these wetlands was also assessed.

Similarly, the the CoCT Biodiversity Network Map (Stipinovich & Holmes, 2009) was used as the basic informant of ecological sensitivities in the study area, This map was groundtruthed during the field surveys and additional sensitivities encountered were added to the map. Ecologically sensitive areas were classified based on the presence of natural vegetation, the potential for rehabilitation, presence of wetlands and the connectivity of the site with other sites of ecological importance.

An ecological status was assigned to each plant community with habitats of the characteristics as per **Table 6-3~~Table 6-3~~**. Areas where vegetation has been completely removed, such as in built-up areas or agricultural fields, were classified as degraded.

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Table 6-3: Habitat Characteristics of Ecological Status

HIGH	INTERMEDIATE	LOW
high levels of indigenous biodiversity	intermediate levels of biodiversity	low levels of biodiversity/no natural vegetation
low alien plant density	relatively low alien plant density	dense alien invasive vegetation
few signs of previous impact on	signs of low or moderate levels of soil	current erosion and/or agricultural

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soil structure	disturbance and erosion	activities
minimal or no solid waste	some solid waste	extensive dumping of solid waste

Data on potential plant Species of Conservation Concern (SCC), previously known as Red Data or Red List species, within the study area were obtained, which incorporated Helme's first hand knowledge of the region.

e) Avifauna (Birds) Assessment

An avifauna (birds) assessment was undertaken by Chris van Rooyen from Chris van Rooyen Consulting.

The following sources were consulted in order to inform the findings of this study:

- Bird distribution data of the Southern African Bird Atlas Project (SABAP – Harrison *et al*. 1997) were obtained from the Animal Demography Unit at the University of Cape Town for the Quarter-Degree Grid Cells (QDGCs) traversed by the proposed line. In this instance, the combined proposed alignments are situated in 3418BA and 3318DC. The conservation status of all species considered likely to occur in the area was determined as per the most recent iteration of the southern African Red Data list for birds (Barnes, 2000), and the most recent and comprehensive summary of southern African bird biology (Hockey *et al*. 2005).
- The SABAP data was supplemented with SABAP2 data for the relevant QDGCs. This data is much more recent, as SABAP2 was only launched in May 2007, and should therefore be more accurate. For SABAP, Quarter-Degree Grid Cells (QDGCs) were the geographical sampling units. QDGCs are grid cells that cover 15 minutes of latitude by 15 minutes of longitude (15. × 15.), which correspond to the area shown on a 1:50 000 map. For SABAP2 the sampling unit has been reduced to pentad grid cells (or pentads); these cover 5 minutes of latitude by 5 minutes of longitude (5. × 5.). Each pentad is approximately 8 × 7.6 km. This finer scale has been selected for SABAP2 to obtain more detailed information on the occurrence of species and to give a clearer and better understanding of bird distributions. There are nine pentads in a QDGC.
- The power line bird mortality incident database of the Eskom – Endangered Wildlife Trust Strategic Partnership (1996 to 2007) was consulted to determine which of the species occurring in the study area are typically impacted upon by power lines and the extent to which they are impacted on (Van Rooyen, 2006).
- A classification of the vegetation types in the relevant GDGCs was obtained from Harrison *et al*. (1997).
- Information on micro habitat level was obtained by studying high resolution satellite images of the study area on Google Earth and by physically inspecting the terrain on 11 and 12 March and 12 and 13 August 2010.
- Information on the species diversity of avifauna in the DNR was obtained from the Birds in Reserves Project website of the Animal Demography Unit of the University of Cape Town (http://birp.adu.org.za/).

f) Heritage Impact Assessment

The Heritage Impact Assessment (HIA) was undertaken by Tim Hart from the University of Cape Town, and the report contains the following:

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- An explanation of legislation pertaining to Heritage Management and provision of a break-down of important points.
- Identification and mapping of all heritage resources in the affected area.
- An assessment of the significance of such resources in terms of the heritage assessment criteria.
- An assessment of the impact of the development of such heritage resources.
- Consideration of alternatives if heritage resources will be adversely affected by the proposed development.
- Plans for the mitigation of any adverse impacts during and after the completion of the proposed development.

The assessment of the Transmission power lines in terms of heritage is methodologically unlike impact assessments, which involve assessing physical landscape disturbance. Since the Transmission power lines typically evoke the greatest change to a landscape above the ground surface, the emphasis is on assessing impacts to heritage that is visually sensitive, such as places or structures that are publicly celebrated as heritage or have the potential to be publicly celebrated as such. Historical farms, iconic landscapes and views, and places of conflict or celebration are therefore important.

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The following guiding principles were used:

- In open landscape during daylight hours, 400kV Transmission power lines on self-supporting towers are visible (but not necessarily intrusive) from a distance of up to approximately 5km.
- CNdV and DEADP (2006) in their development of guidelines for the establishment of wind energy facilities in the Western Cape have suggested that a buffer zone of 1km be established around significant heritage sites to minimise the change to "sense of place" (this is sometimes difficult to achieve in parts of the Western Cape (such as the Winelands) where celebrated heritage places are common on the landscape). The point at which a Transmission power line may be perceived as intrusive or offensive, is a subjective judgment. However, in our experience Transmission power lines within 1km of a reference point are noticeable but not necessarily intrusive. After 450m the Transmission power lines become increasingly intrusive and become visually dominating after 100m, depending on topography (see **Section h)~~h)~~**).
- The presence of pre-existing Transmission power lines in an area serves as a mitigation factor (rather than a cumulative negative impact) in terms of establishing new Transmission power lines in the same area. In other words electrical infrastructure clutter is best confined to existing areas or corridors of vertical visual disturbance, rather than introducing new vertical visual disturbance to undisturbed landscape.
- While archaeological and palaeontological sites share the potential to be publicly celebrated heritage places, they are less visible than structures in a landscape and are therefore less celebrated as tangible heritage with visual sensitivity. Since the impact on the land surface caused by Transmission power lines is very small, and reasonably adjustable at the level of final route selection, this study focused on aspects of heritage that are less easy to negotiate in terms of the proposed activity, ie. heritage sites that are visually sensitive.
- The direct impact on archaeological and palaeontological sites can only be addressed at the final "walkdown phase". This is hardly necessary on this project as almost all areas have been modified in the past. Mitigation can normally be achieved by micro-adjustment of tower positions and exclusion of sensitive areas.

The HIA was also undertaken based on information gathered from:

- Two site visits of two days duration each
- Discussions with the Heritage Western Cape (HWC) during the scoping phase
- Rating of impacts with respect to all proposed tower posigions throughout the study area via a full team workshop held after site inspections had taken place.

g) Social Impact Assessment

The Social Impact Assessment (SIA) was undertaken by Ingrid Snyman from Ingrid Snyman Development Consultants and Dr. David de Waal from BKS.

The aim of the SIA is to:

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- Determine the current socio-economic status of the area and the social characteristics of the receiving environment.
- Indicate the anticipated core impact categories and impact areas (possible hot spots);
- Identify anticipated positive socio-economic impacts of the proposed project, including positive impacts and provide management measures for these impacts;
- Identify and highlight negative social impacts (social hot spots) of the proposed project and indicate mitigation measures to deal with these impacts;
- Present the findings, recommendations and conclusions of the social study.

Site visits were undertaken in March and August 2010 to enable to project team to familiarise themselves with the study area and the social characteristics of the receiving environment. A literature review and desktop assessment assisted in establishing the focus of the study, gather more information regarding the area and in identifying possible social issues (impacts and planning processes).

Data was gathered in the following methods:

- Primary Data
  - Primary data assisted the consultants in establishing the social setting and characteristics of the study area, as well as the key economic activities.
  - Discussions with key persons also formed part of the research process.
- Secondary Data
  - Secondary data, which was not originally generated for the specific purpose of the study, were gathered and analysed for the purposes of the study.
  - Such data included the census data, project maps, local histories, and planning documentation of the CoCT.
- Consultation
  - Information gathered and social issues identified and verified during the public participation process undertaken as part of the EIA process also served as key input to the social assessment.
  - Through the public participation process detailed inputs were received from I&APs. Therefore, only some focused consultation was undertaken.
  - The aim was to further explore and verify issues, thus enabling a more detailed social analysis.

Profiling serves to build on information generated during the Scoping phase. It involves a description of the social characteristics and history of the area being assessed, an analysis of demographic data, changes in the local population, and the land-use pattern in the study area, as well as any other significant developments in the area and thus social character over time. The profiling process is a combination of secondary and primary research, site visits and consultation. This could include information on:

- Historical background;
- Social characteristics;
- Culture, attitudes and socio-psychological conditions;
- Population characteristics;

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- Community and institutional structures;
- Community resources; and
- Broad economic impacts.

The broad profiling will typically include descriptions regarding:

- The social trends and current conditions;
- The land-use in the area;
- The demographical profile and social characteristics of the host community;
- Other potential developments in the area;
- The local and regional economy; and
- Potential economic links between the proposed project and its environs.

A baseline assessment indicates the current reality in the social and related aspects of the affected environment. A baseline assessment is necessary to enable a logical and theoretically sound analysis of social impacts. It forms part of the process of identifying important cause-and-effect relationships and a comparative framework for anticipated changes and impacts. The output of this phase is the impact matrix and mitigation measures.

The following variables are typically assessed (Burdge, 1995) as part of the SIA:

- Population impacts
- Community/institutional arrangements
- Conflicts between local residents and newcomers
- Individual and family level impacts
- Community infrastructure needs
- Intrusion impacts

To assess the impacts associated with the proposed project, the above variables were adapted to allow for the assessment undertaken during the EIA phase. These variables would relate to the construction and operational phases of the proposed project.

h) Visual Impact Assessment

The Visual Impact Assessment (VIA) was undertaken by Mike Howard from BKS.

The following methodology was used for the VIA:

- Determine the setting, visual character and land use of the area surrounding the route, and the *Genius Loci* (sense of place);
- Discussions and meetings with the lead consultant team to identify specific aspects of the construction and development which would affect the visual quality of a setting;
- Define the extent of the affected visual environmental, the viewing distance and the critical views.

The VIA statements in this report were based on the opinion of the authors and attitudes that are generally accepted worldwide.

The criteria used to determine the intensity of the visual impacts in the study area include:

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- The area from which the project can be seen (the viewshed).
- The viewing distance.
- The capacity of the landscape to visually absob structures and forms placed upon it (the visual absorbtion capacity).
- The appearance of the project from important or critical viewpoints.

6.3.2 Technical and Specialists Integration Workshop

A Technical and Specialists Integration Workshop was undertaken on 18 March 2011. The purpose of the workshop was unprecedented in terms of the customary method of undertaking an EIA process. Ususally the EIA process recommends a corridor of approximately 3km on either side of the route alignments, of which the DEA grants environmental authorisation. The pylon positions within the approved corridor are then finalised with a team of specialists (based on the sensitivities within the study area).

However, this EIA process must be customised as the corridor within which to manoeuvre the pylon positions would be too wide as the range of significance of the Transmission power line's impact would change drastically within 100m; considering the urban environment of the study area. Therefore, this EIA process will recommend pylon positions, with a flexibility of up to 10m around the positions. Therefore, the EMP (**Section ~~6.3.5~~6.3.5**) will be site-specific to each pylon position and made available for public review (unprecedented in an Eskom EIA process).

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Each specialist assigned a significance rating to each pylon position (see **Section ~~6.3.1~~6.3.1**) based on their visit to the site and their experience. The following factors were also taken into account in allocating a specific score to a pylon:

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- The following ecologically-sensitive areas were avoided, as far as practically possible:
  - Wetlands and stormwater dams.
  - Rivers and their floodplains.
  - Critical Biodiversity Areas (CBAs).
  - Nature Reserves.
- Existing power lines:
  - Placing a new power line next to or recycled on an existing power line reduces the impact of the route alignment.
  - Other Eskom Transmission and Distribution power lines running parallel to a proposed alignment were thus treated as a risk-reducing factor.
  - Existing power lines have to be crossed as perpendicular as possible and as close as possible to the lowest height between existing pylon towers (i.e. where the line sag is the lowest).
- Roads and Railways:
  - A consolidation of linear infrastructure within a particular corridor would be preferable.
  - Railways have to be crossed as perpendicular as possible.
- Towns and industrial activity:
  - These are centres of human activity and are generally avoided by large power line sensitive bird species.

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- The presence of towns, settlements and industrial activity is therefore a risk-reducing factor from a bird collision, disturbance and habitat destruction perspective.
- Formal and informal settlements, commercial and industrial activities have been avoided as far as practically possible.

- Agricultural lands and vineyards:
  - The integral value of vineyards and certain agricultural properties cannot be discarded as there could be a loss of production within its respective industry.

The significance rating of each pylon position was used as a basis to determine the recommended route alignment. Thereafter, workshops were held with Eskom's Line Design Engineers on 25 March 2011 and 11 May 2011. These workshops helped determine the technical feasibility of each pylon position. The significance rating of each pylon position was then confirmed with each specialist once again.

Through Eskom's technical input and the inputs of the various specialists, proposed pylon have been optimally positioned with the result that most impacts were avoided, and practical mitigation measures are prescribed to reduce the impacts of those that can't be avoided.

6.3.3 Enviro-Legal Review

The enviro-legal review was undertaken by Advocate Nicolai Massyn of Green Gain Consulting (Pty) Ltd.

The environmental legal input that was provided, largely involved review responsibilities and advice on process issues. This is a particularly important part of the EIA Report due to the rapidly changing legislative context. BKS will ensure that the EIA process is fully compliant with the legal requirements.

The following specific input was provided:

- Review of the Draft Scoping Report and the Draft EIA Report (including the Draft EMP) with brief written comments on the legal process.
- *Ad hoc* telephonic/e-mail input to project team queries, including legal issues emerging from the public participation process.
- A review of the enviro-legal requirements that apply to the proposed development.

6.3.4 Public Participation Process in EIA Phase

The objective of the PPP in the EIA phase of the project is to present the findings of the investigations to the stakeholders and to give them an opportunity to comment on these. To achieve this, the following consultation process was undertaken, similar to the Scoping Phase:

- The Draft EIA Report will be made available for review from 5 July to 16 August 2011 by registered I&APs.
- Public meetings will be held at various locations in the study area to present the findings of the EIA Report to I&APs.

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All I&APs that are registered on the I&AP database will be notified via e-mail, post or fax of the abovementioned consultation process.

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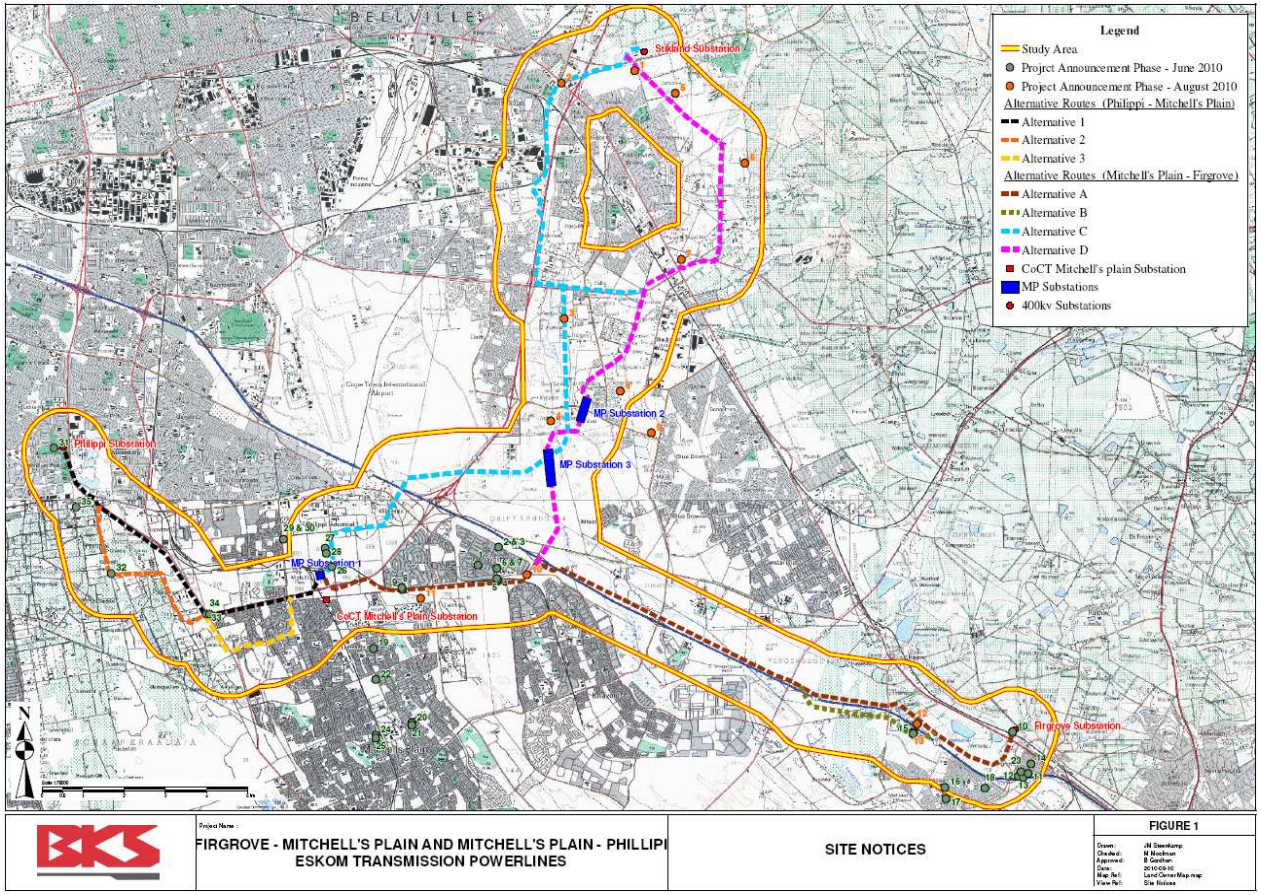

Figure 6-1: I&APs Consulted to Date

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a) Draft EIA Report Review

Registered I&APs were notified of the availability of the Draft EIA Report for their comment for a period of 40 days from 5 July to 16 August 2011. I&APs are allowed to register during this period. However, only the comments and issues raised up to 8 August 2011 will be incorporated in the Final EIA Report, for submission to the DEA. Comments and issues raised after the end date will be submitted directly to the DEA. Consultations with I&APs and relevant stakeholders were done using the following methods (see **Pre-Application Meeting** with the DEA

17. Post-Application Meeting with the DEA
18. Approval of the Scoping Phase

Appendix B~~**Appendix B**~~ for further details):

- Advertisements in the following newspapers:
  - Die Burger (Provincial);
  - Cape Times (Provincial);
  - The People's Post (Local);
  - The Plainsman Newspaper (Local); and
  - The Vukani (Local).
- Site notices at 35 strategic locations along the study area , as done during May and August 2010 (see **Figure 6-1**~~**Figure 6-1**~~).
- Flyers were distributed in the study area.
- Public open days will be scheduled during the review phase of the Draft EIA Report and sufficient notice will be given to I&APs.

I&APs can comment on the Draft EIA Report in various ways, such as by completing the comment sheet, submitting individual comments in writing, sending commented via facsimile or e-mail and through one-on-one discussions with members of the Project team during the public meetings to be held during the last week of July 2011. Comments and issues raised were noted in an updated version of the Issues and Responses Report (**Pre-Application Meeting** with the DEA

19. Post-Application Meeting with the DEA
20. Approval of the Scoping Phase

Appendix B~~**Appendix B**~~). These comments will be considered and incorporated into the Final EIA Report for submission to the DEA.

b) Final EIA Report Review

The EIA Report will be finalised based on the comments and issues raised during the review of the Draft EIA Report. Changes made in the Final EIA Report will be highlighted in yellow to enable the reader to distinguish the changes made from the Draft EIA Report. The Final EIA Report will subsequently be submitted to the DEA for consideration and acceptance. Registered I&APs will also be notified of the availability of the Final EIA Report to ensure that the same information submitted to the DEA will be made available to them. Comments and issues raised by the I&APs will be submitted directly to the DEA for consideration.

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6.3.5 Environmental Management Plan

The EIA Report has recommended the positions of the pylons. A site-specific EMP has been compiled that takes into consideration each aspect at each pylon position. This site-specific Draft EMP will be submitted as part of the public review process for the Draft EIA Report. Thereafter, the Final EMP will be submitted together with the Final EIA Report to the DEA, for their decision on the final positions of the pylons as opposed to a wide corridor. As the study area is in an urban area, the space available for the placement of the pylons is limited. Therefore, an approved corridor of even 100m on either side would change the significance rating of a particular route alignment severely.

6.4 DECISION-MAKING PHASE

The Final EIA Report and EMP will be submitted to the DEA for its consideration and approval. The DEA will make a decision based on the recommendations of the EAP in this EIA Report. The timeframe for the review of the EIA Report and the decision to issue Environmental Authorisation spans over 30 calendar days.

6.4.1 Public Participation Process in Authorisation Phase

Subsequent to the issue of the environmental authorisation, all registered I&APs will be informed by e-mail, fax or post of the availability of the environmental authorisation, upon request. In addition, the registered I&APs will be informed of the procedure to lodge an appeal of the environmental authorisation, should they wish to do so.

6.5 EIA PHASE PROGRAMME

The key dates for the proposed development are listed in Table 6-4~~Table 6-4~~.

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Table 6-4: Key Dates in the EIA Phase

ACTIVITY	DATE
Public review of EIA Report	5 July 2011 – 16 August 2011
Anticipated dates of public meetings	21 July 2011 – 28 July 2011
Submission of Final EIA Report to the DEA	15 August 2011
Authority Review of EIA Report	16 August 2011 – 12 October 2011
Anticipated date of Environmental Authorisation Issued	15 November 2011
Servitude Negotiation Process	December 2011 onward

6.6 POST ENVIRONMENTAL AUTHORISATION

This section relates to the processes that are separate from the EIA process, and that may be perceived to be linked to the EIA process.

6.6.1 Servitude Negotiation Process

The PPP undertaken for the EIA does not include the final servitude negotiations with the landowners that will be directly affected by the final route. It is important that the aims of the EIA and servitude negotiation processes are seen as separate. They share a common cause (the construction and operation of a Transmission power line) and may share common landowner databases, but they have different aims.

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The servitude negotiations task will be undertaken by a negotiator from Eskom if a positive environmental authorisation for the project is received. The Eskom negotiator has, however, been involved in the Project Team site visit, workshops and discussions regarding the selection of a recommended alignment for the proposed Transmission power line. Therefore, while an extensive effort was made to identify and involve all possibly affected landowners through representative organisations, such as the municipalities and farmers' organisations and, as far as possible, with individual landowners, the PPP was not able to consult individually with all the potentially affected landowners during the EIA study.

SERVITUDE NEGOTIATION AND THE EIA PROCESS

Transmission power lines are constructed and operated within a servitude (up to 55m wide for 400kV lines) that is established along its entire length. The servitude allows Eskom Transmission certain rights and controls that support the safe and effective operation of the line. The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or the negotiation process. The negotiation process is undertaken by Eskom Transmission. Important points relating to the EIA process are:

- Servitude negotiation is a private matter between Eskom Transmission and the landowner concerned.
- The negotiation process involves a number of stages (see text box below), and culminates in the signing of a servitude. Here, Eskom Transmission enters into a legal agreement with the landowner.
- The agreements will detail aspects such as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities.
- Compensation measures are agreed in each case.
- It may take place at any time in the planning of a new line.
- It must be completed (i.e. the agreement must be signed) before construction starts on that property.
- **The servitude negotiation process is independent of the EIA process.**

The EIA process has become important in the initial planning and route selection of a new Transmission power line. For this reason, it is preferable that the negotiation process begins after the EIA has been completed. At this stage, there is greater confidence in the route alignment to be adopted, and it would be supported by an environmental authorisation.

However, it may be required that the negotiation process starts earlier, and may begin before or run in parallel to the EIA process. This may be due to tight timeframes, knowledge of local conditions and constraints, etc. Eskom Transmission has a right to engage with any landowner at any time, although it does so at risk if environmental authorisation has not been awarded.

Source: Eskom Transmission, Gamma-Omega 765kV Transmission Line, Draft Environmental Impact Report, Main Report, March 2002

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THE NEGOTIATION PROCESS

The negotiation process can be extensive, often running into years on the longer lines. It is, therefore, critical that it is correctly programmed into the planning of a new line. The negotiation process involves:

- Initial meeting with the landowner.
- The signing of an option to secure a servitude (this indicates that the owner will accept that the line will cross his property, subject to conditions to be finalised in the negotiation of the servitude agreement). An option is valid for one year.
- Once the route is confirmed (i.e. options signed with the upstream and downstream landowners) the servitude agreement will be finalised with the individual landowners. This agreement will set out the conditions for the establishment and operation of the servitude, and will be site specific (different landowners may have different requirements). Compensation payments are made when the servitude is registered at the Deeds office.
- Once construction is complete and the land is rehabilitated to the landowner's satisfaction, the landowner signs a 'Final Release' certificate. Until such time Eskom Transmission remains liable for the condition of the land.
- Once the clearance certificate is signed, the responsibility for the line and servitude is handed over to the regional Eskom Transmission office. Prior to this, the Eskom national office is responsible for the process.

Source: Eskom Transmission, Gamma-Omega 765kV Transmission Line, Draft Environmental Impact Report, Main Report, March 2002

6.6.2 Rezoning Process

Similarly, the rezoning of the properties that the servitude crosses will happen after the servitude has been negotiated. The rezoning process is also independent of this EIA process for the Transmission power line and the substation site.

6.7 Assumptions and Limitations

The following assumptions and limitations were identified for this scoping process:

- EIA process:
  - The EIA process is multi-disciplinary, which was informed by the Project Team (Table 2-1~~Table 2-1~~). It is thus necessary to assume that the information provided to the Project Team at the time is accurate and true.
  - Data shown in the maps were supplied by various sources and was used as received. The data was not verified.
- Public Participation Process:
  - Every effort was made to contact all stakeholders within the study area and within 100m of the study area. The assumption is made that information presented by all the stakeholders has been accurate and has been presented timeously in the study.

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- According to the EIA Regulations (2006), landowner consent must be obtained from properties, where the Applicant is not the owner of the land. However, there have been difficulties in obtaining the landowner consent form for the Mitchell's Plain Substation Alternatives 1 and 2.

- Soil and Agricultural Potential Assessment:
  - The portion of the routes that occurs on the 1:50 000 scale soil map sheet 3418BB Somerset West (Jacobs, Oosthuizen & Stehr, 2003) has not been finalised to date. Consequently, this section has not yet been digitised and added to the nation-wide survey maps. In order to incorporate this information in the necessary maps for this study, the provisional information was checked and correlated so that the map could be digitised to produce the map in **Appendix I~~Appendix I~~: Soil and Agricultural Study**.

- Ecological Assessment:
  - Due to the uniqueness and complexities of the Fynbos biome, it was requested by the CoCT that a local fynbos specialist be appointed for the ecological studies. BKS appointed the Fynbos specialist, Mr. Nick Helme, to assist with the finalisation of the ecological assessment during the EIA phase.
  - The first author (Mrs. le Roux) undertook the initial field survey in March 2010, which is well outside the optimal winter-spring timing for vegetation surveys in the winter rainfall Fynbos region, but this was supplemented by a fieldtrip in August 2010.
  - The first author was not familiar with Fynbos vegetation types or the potential plant Species of Conservation Concern, and this meant that there were important constraints on the accuracy of the ecological findings. The draft report was reviewed and edited by the second author (Mr. Nick Helme), who did not undertake any fieldwork, but instead was able to draw on nearly twenty years experience in the region.
  - The second author took a habitat based approach, whereby habitat quality and indigenous plant diversity was used as a surrogate for botanical sensitivity. Personal knowledge of rare plant occurrences was incorporated into the data where possible.
  - Google Earth .kmz files of powerline routes, substation positions and pylon positions were made available to the second author, who assumed that these were accurate to within 10m, particularly in terms of the proposed pylon positions.
  - To obtain a comprehensive understanding of the dynamics of the flora, fauna, avifauna and the wetland environment on the study site, the ecological and the wetland assessments should consider investigations across different seasons and through replication. This would allow a true reflection of baseline investigations. However, due to time constraints, such long-term studies are not feasible with the EIA process.
  - Limited time is available for the study and the field survey was limited to a snapshot view of all areas of concern.
  - The assumption was made that all the sources of information are adequately reliable. However, there are factors that may detract from the accuracy of the predicted results.

- Avifauna Assessment:

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- The SABAP data covers the period 1986-97. Bird distribution patterns fluctuate continuously according to availability of food and nesting substrate. Fortunately, the new SABAP2 project has, thus far, gathered data for these QDGCs (83 checklists for 3418BA and 244 for SABAP2). Therefore, the SABAP data could be supplemented with this more recent dataset and by general knowledge of the area.
- It is difficult to compare the two SABAP datasets as far as reporting rates of species are concerned because of different efforts that went into the data capturing e.g. for 3418BA there were 684 SABAP but only 83 SABAP2 checklists completed (for a full discussion of potential inaccuracies in SABAP data, see Harrison *et al.*, 1997).
- Predictions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will hold true under all circumstances. However, power line and substation impacts can be predicted with a fair amount of certainty, based on international and local experience gained by the avifauna specialist.

- Visual Impact Assesment:
  - The assessment does not consider the ancillary project infrastructure and components such as borrow pits, spoil dumps, etc. These components will be assessed in detail during the design phase if the project is implemented.
  - The assessment is based on assumed demographic data. A detailed study was not done to determine accurate data on potential viewers of the project components. If necessary these studies could be undertaken during the design phase of the project.
  - The location and extent of the construction campsites, as well as material lay-down areas will only be determined during the design and construction phases. These, however, have a relatively temporary nature and can effectively be controlled through the EMP.
  - Determining a visual resource in absolute terms is not possible. Evaluating a landscape's visual quality is both complex and problematic. Various approaches have been developed but they all share one problem: unlike noise or air pollution, which can be measured in a relatively simple way, for the visual landscape mainly qualitative standards apply. Therefore, subjectivity cannot be excluded in the assessment procedure (Lange, 1994). Individually, there is a great variation in the evaluation of the visual landscape based on different experiences, social level and cultural background. Exacerbating the situation is the inherent variability in natural features. Factors such as climate, season, atmospheric conditions, region and sub-region all affect the attributes that comprise the landscape. What is considered scenic to one person may not be to another (NLA, 1997).
  - The impact assessment is undertaken for the joint team recommended alternative routes only and is not necessarily the recommended route from a visual impact perspective only.
  - Localised visual perceptions of the economically depressed communities of the population have not been tested as these may be influenced rather by the economic and job opportunities that will exist rather than the direct visual perception of the project.
  - If the study determined that the negative visual impact is of such a magnitude and significance that it will seriously influence the decision on whether or not to build, it

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will then be necessary to test and determine the visual perceptions of neighbouring communities. Such a study is intricate, costly and time consuming.

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7 DESCRIPTION OF RECEIVING ENVIRONMENT

7.1 STUDY AREA CONTEXT

7.1.1 Regional Context

The study area falls within the City of Cape Town Metropolitan Municipality (CoCT), which is the most densely populated municipality in the Western Cape Province (Figure 7-1~~Figure 7-1~~). The Western Cape Province is along the western coast of the Republic of South Africa and is a popular tourist destination.

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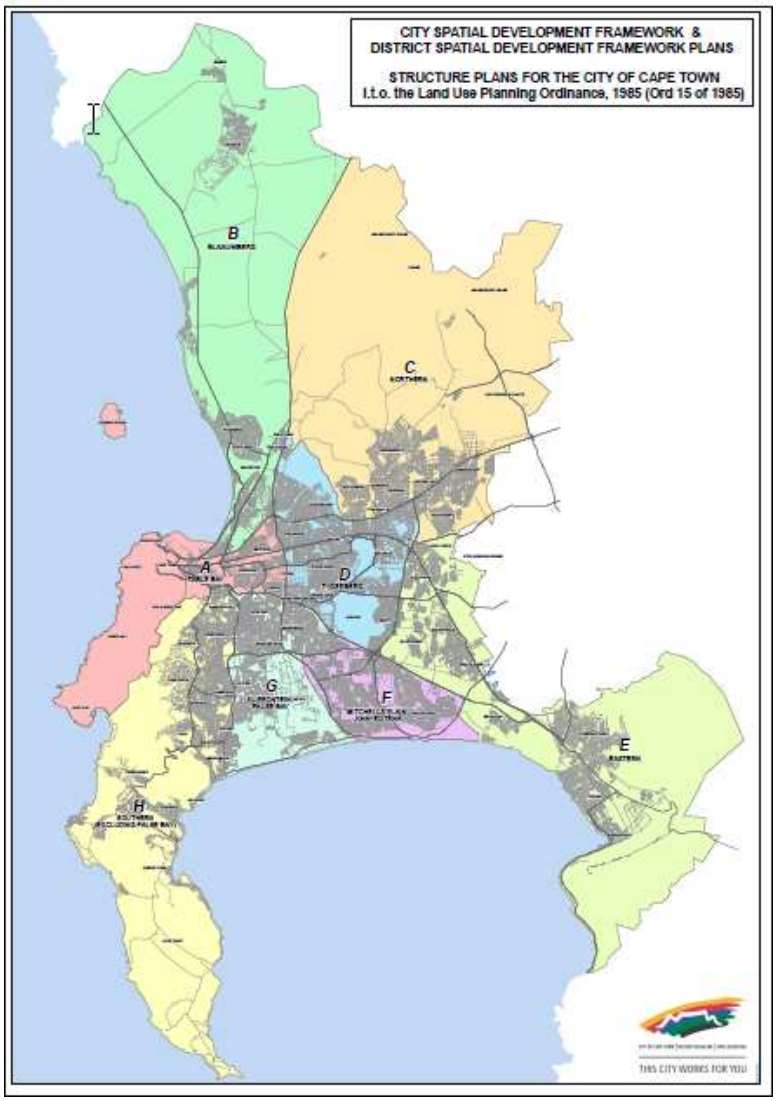

Figure 7-1: City of Cape Town Metropolitan Municipality in Regional Context (City of Cape Town, 2007)

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7.1.2 Local Context

The study area is within an area known as the Cape Flats, within the greater CoCT (Figure 3-6~~Figure 3-4~~). The study area is made up of mainly marginalised communities such as Mitchell's Plain in the south and east to Philippi in the west, agricultural lands within the Philippi area, and industrial areas at the Lansdowne Road and M7 intersection.

The CoCT is divided into eight Planning Districts. The following districts fall within the study area (Table 7-1~~Table 7-1~~ and Figure 7-2~~Figure 7-2~~):

- District D (Tygerberg).
- District E (Eastern).
- District F (Mitchell's Plain/Khayelitsha).
- District G (Klipfontein/False Bay).

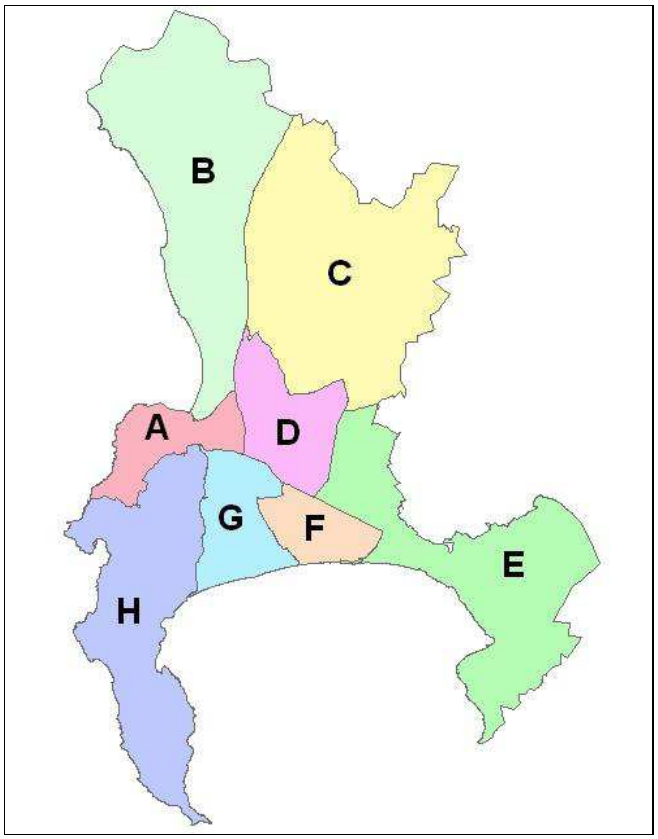

Figure 7-2: Planning Districts of CoCT (CoCT, 2007)

The Khayelitsha and Mitchell's Plain district include areas like Crossroads, Khayelitsha, Philippi and Mitchell's Plain, and are bordered by the N2 and Lansdowne Road to the north, Weltevreden Road to the west, the coastline to the south and Baden Powell Drive and the Macassar Dunes to the south-east. These areas developed extensively since the 1970's. Cape Town International Airport is found to the north (CoCT, 2009c). The study area from

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Mitchell's Plain to the Firgrove substation includes sections of Khayelitsha, open undeveloped land, land that are currently being developed and agricultural land such as the Vergenoegd Wine Estate. The study area to the north of Mitchell's Plain and Khayelitsha mainly includes Delft South, the DNR, Mfuleni, the Blackheath Industrial Area, the Saxenburg Industrial Park, Hagley and the greater Kuilsrivier area, as well as the Stikland Industrial area.

Table 7-1: Districts within the Study Area (CoCT, 2007)

ALTERNATIVE ALIGNMENT	PLANNING DISTRICT	COMMUNITIES/AREAS
FM-A	District E and F	Macassar, Firgrove, Croydon, the farm Zandvliet 664, The farm Vergenoegd 653 (Firgrove Rural area) and the Vergenoegd Wine Estate, Khayelitsha such as Oliver Tambo Sports Centre, Victoria Merge, Village 3 North, Bongani, Bongweni, Ikwezi Park, Mandalay, Tembani.
MS-C	District E	Philippi East, Delft South, The Driftsands Nature Reserve, Brentwood Park, Hagley, Wembly Park, Cormac Park, Kuilsrivier Waste Water Treatment Plant, Kalkfontein.
MS-D	District D, E and F	The Driftsands Nature Reserve, areas to the north of the N2 such as Mfuleni, Fairdale, Fountain Village, Sunst Glen, Happy Valley, Wimbledon, Happy Valley 2. Areas in the eastern section of the study area to the north of the M12 (Stellenbosch Road) such as Saxenburg Industrial park, Zevendal, Brandwag, Elim, Rouxville, Amandelrug, Mikro Park, Soneike.
Substation Alternative 1	District F	Situated with the area of Philippi on Portion 10 of the Cape Farm 693. Stock Road is situated to the east of the proposed site and the Cape Flats Freeway (R300) to the south. Railway lines are to the west and northern portions of the site.
Substation Alternative 2	District E	Situated on Portion 6 of the Farm Bardale 451 within the area of Silversands adjacent to Hindle Road. The Silversands Primary School is situated north of the area under investigation.
Substation Alternative 3	District F	Situated within the Driftsands Nature Reserve. Mfuleni is to the south east. . The site is located on the remaining extent of Portion 1 of the Farm Driftsands 544.
Switching Station	District E	Situated in close proximity to the farm Saxenburg 419 and the Saxenburg Industrial Park
Stikland Substation	District E	Situated in close proximity to Soneike. Bottelary Road is to the south and Cecil Morgan Road to the west. Soneike Shopping Centre is adjacent Bottelary Road to the south of the site.
Firgrove Substation	District E	Situated within the areas of Macassar, Firgrove and the farm Zandvliet 664. Old Main Road (R102) is situated to the south of the site.

7.2 CLIMATE AND ATMOSPHERIC CONDITIONS

The South African Weather Service (2003) affirms that the climate of the Western Cape is typically Mediterranean, with warm dry summers and mild moist winters. The study area experiences average summer temperatures of 16-26°C and average winter temperatures 7-18°C. Average sunshine received is 77% in summer and 62% in winter.

From April to September, the average rainfall is 500mm. An increasing amount of rain is experienced during the summer months (between October and March) is limited to an average of 100mm and is associated with thunderstorms and lightning strikes.

The Western Cape region has traditionally been known as the "Cape of Storms" due to the strong summer and winter winds. Typically, south-easterly winds occur during the summer months and north-westerly winds during the winter.

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The Mean Annual Temperature (~~Figure 7-3~~Figure 7-3), precipitation (~~Figure 7-4~~Figure 7-4), daylight hours (~~Figure 7-5~~Figure 7-5) and the average wind speed (~~Figure 7-6~~Figure 7-6) are shown in the following figures.

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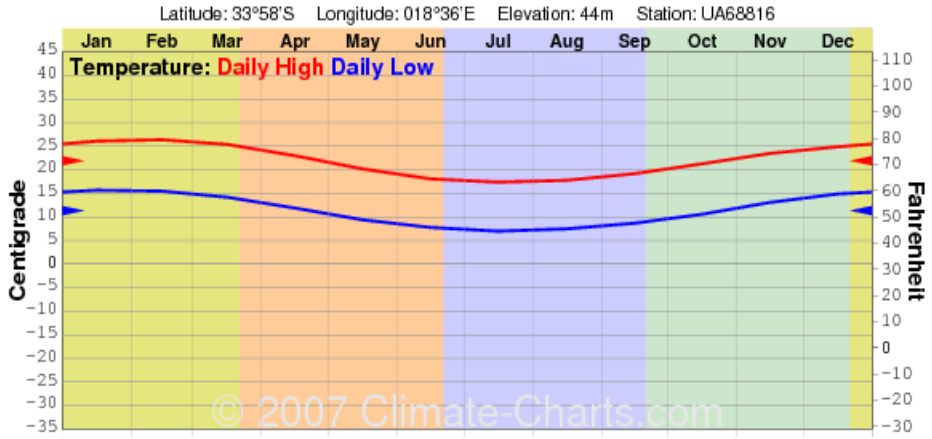

Figure 7-3: Climate Chart for Cape Town International Airport, Indicating Mean Annual Temperature (Climate Charts, 2008)

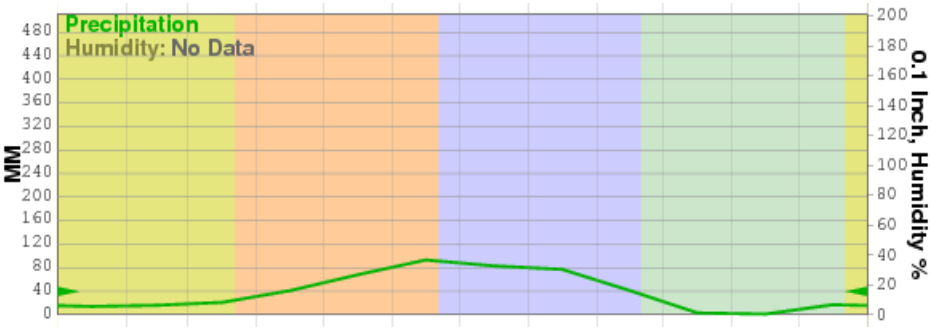

Figure 7-4: Climate Chart for Cape Town International Airport, Indicating Precipitation (Climate Charts, 2008)

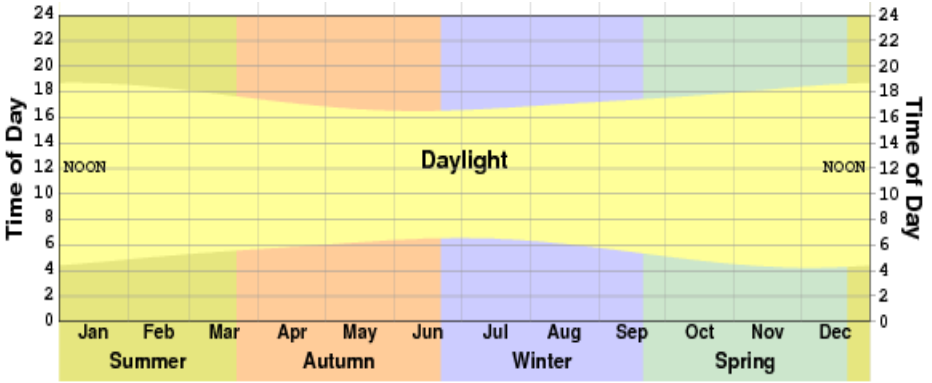

Figure 7-5: Climate Chart for Cape Town International Airport, Indicating Daylight Hours (Climate Charts, 2008)

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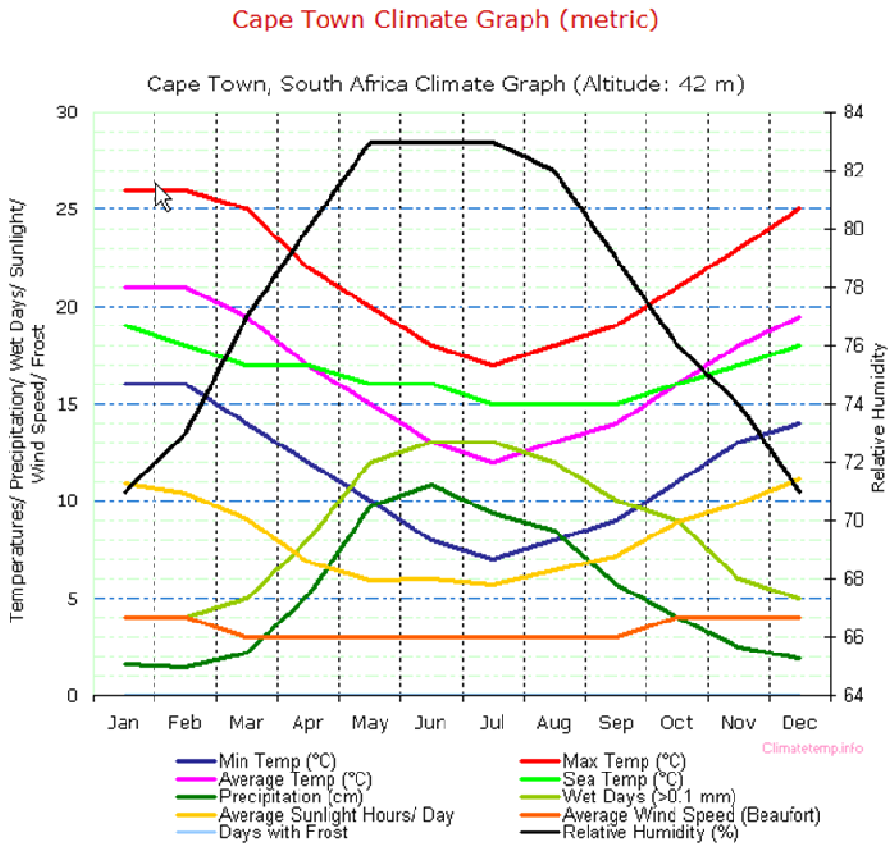

Figure 7-6: Cape Town Climate Graph (Climate Temp, 2008)

The corrosion severity map of South Africa (Roberge, 2011) schematically summarises 20 years of atmospheric exposure testing (~~Figure 7-7~~). The coastal regions extending some 4-5 km inland tend to be most corrosive due to the effect of wind swept chlorides. High humidity levels tend to exacerbate the detrimental effects of such chlorides. The industrial sector is the prime contributor to air pollution. More than 90% of South Africa's electricity is generated from the combustion of coal that contains approximately 1.2% sulfur and up to 45% ash. Coal combustion can lead to particulate matter in the air, as well as contribute to acid rain. While major cities in South Africa do not possess pollution levels comparable to many major cities in China, India or Mexico, pollutant levels are not insignificant. Nitrogen dioxide levels in Cape Town, South Africa, for instance, were significantly higher than those measured in Calcutta, and surpassed the World Health Organization's annual mean guideline for air quality standard of 50 micrograms per cubic meter. In addition to industrial pollution, low-level atmospheric pollution often results from coal combustion in stoves, as well as coal-heated boilers that are found in hospitals and factories.

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Figure 7-7: Corrosion Severity Map of South Africa (Roberge, 2011)

7.3 TOPOGRAPHY

The Cape Flats regressive inland dune system is situated in the suburbs of Philippi, Mitchell's Plain and Khayelitsha, which is less than 40m above mean sea level. These stabilised parabolic dunes provide a relatively flat, sandy landscape the majority of which is very low lying, supporting widespread vleis and wetlands (CoCT, 2009a and CoCT, 2009b).

Urban sprawl and agricultural activities have transformed the landscape, resulting in isolated dune remnants of up to 10m (see Figure 7-8~~Figure 7-8~~).

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Figure 7-8: Typical Topography of Cape Flats Area

7.4 GEOLOGY

According to the 1:250 000 scale Geological Map the study is underlain mainly by Quaternary Deposits and some of the much older rocks are in small pockets (Figure 7-9~~Figure 7-9~~). Table 7-2~~Table 7-2~~ presents the generalised stratigraphy of the study area for the Firgrove-Mitchell's Plain study area, and the approximate percentage of the alternative routes underlain by the different rock types.

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The alternative locations of the proposed Mitchell's Plain substation are underlain by deposits of the Witzand Formation (CoCT, 2009a and CoCT 2009b). The semi-consolidated aeolian sandy soils of the Witzand Formation provide a building sand resource around Macassar and Blue Downs. These soils give way to the sandy soils that overlay the Cape Granite and low grade metamorphic rocks of the Malmesbury Group in the vicinity of the Firgrove area. This simple geological structure has given rise to soils with little variation.

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The modified Mercalli Scale seismic intensity rating of the Firgrove-Mitchell's Plain study area is VII (i.e. difficult to stand; furniture broken; damage negligible in building of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken; noticed by people driving motor cars).

Table 7-2: Stratigraphy of Firgrove-Mitchell's Plain Study Area

MAP REFERENCE	GENERALISED STRATIGRAPHY			GENERALISED ROCK/SOIL TYPES	APPROXIMATE PERCENTAGE UNDERLAIN BY STRATIGRAPHIC UNIT	
					Alternative A and B	Alternative C and D
Qb	Quaternary Deposits		Formation name not yet designated	Brackish calcareous soil	10%	0%
Qw			Witzand Formation	Unconsolidated white sand with shells locally along beaches	63%	100%
Ql			Langebaan Formation	Limestone and calcrete with calcified dune sand	5%	0%
Qs			Springfontyn Formation	Light-grey to pale-red sandy soil. Occasionally peaty soils occur	15%	0%
Nt	Cape Supergroup	Malmesbury Group	Tygerberg Formation	Greywacke, phyllite, quartzitic sandstone occasionally with inter-bedded lava and tuff	5%	0%
N-Ck	Cape Granite Suite		Kuils River to Heidelberg Pluton	Granite and Granitic rocks	<2%	0%

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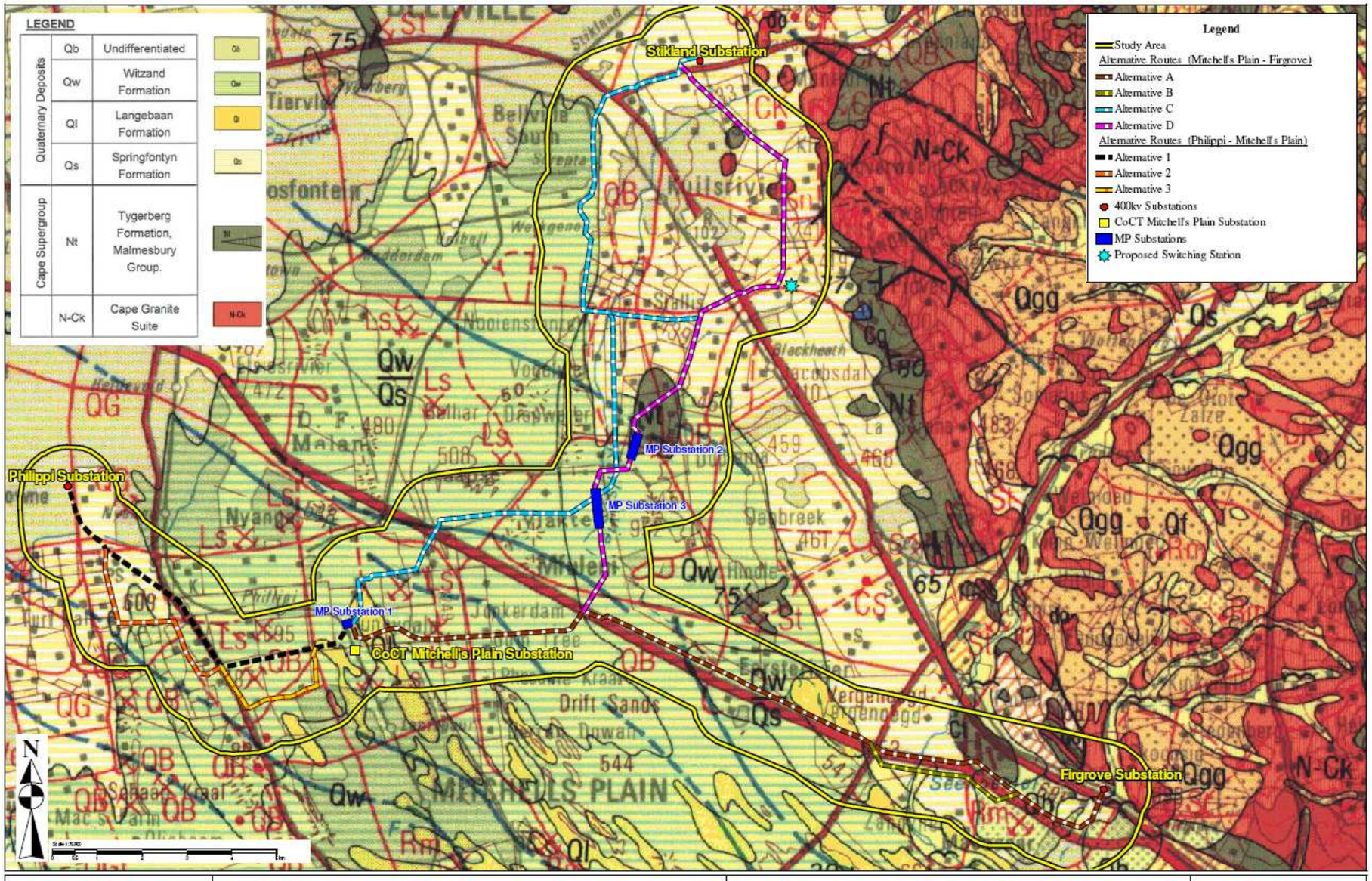

Figure 7-9: Geology of Study Area

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7.5 SOILS AND AGRICULTURE

The study area contains the following types of soils, as described in Table 7-3~~Table 7-3~~ (with corresponding colours), which are also shown in Figure 7-10~~Figure 7-10~~.

- **In the West of the study area:** Moderately deep to deep, fine-grained to medium-grained, grey to yellow sandy soils, dominantly of the Namib (Nb) soil form.
- **East of the study area:** Shallower, duplex soils (i.e. sandy topsoil abruptly overlying a structured clay subsoil) of the Kroonstad (Kd) or Estcourt (Es) soil forms.
- **Next to the Kuils River (east of Khayelitsha) and Eerste River:** Wetland soils of the Katspruit (Ka) soil form.

Table 7-3: Soil Mapping Units of Study Area (Soil Classification Working Group, 1991)

MAP UNIT	DOMINANT SOIL FORM	SOIL CHARACTERISTICS	AGRICULTURAL POTENTIAL
dNb	Namib	Deep (>1 200mm), yellowish-grey, eluvial sands	Low to moderate
dHu	Hutton	Deep (> 1 200mm), red, sandy loam soils	Moderate to high
mdNb	Namib	Moderately deep (600-1 200mm), yellowish-grey, eluvial sands, often on cemented hardpan carbonate	Low to moderate
mdKd	Kroonstad	Moderately deep (600-1 200mm), grey to brown, sandy soils overlying mottled, usually structured, hydromorphic loamy sand to clay loam subsoils	Low to moderate
sNb	Namib	Shallow (300-600mm), yellowish-grey, eluvial sands, usually on cemented hardpan carbonate	Low
sGs	Glenrosa	Shallow (300-600mm), grey-brown, loamy topsoils on weathering rock	Low
sKd	Kroonstad	Shallow (300-600mm), grey to brown, sandy soils overlying mottled, usually structured, hydromorphic loamy sand to clay loam subsoils; often in low-lying positions	Low
sKa	Katspruit	Shallow (300-500mm), grey to black, fine to medium sandy to sandy loam topsoils, on hydromorphic clay loams to clay subsoils; often in low-lying areas	Very low
vsKa	Katspruit	Very shallow (100-300mm), grey to black, fine to medium sandy to sandy loam topsoils, on hydromorphic clay loams to clay subsoils; in low-lying areas	Very low
Vlei	Katspruit	Virtually permanent wetland areas, surface water and hydromorphic soils	None
U	-	Built up areas that were not surveyed	None

Note: where the same mapping unit is shown with a different number attached, (e.g. dNb4), it refers to a separate occurrence of the same mapping unit, as referred to in Table 7-3~~Table 7-3~~.

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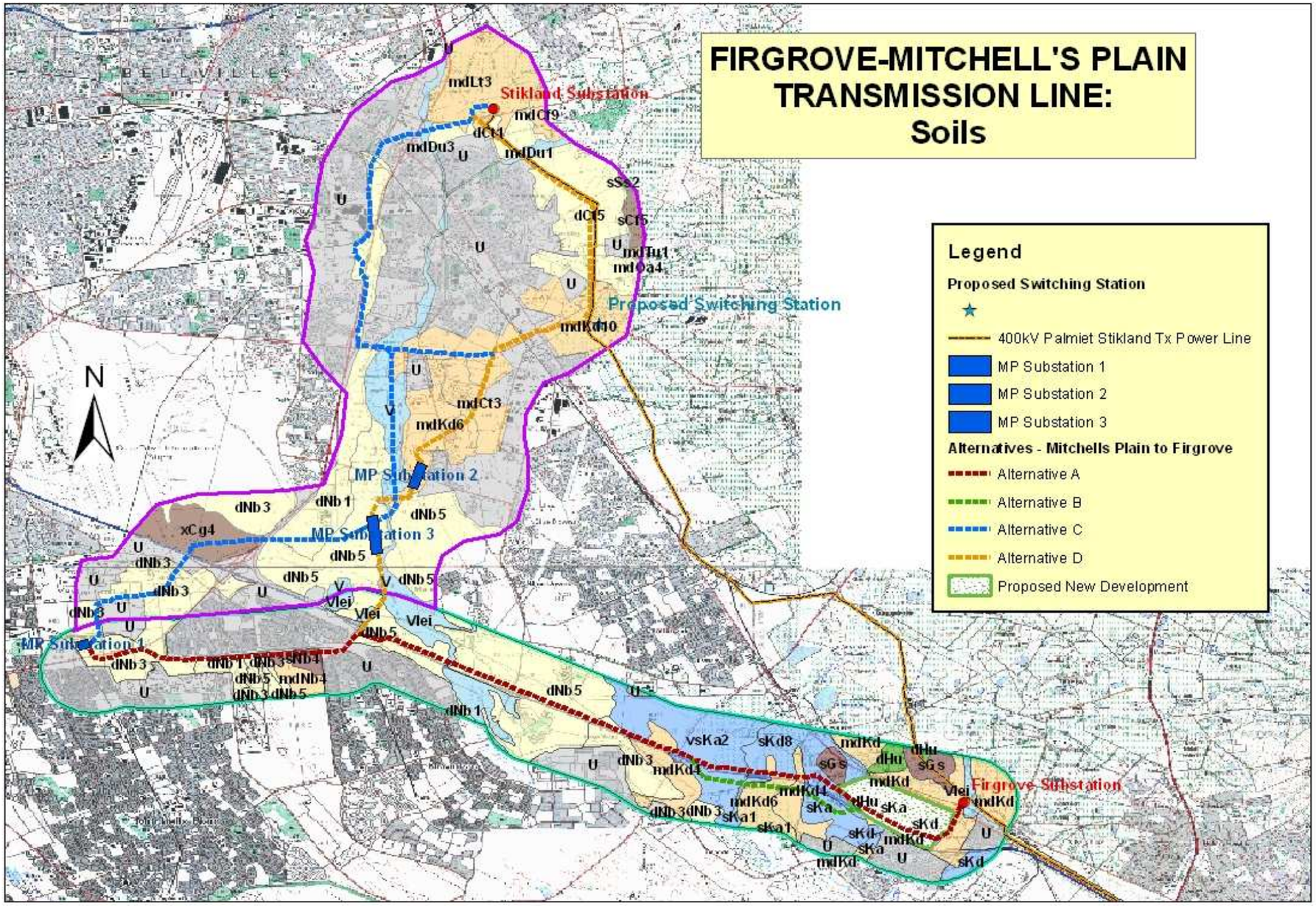

Figure 7-10: Soil formations of Study Area

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7.6 AGRICULTURAL POTENTIAL

7.6.1 Mitchell's Plain Substation Alternatives

The soils on Alternative sites 1 and 3 for the proposed substation are predominately sandy soils (deep Fernwood/Namib) and have a low to moderate agricultural potential, with restrictions caused by the low inherent fertility and the excessive drainage from the sandy texture. The soil at Alternative site 2 is close to a wetland and has a subsurface clay horizon in the soil profile. The soil also has a low agricultural potential. From a grazing viewpoint all these sites have also a low potential. The impact of the potential loss of these soils from an agricultural view point is very low, due to both the soil characteristics as well as the urban nature of the immediate surroundings.

7.6.2 Area close to Firgrove Substation

Cultivated land in the Firgrove-Mitchell's Plain project area extends over 482 ha. Contradictory information is found with respect to crops produced in the area close to the Firgrove Substation; however, it appears that vineyards and vegetable farms are found here.

Figure 7-11: Vegetable farm near Firgrove Substation

7.6.3 Vergenoegd Wine Estate

Most of the Vergenoegd wine estate's activities are undertaken to the west of the Eerste River, which traverses the farm. The area to the east of the Eerste River is not cultivated due to poor soils and is currently used for natural grazing purposes.

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The wine estate is situated on approximately 230ha of the Vergenoegd Farm. Approximately 74ha contains established vineyards, of which 17 ha is irrigated on a permanent basis with a drip irrigation system. The remaining 57ha of vineyards are farmed with supplementary irrigation.

Irrigation water is conveyed upstream by a canal in the Eerste River to a lined dam on the property from which vineyards are irrigated. Water is extracted directly from the Eerste River, where necessary, and is controlled by the Lower Eerste River Irrigation Board.

The quality of the water is threatened by municipal sewage upstream. Contamination is currently at acceptable levels and does not have a negative effect on agricultural production (Jacobs, 2010).

7.7 Economic Potential of Agricultural Land

The total labour requirements for vegetable production are shown in Table 7-4~~Table 7-4~~. One (1) hectare of vegetables creates approximately 1.3 employment opportunities. The total labour requirements for vineyard production, excluding labour requirements in a cellar is approximately 150 man days/ha or 0.65 employment opportunities per hectare.

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Table 7-4: Labour Requirements for Vegetable Production in Western Cape

TYPE	MAN DAYS/HECTARE	MAN YEARS/HECTARE
Permanent	210	0.9
Seasonal	90	0.4
Total	**300**	**1.3**

7.8 Water Resources and Quality

7.8.1 Surface Water

Large scale landscape transformation has resulted in the degradation of many water bodies within the study area. Natural drainage lines have been engineered to accommodate urban development, many being directed to open canals or storm water drainage systems.

The once seasonal Big Lotus Canal and River feeding Zeekoevlei, is now heavily degraded as the attenuation works, which was designed to improve the river's water quality, has failed (Water Research Commission, 2009). According to Day *et al.* (1999) the Big Lotus River has a poor ecological status as shown in Table 7-5~~Table 7-5~~ and Table 7-6~~Table 7-6~~.

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Table 7-5: Ecological Status Classes*

Status Class	Description
Class 1	100% of potential value; unmodified, natural.
Class 2	80-99% of potential value; largely natural with few modifications. A small change in natural habitats and biota may have taken place, but the assumption is that ecosystem functioning is essentially unchanged.
Class 3	60-79% of potential value; moderately modified. A loss and change of natural habitat and biota has occurred, but basic ecosystem functioning appears to be predominantly unchanged.
Class 4	40-59% of potential value; largely modified. A loss of natural habitat and taxa and a reduction in basic ecosystem functioning has occurred.
Class 5	20-39% of potential value; seriously modified. The loss of natural habitat, taxa and ecosystem functioning is extensive.

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Status Class	Description
Class 6	0-19% of potential value; modifications have reached a critical level and there has been an almost complete loss of natural habitat and biota. In the worst cases, basic ecosystem functioning no longer exists.

** Day et al. (1999)*

Table 7-6: Water Quality of the Big Lotus River*

Description	Parameter
Dissolved Oxygen	110 mg/ℓ
pH	8.4
Ammonia	0.38 mg/ℓ
Phosphorus	0.352 mg/ℓ
Faecal coliform	36 000 counts/100 ml

(Source: Cape Metropolitan Council, 1998)
** Day et al. (1999)*

According to the Cape Metropolitan Council (1998), the Kuils River receives its water from adjacent agricultural lands, heavy-industrial areas and residential areas, with only small fragments of natural vegetation. The quality of the river's water is low (see **Figure 7-12**~~**Figure 7-11**~~) and has been influenced by litter, untreated and treated effluent releases from industry and wastewater treatment works, respectively. This water, which has percolated through the surrounding dune system, including portions of the Kuils River that has been canalised, feeds the Khayelitsha wetland system – the largest wetland in the study area.

Urban development has decreased infiltration, resulting in increased volumes of water requiring management. Winter flooding is now common in large portions of urbanised Khayelitsha.

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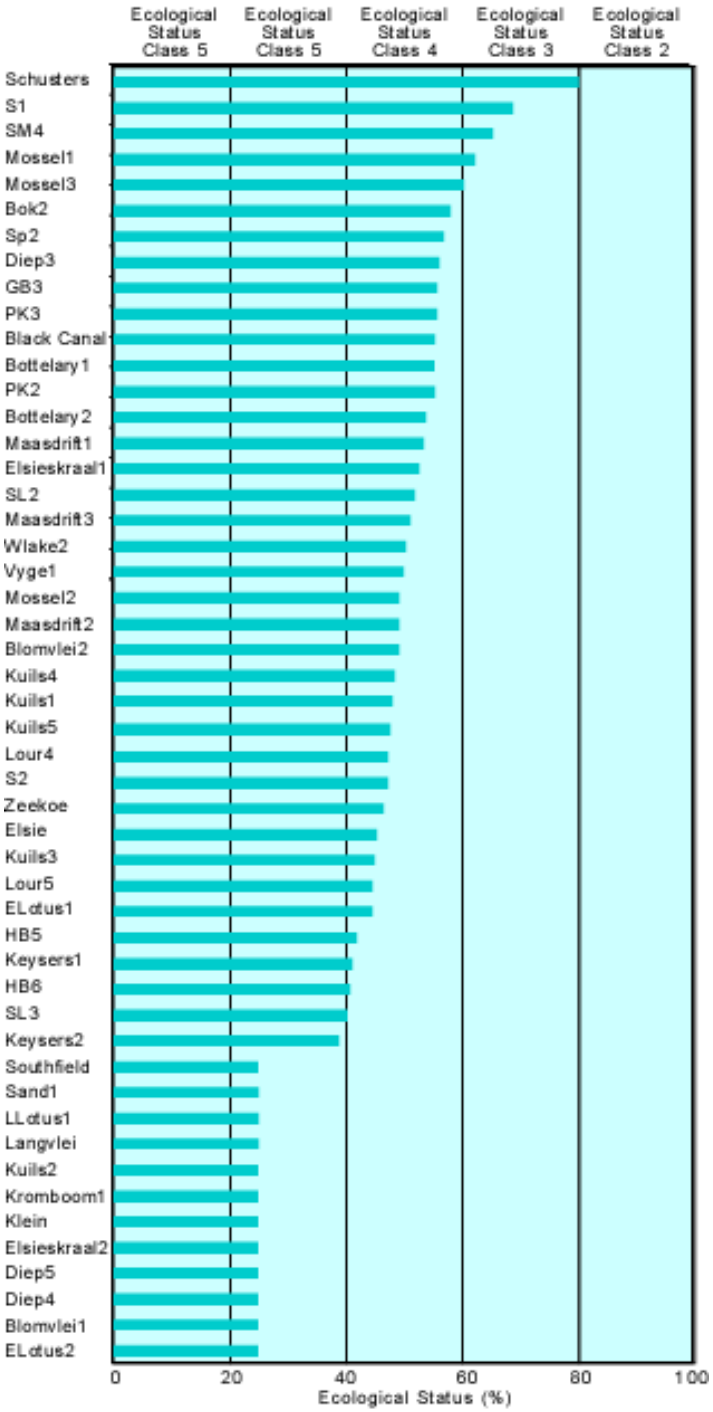

Figure 7-12: Wetland Traditional Rivers (Day *et al.*, 1999)

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7.8.2 Groundwater

The Cape Flats Aquifer is the main ground water resource within the study area. The main part of the aquifer is to the south of the N2 and flows in a westerly direction towards Zeekoevlei and a southerly direction towards Monwabisi/Mnandi.

In accordance with the University of Cape Town (2006), the aquifer is underlain by impervious Malmesbury shales or Cape granite consisting of Cenozioc deposits. Recharge is at an annual rate of 15- 20 million m^3 with negligible contributions from the Kuils River and Zeekoevlei systems. Currently, water is being extracted in bulk from the Philippi Agricultural area, Mitchell's Plain and Strandfontein.

The chemistry of groundwater from the Cape Flats Aquifer is shown in Table 7-7~~Table 7-7~~. The water quality based on electrical conductivity and a mean pH value of 8 indicate that the quality is generally acceptable for any use. According to the respondents, the quality of water in the region is generally good for irrigation purposes.

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Table 7-7: Groundwater Chemistry from the Cape Flats Aquifer*

ELEMENT/PARAMETER	MEAN VALUE
pH	8,0
Electrical Conductivity (mS/m)	53,5
Total Dissolved Salts (mg/ℓ)	365,0
Calcium (mg/ℓ)	70,0
Magnesium (mg/ℓ)	6,0
Sodium (mg/ℓ)	21,0
Potassium (mg/ℓ)	1,5
Chloride (mg/ℓ)	29,0
Total Alkalinity ($CaCO_3$) (mg/ℓ)	157,0
NO_3 + NO_2 (as N) (mg/ℓ)	2.86
Fluoride (mg/ℓ)	0,19
SO_4 (mg/ℓ)	33,0
PO_4 as P (mg/ℓ)	0,014
Si (mg/ℓ)	2,9
NH_4 (as N) (mg/ℓ)	0,05

** Meyer (2001)*

Groundwater is used for irrigation purposes in the study area. Water is extracted from boreholes and pumped into earthen dams which may be lined with chemical products to prevent seepage. Borehole yields are reported to be 3.7-25.0ℓ/s. Borehole depth may vary between 30 and 40m (Leon, 2010).

The average electrical conductivity of borehole water on the Cape Flats is 53.5mS/m. Determinants seldom exceed maximum recommended limits and groundwater generally displays a sodium-chloride-calcium-alkaline nature.

7.8.3 Wetlands

The floodplains of the Kuils River and the Eerste River, which are associated with extensive wetlands, are located within the study area. These wetlands are mostly Dune Strandveld wetlands, with some Sand Fynbos wetlands around the existing Firgrove and Stikland substations. The wetlands in the study area are taken from the Cape Town Biodiversity Network Report (Stipnovich & Holmes, 2009), and are considered important in terms of

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ecological functioning and sensitivity (Snaddon, 2009) (see Figure 7-14~~Figure 7-13~~). The wetland systems within and to the southeast of the DNR and including the Kuils River Floodplain are regarded as the highest conservation priority within the study area, and support the highest biodiversity of frogs, birds, insects, etc. (Helme, 2009).

The route alignment FM-A crosses the Firgrove wetland, Youngsfield wetland, Kuils River floodplain and the Khayelitsha wetland (Figure 7-13~~Figure 7-12~~). These wetlands were named for referencing purposes in this report. Of these four wetlands, the Kuils River floodplain is the largest and the most important wetland in terms of wetland functions.

Kuils River floodplain

Khayelitsha Wetland

Firgrove Wetland

Youngsfield Wetland

Figure 7-13: Photographs of Wetlands in Study Area

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Figure 7-14: Wetlands in Study Area (Stipinovich & Holmes, 2009)

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a) Kuils River Floodplain

The section of the Kuils River floodplain that is in the study area flows through heavy industrial and residential areas, with only small fragments of natural vegetation. Many pollutants are likely to be discharged into the river. The Kuils River has been directly impacted by infilling at various sections, and developments are often very close to the water channel.

The route alignments cross the Kuils River floodplain at the following area:

- To the north of the Stellenbosch Arterial Road crossing (33°57'16.31"S; 18°39'47.76"E) the Kuils River is a channelled valley bottom. To the south of this crossing, the river is much more diffuse in an unchannelled valley bottom and overgrown with *Pragmites australis* (Figure 7-15~~Figure 7-14~~).
- Alternative MS-C runs parallel to the river, at various distances of 100-300m east of the river. This section of the route alignment falls within wetlands associated with the Kuils River, and crosses further south within the DNR again (Figure 7-16~~Figure 7-15~~).
- Alternative MS-D crosses the Kuils River within the DNR and near the suburb of Rouxville (Figure 7-16~~Figure 7-15~~). The alignment also runs parallel to the Kuils River south of the DNR, at approximately 200m west of the river.

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Channelled valley bottom wetland north of the Stellenbosch Arterial Road

Flow of water in the Kuils River is more diffuse and unchannelled with *Phragmites australis*, south of the Stellenbosch Arterial Road

Figure 7-15: Crossing of the Kuils River floodplain by Alternative MS-C

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Driftsands Nature Reserve

Kuils River area near Rouxville suburb

Figure 7-16: Crossing of the Kuils River floodplain by Alternative MS-D

b) Driftsands Wetland

A mosaic of important wetlands is found interspersed within the dunes in the Driftsands Nature Reserve. These wetlands are sensitive habitats for frogs, small mammals, plants and birds.

c) Mitchell's Plain Wetland

Substation Alternative 1 is proposed on a section of an open space north of Mitchell's Plain. During the site visit the presence of a wetland was confirmed on this site. The topography of the area is erratic and previous excavations have occurred. At the lowest points of these excavations permanent water is found (Figure 7-17~~Figure 7-16~~). Water and light grey mottling were found 0.5m into the soil profile. Little typical wetland vegetation was found, other than a few individuals of *Zantedeschia aethiopica*. During the site visit in March 2010, the area proposed for the Mitchell's Plain Substation Alternative 1 was completely covered by *Acacia saligna*, but by August 2010 it was noted that these trees had been felled (Figure 7-17~~Figure 7-16~~).

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Wet soils at 0.5m

Soil sample with mottles

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Acacia saligna cover during March 2010 Acacia saligna removed in August 2010

Figure 7-17: Mitchell's Plain Wetland

7.9 ECOLOGY

The study area lies within the Fynbos biome and the Cape Floristic Region (CFR). The CFR is one of only six floristic regions in the world, is the richest temperate flora in the world, and is the only one confined to a single country. It is also by far the smallest floristic region, occupying only 0.1% of the world's land surface, and supporting about 9000 plant species – almost half of all the plant species in South Africa. At least 70% of all the species in the Cape region do not occur elsewhere, and many have very small home ranges (these are known as narrow endemics). Most of the lowland habitats are under pressure from agriculture, urbanisation and alien plants, and thus many of the range restricted species are also under severe threat of extinction, as habitat is reduced to extremely small fragments. Data from the Red Listing process recently undertaken for South Africa is that 67% of the threatened plant species in the country occur only in the Fynbos biome, and these total over 1800 species (Raimondo *et al*, 2009). It should thus be clear that the south-western Cape is a major national and global conservation priority, and is quite unlike anywhere else in the country in terms of the number of threatened plant species.

The proposed infrastructure is located within an area known as the Cape Flats, which is an acknowledged national hotspot of threatened vegetation types and threatened plant species (Rebelo *et al*, 2011). The area has been previously described as a "conservation megadisaster" (Wood *et al*, 1994) due to the unprecedented loss of habitat and species in the heart of a global plant diversity hotspot. The CoCT supports about 18% of all threatened plant species in the country, and the Cape Flats are known to support a large proportion of the Endangered and Critically Endangered plant species within the City (Rebelo *et al*, 2011).

The study area is located within numerous urban and peri-urban settlements, and most of the remaining open space is highly fragmented. The study area can be broadly divided into open spaces and built environment (where no natural vegetation is left). Open spaces are further divided into wetlands and Dune Stranveld (see **Figure 7-20~~Figure 7-19~~**).

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7.9.1 Built-Up Environment

Industrial areas, residential areas or agricultural fields (where no natural vegetation is left) can also be found within the greater study area. Figure 7-18~~Figure 7-17~~ contains photographs taken of these areas during the field survey.

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Figure 7-18: Built-Up Areas within Study Area

7.9.2 Old Agricultural Lands

Certain sections along the proposed development route are abandoned agricultural lands (Figure 7-19~~Figure 7-18~~). These areas are generally covered by pioneer grass species such as *Cynodon dactylon*, *Eragrostis curvula* and *Lagurus ovatus* and forbs such as *Asclepias fruticosa*. The vegetation cover of these areas is generally more than 80% and the height is approximately 75cm. The biological diversity in these areas is low and there is no indication of the original fynbos veld types that were initially present on these sites.

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Figure 7-19: Old Agricultural Lands within Study Area

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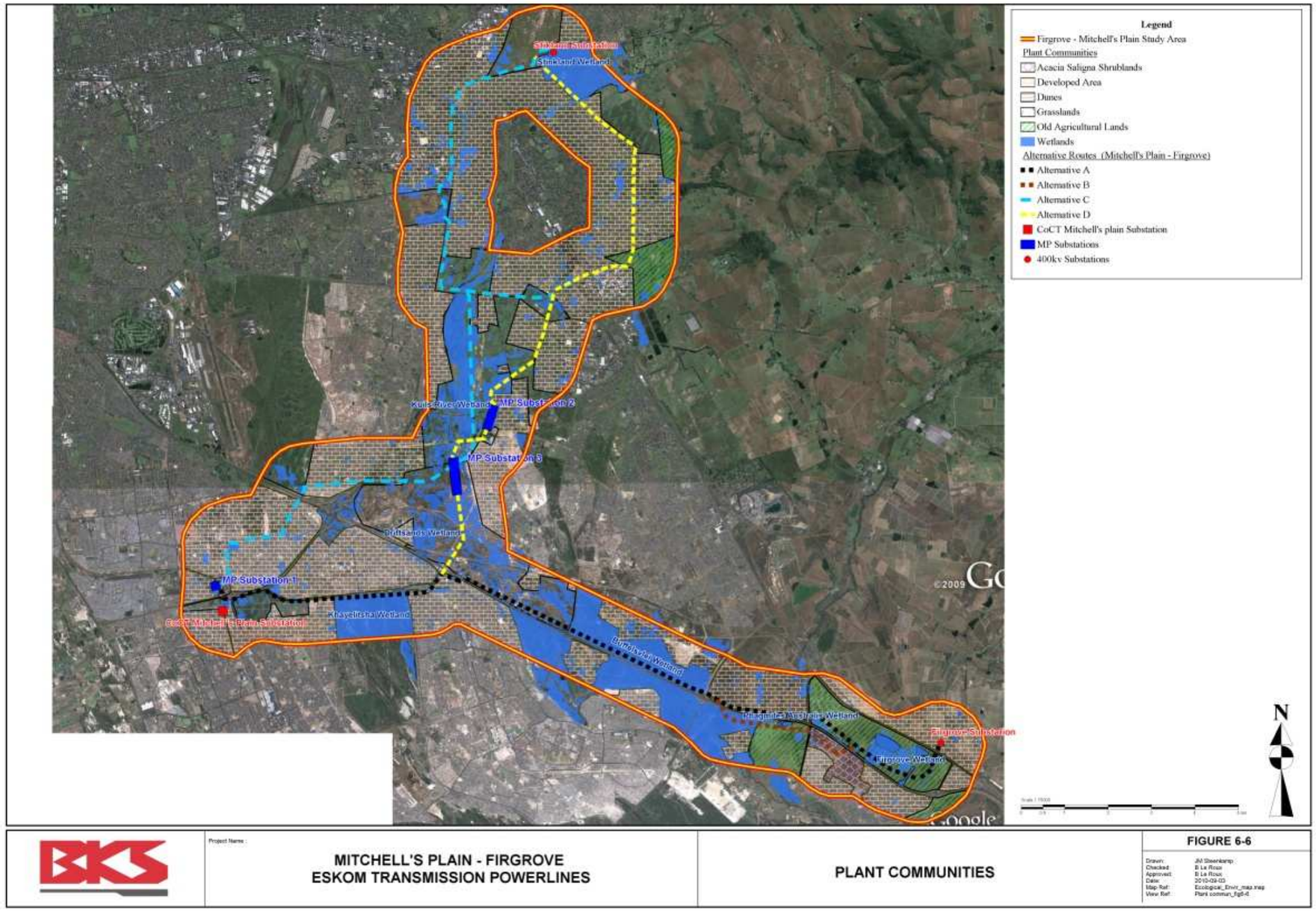

Figure 7-20: Plant Communities in Study Area

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7.9.3 *Acacia saligna* Shrublands

Acacia saligna is an invasive tree from Australia that poses real threats to the natural biodiversity of the fynbos biome, and it usually invades areas where there has been soil disturbance. The species prefers seasonally damp soils and resprouts rapidly after fire. Certain sections within the study area are dominated by dense stands of this species (Figure 7-21~~Figure 7-20~~). This is usually a result of soil disturbance and/or repeated, annual fires, which eliminate most of the other shrubby species and allow an under-storey of annual, alien grasses (mainly *Briza, Lolium* and *Avena* species) to establish.

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Despite the high impact on the natural Strandveld within the study area, some indigenous species persist, including:

- *Aspalathus hispida*;
- *Searsia laevigata*;
- *Ehrharta villosa*; and
- *Chrysanthemoides monilifera*.

Certain areas could potentially be partly rehabilitated, provided that the soil structure has not been disturbed by earthmoving machinery, chemically altered by dense stands of *Acacia* (which increase soil nitrogen levels), and provided that the areas experience an appropriate fire cycle (many patches in this urban area burn too often). In reality very few, if any, of these areas will be rehabilitated, and this would also require expensive and time consuming ongoing ecological management.

Figure 7-21: Alien *Acacia saligna* shrublands within the study area

** Note recent fire effects in the picture on the right.*

7.9.4 Other Alien Invasive Species

Several species of alien invasive vegetation were brought to the Cape during the 1800s for dune stabilisation works across the Cape Flats. These species have proven to be so successful that many of them have spread, pressurising adjacent fynbos areas.

Acacia saligna is the dominant woody invasive within the study area. Alien acacias result in elevated nutrient levels in the soil, which allow and encourage the invasion of alien annual grasses, which in turn faciliate more frequent fires (Mucina & Rutherford, 2006). Many of the *A. saligna* trees in the study site are infected by a gall forming rust fungus,

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Uromycladium tepperianum, which is used as a biological control agent on these trees, although this seldom kills the trees.

Other alien invasive plants recorded within the study area include:

- *Pinus pinea*;
- *Eucalyptus* species;
- *Pennisetum clandestinum*;
- *Persicaria* species;
- *Ricinus communis*;
- *Lolium* species;
- *Avena* species;
- *Bromus* species;
- *Datura* species;
- *Echium vulgare*; and
- *Plantago lanceolata*.

Most alien species have a certain degree of impact on the biodiversity of the ecosystems. In the study area *A. saligna* and *P. clandestinum* (kikuyu grass) are probably the most serious alien invasive plants, and in some areas have replaced the natural vegetation entirely. In some areas where alien vegetation cover is not the result of prior soil disturbance the natural vegetation is considered to be rehabilitable, but often dense alien vegetation is the result of soil disturbance, which makes rehabilitation very difficult.

7.9.5 Dune Strandveld

The DNR is situated in the middle of the study area and is central to the alternative alignments. Dunes and characteristic vegetation of the Cape Flats Dune Strandveld are found in certain areas of the DNR (Figure 7-22~~Figure 7-21~~). The DNR is regarded as sensitive as it is one of the few reserves that formally conserves Endangered Cape Flats Dune Strandveld.

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All the route alignments will cross/pass the DNR. Figure 7-22~~Figure 7-21~~ presents photographs of where the alternatives alignments will cross/pass the DNR. Alternative FM-A passes the southern edge of the nature reserve and will have only a minor influence on the nature reserve; habitat fragmentation will not occur. Alternative MS-C crosses the nature reserve and several sensitive wetlands as indicated in Figure 7-14~~Figure 7-13~~, but most of the alignment in this section follows existing Eskom Distribution power lines already disturbed, and the proposed alignment should thus have minimal influence on the vegetation. Alternative MS-D runs within an existing servitude along the eastern boundary of the DNR, where it will not have a large influence on any sensitive vegetation. The southern section of Alternative MS-D that runs along the boundary of the Nature Reserve will be within a footpath that does not provide adequate space for the Transmission power line servitude. Some of the natural vegetation and wetlands will be influenced along this section. The DNR was invaded by various informal settlements, and most of the Nature Reserve is thus impacted by human activities such as too frequent fires and grazing by cattle. The Nature Reserve is not adequately fenced – both people and cattle have created many footpaths, and illegal waste dumping is a problem along the edges. Due to these disturbances the original Dune Strandveld has been replaced by grasses (indigenous and

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alien) in many areas. Despite these impacts the DNR still supports valuable habitat and vegetation of an endangered type. Alternatives FM-A, MS-C and MS-D will not influence the best habitat within the reserve, and will cross mostly heavily disturbed areas of relatively Low sensitivity.

FM-A: along the southern boundary between the DNR and the N2, facing west

MS-C: along existing pylons, facing east

MS-D: along eastern boundary of the DNR within the servitude and along footpaths

MS-D: along eastern boundary of the DNR within the servitude and along footpaths

Figure 7-22: Route Alignments Crossing the DNR

7.9.6 Critical Biodiversity Areas

Critical Biodiversity Areas (CBA) are features critical for the conservation of biodiversity and maintenance of ecosystem functioning and should remain in a natural state as far as possible. All natural wetlands are considered part of the Biodiversity Network (see Figure 7-25~~Figure 7-24~~).

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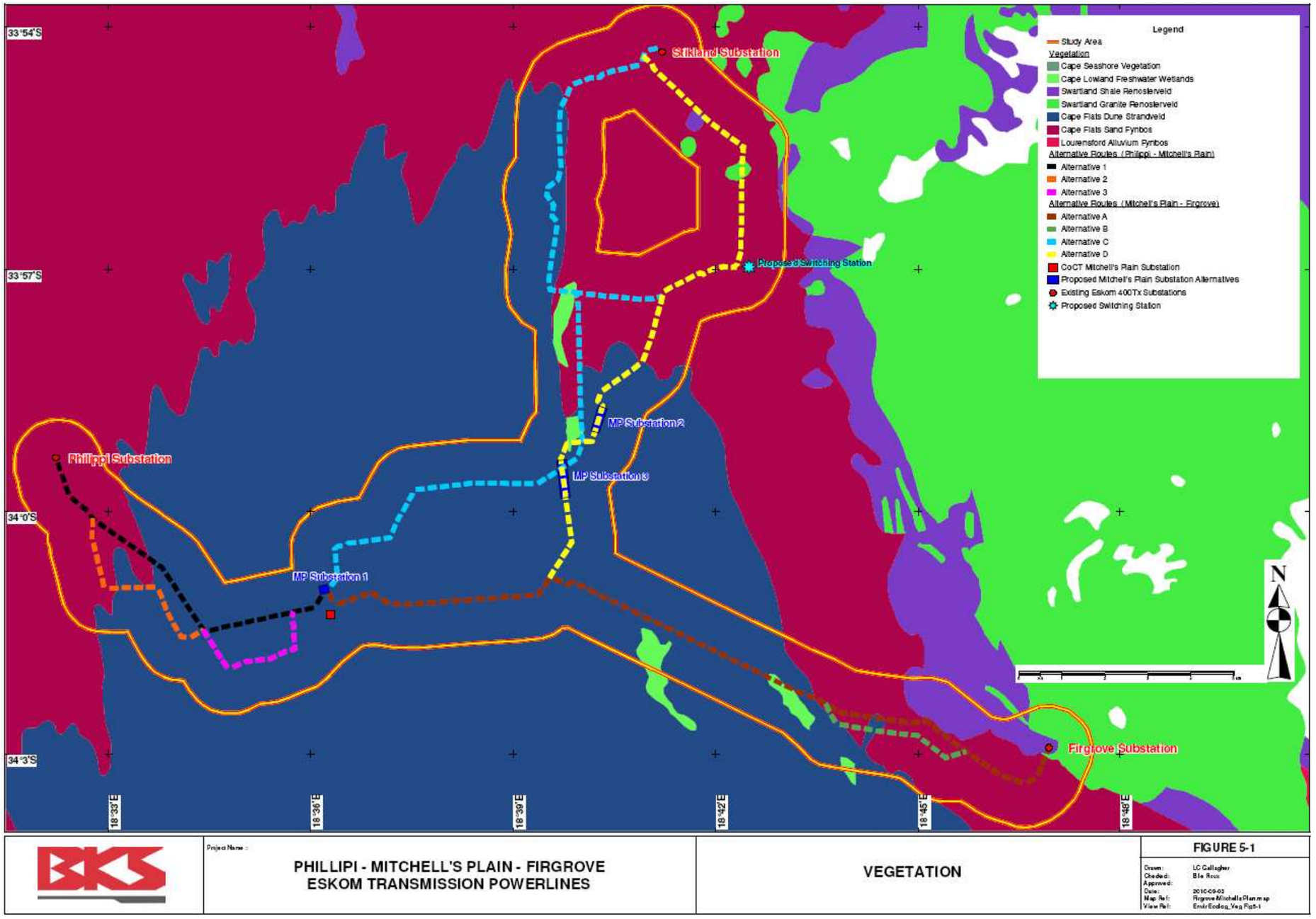

Figure 7-23: Historical Veld Types In and Around Study Area

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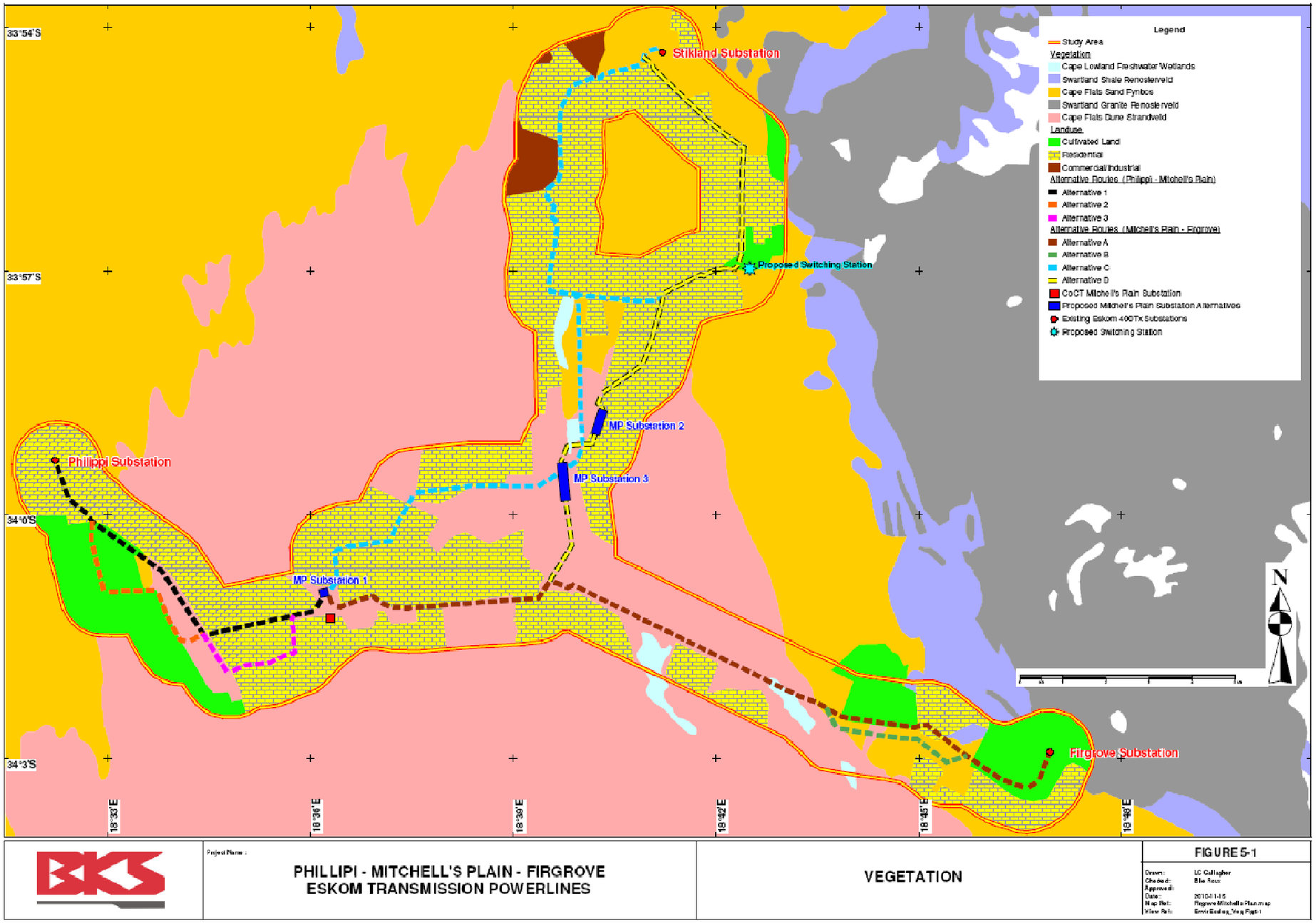

Figure 7-24: Remnant Vegetation Veld Types In and Around Study Area

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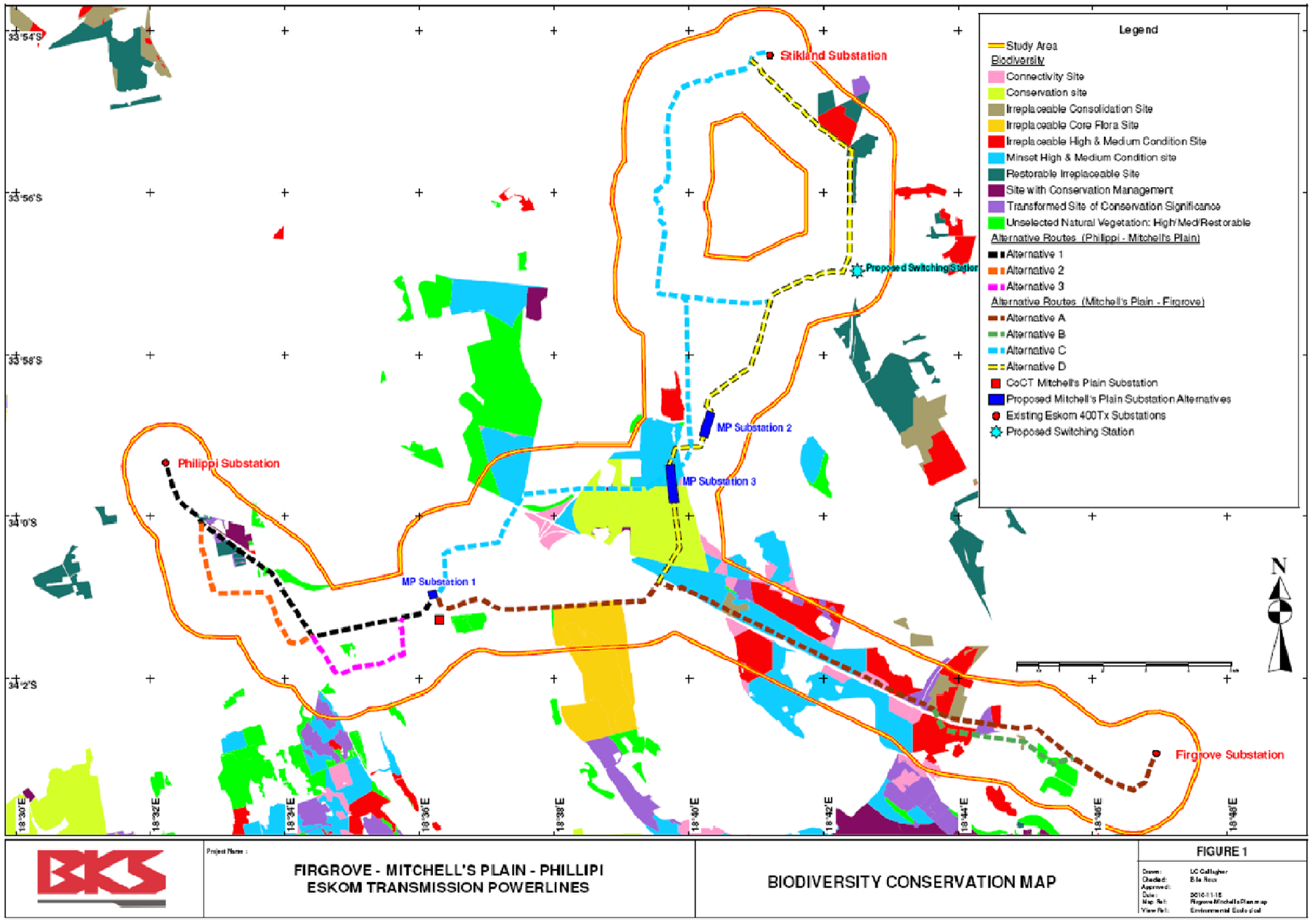

Figure 7-25: Biodiversity Conservation Map

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7.9.7 Red Data Listed Plants

Plant species classified as the red data list (SANBI, 2004) have been recorded in the relevant Quarter Degree Square of the study area. See Table 7-8~~Table 7-8~~, Table 7-9~~Table 7-9~~ and Table 7-10~~Table 7-10~~ for a list of all the species that may occur within the study area.

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Table 7-8: Red Data Listed Plant Species for Quarter Degree Square 3318DC

FAMILY	SPECIES
Extinct	
Ericaceae	*Erica alexandri* Guthrie & Bolus subsp. *acockii* (Compton) E.G.H.Oliv.
Critically Endangered, Possibly Extinct	
Fabaceae	*Aspalathus puberula* (Eckl. & Zeyh.) R.Dahlgren
Fabaceae	*Aspalathus retroflexa* L. subsp. *bicolor* (Eckl. & Zeyh.) R.Dahlgren
Critically Endangered	
Asteraceae	*Cotula myriophylloides* Harv.
Asteraceae	*Metalasia distans* (Schrank) DC.
Cyperaceae	*Trianoptiles solitaria* (C.B.Clarke) Levyns
Ericaceae	*Erica bolusiae* Salter var. bolusiae
Fabaceae	*Amphithalea ericifolia* (L.) Eckl. & Zeyh. subsp. *erecta* Granby
Fabaceae	*Aspalathus horizontalis* (R.Dahlgren) R.Dahlgren
Fabaceae	*Podalyria microphylla* E.Mey.
Fabaceae	*Psoralea glaucina* Harv.
Hyacinthaceae	*Lachenalia arbuthnotiae* W.F.Barker
Iridaceae	*Babiana leipoldtii* G.J.Lewis
Iridaceae	*Babiana regia* (G.J.Lewis) Goldblatt & J.C.Manning
Iridaceae	*Babiana secunda* (Thunb.) Ker Gawl.
Iridaceae	*Watsonia amabilis* Goldblatt
Iridaceae	*Watsonia humilis* Mill.
Oxalidaceae	*Oxalis natans* L.f.
Proteaceae	*Diastella proteoides* (L.) Druce
Proteaceae	*Leucadendron levisanus* (L.) P.J.Bergius
Proteaceae	*Leucadendron thymifolium* (Salisb. ex Knight) I.Williams
Proteaceae	*Leucadendron verticillatum* (Thunb.) Meisn.
Proteaceae	*Serruria aemula* Salisb. ex Knight
Proteaceae	*Serruria furcellata* R.Br.
Proteaceae	*Serruria pinnata* (Andr.) R.Br.
Proteaceae	*Serruria trilopha* Salisb. ex Knight
Restionaceae	*Restio acockii* Pillans
Endangered	
Aizoaceae	*Tetragonia caesia* Adamson
Amaryllidaceae	*Hessea cinnamomea* (L'Hér.) T.Durand & Schinz
Asphodelaceae	*Aloe ramosissima* Pillans
Asteraceae	*Athanasia capitata* (L.) L.
Asteraceae	*Marasmodes dummeri* Bolus ex Hutch.

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FAMILY	SPECIES
Asteraceae	*Metalasia octoflora* DC.
Boraginaceae	*Echiostachys spicatus* (Burm.f.) Levyns
Ericaceae	*Erica ferrea* P.J.Bergius
Fabaceae	*Aspalathus aculeata* Thunb.
Fabaceae	*Aspalathus tylodes* Eckl. & Zeyh.
Fabaceae	*Lebeckia meyeriana* Eckl. & Zeyh.
Fabaceae	*Lebeckia plukenetiana* E.Mey.
Fabaceae	*Podalyria argentea* Salisb.
Fabaceae	*Psoralea peratica* C.H.Stirt.
Fabaceae	*Xiphotheca lanceolata* (E.Mey.) Eckl. & Zeyh.
Fabaceae	*Xiphotheca reflexa* (Thunb.) A.L.Schutte & B.-E.van Wyk
Geraniaceae	*Pelargonium chelidonium* (Houtt.) DC.
Hyacinthaceae	*Lachenalia liliflora* Jacq.
Hypoxidaceae	*Spiloxene minuta* (L.) Fourc.
Iridaceae	*Aristea biflora* Weim.
Iridaceae	*Aristea lugens* (L.f.) Steud.
Iridaceae	*Babiana odorata* L.Bolus
Iridaceae	*Babiana villosula* (J.F.Gmel.) Ker Gawl. ex Steud.
Iridaceae	*Geissorhiza furva* Ker Gawl. ex Baker
Iridaceae	*Geissorhiza setacea* (Thunb.) Ker Gawl.
Iridaceae	*Gladiolus jonquilliodorus* Eckl. ex G.J.Lewis
Iridaceae	*Sparaxis grandiflora* (D.Delaroche) Ker Gawl. subsp. *grandiflora*
Mesembryanthemaceae	*Lampranthus debilis* (Haw.) N.E.Br.
Mesembryanthemaceae	*Lampranthus dilutus* N.E.Br.
Mesembryanthemaceae	*Lampranthus diutinus* (L.Bolus) N.E.Br.
Mesembryanthemaceae	*Lampranthus explanatus* (L.Bolus) N.E.Br.
Mesembryanthemaceae	*Lampranthus leptaleon* (Haw.) N.E.Br.
Mesembryanthemaceae	*Lampranthus reptans* (Aiton) N.E.Br.
Orchidaceae	*Disa draconis* (L.f.) Sw.
Orchidaceae	*Disa lugens* Bolus var. *lugens*
Orchidaceae	*Disa tenella* (L.f.) Sw. subsp. *tenella*
Orchidaceae	*Pterygodium cruciferum* Sond.
Oxalidaceae	*Oxalis falcatula* T.M.Salter
Oxalidaceae	*Oxalis strigosa* T.M.Salter
Penaeaceae	*Stylapterus fruticulosus* (L.f.) A.Juss.
Poaceae	*Prionanthium pholiuroides* Stapf
Polygalaceae	*Muraltia brevicornu* DC.
Polygalaceae	*Muraltia decipiens* Schltr.
Polygalaceae	*Muraltia mitior* (P.J.Bergius) Levyns
Proteaceae	*Leucadendron lanigerum* H.Buek ex Meisn. var. *lanigerum*
Proteaceae	*Serruria brownii* Meisn.
Proteaceae	*Serruria cyanoides* (L.) R.Br.

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FAMILY	SPECIES
Proteaceae	*Serruria incrassata* Meisn.
Proteaceae	*Serruria linearis* Salisb. ex Knight
Proteaceae	*Spatalla caudata* (Thunb.) R.Br.
Restionaceae	*Elegia acockii* (Pillans) Moline & H.P.Linder
Restionaceae	*Ischyrolepis pratensis* Esterh.
Restionaceae	*Ischyrolepis sabulosa* (Pillans) H.P.Linder
Restionaceae	*Restio micans* Nees
Rhamnaceae	*Phylica plumosa* L. var. squarrosa (Vent.) Sond.
Rosaceae	*Cliffortia ericifolia* L.f.
Rosaceae	*Cliffortia hirta* Burm.f.
Rosaceae	*Cliffortia marginata* Eckl. & Zeyh.
Rutaceae	*Agathosma corymbosa* (Montin) G.Don
Rutaceae	*Agathosma glabrata* Bartl. & H.L.Wendl.
Rutaceae	*Macrostylis cassiopoides* (Turcz.) I.Williams subsp. *cassiopoides*
Rutaceae	*Macrostylis cassiopoides* (Turcz.) I.Williams subsp. *dregeana* (Sond.) I.Williams
Rutaceae	*Macrostylis villosa* (Thunb.) Sond. subsp. *villosa*
Thymelaeaceae	*Passerina paludosa* Thoday
Vulnerable	
Asteraceae	*Othonna ciliata* L.f.
Asteraceae	*Steirodiscus tagetes* (L.) Schltr.
Boraginaceae	*Echiostachys incanus* (Thunb.) Levyns
Boraginaceae	*Lobostemon capitatus* (L.) H.Buek
Ericaceae	*Erica capitata* L.
Fabaceae	*Aspalathus acanthophylla* Eckl. & Zeyh.
Fabaceae	*Aspalathus albens* L.
Fabaceae	*Aspalathus araneosa* L.
Fabaceae	*Aspalathus globulosa* E.Mey.
Fabaceae	*Aspalathus lotoides* Thunb. subsp. *lotoides*
Fabaceae	*Aspalathus ternata* (Thunb.) Druce
Fabaceae	*Liparia splendens* (Burm.f.) Bos & de Wit subsp. *splendens*
Geraniaceae	*Pelargonium leptum* L.Bolus
Hyacinthaceae	*Lachenalia mediana* Jacq. var. *mediana*
Hyacinthaceae	*Lachenalia orthopetala* Jacq.
Hyacinthaceae	*Lachenalia reflexa* Thunb.
Hypoxidaceae	*Spiloxene alba* (Thunb.) Fourc.
Iridaceae	*Aristea cantharophila* Goldblatt & J.C.Manning
Iridaceae	*Babiana melanops* Goldblatt & J.C.Manning
Iridaceae	*Geissorhiza purpureolutea* Baker
Iridaceae	*Geissorhiza tenella* Goldblatt
Iridaceae	*Gladiolus meliusculus* (G.J.Lewis) Goldblatt & J.C.Manning
Iridaceae	*Gladiolus recurvus* L.
Iridaceae	*Gladiolus trichonemifolius* Ker Gawl.

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FAMILY	SPECIES
Iridaceae	*Hesperantha spicata* (Burm.f.) N.E.Br. subsp. *spicata*
Iridaceae	*Moraea elsiae* Goldblatt
Iridaceae	*Moraea versicolor* (Salisb. ex Klatt) Goldblatt
Iridaceae	*Moraea villosa* (Ker Gawl.) Ker Gawl. subsp. *elandsmontana* Goldblatt
Iridaceae	*Moraea villosa* (Ker Gawl.) Ker Gawl. subsp. *villosa*
Iridaceae	*Sparaxis elegans* (Sweet) Goldblatt
Malvaceae	*Hermannia rugosa* Adamson
Mesembryanthemaceae	*Antimima aristulata* (Sond.) Chess. & Gideon F.Sm.
Mesembryanthemaceae	*Drosanthemum striatum* (Haw.) Schwantes
Mesembryanthemaceae	*Erepsia patula* (Haw.) Schwantes
Mesembryanthemaceae	*Erepsia ramosa* L.Bolus
Mesembryanthemaceae	*Lampranthus filicaulis* (Haw.) N.E.Br.
Mesembryanthemaceae	*Lampranthus glaucus* (L.) N.E.Br.
Mesembryanthemaceae	*Lampranthus peacockiae* (L.Bolus) L.Bolus
Mesembryanthemaceae	*Lampranthus sociorum* (L.Bolus) N.E.Br.
Mesembryanthemaceae	*Lampranthus stenopetalus* (L.Bolus) N.E.Br.
Mesembryanthemaceae	*Ruschia geminiflora* (Haw.) Schwantes
Orchidaceae	*Acrolophia bolusii* Rolfe
Polygalaceae	*Muraltia brachypetala* Wolley-Dod
Polygalaceae	*Muraltia macropetala* Harv.
Proteaceae	*Diastella divaricata* (P.J.Bergius) Rourke subsp. *montana* Rourke
Proteaceae	*Leucadendron cinereum* (Sol. ex Aiton) R.Br.
Proteaceae	*Leucadendron corymbosum* P.J.Bergius
Proteaceae	*Leucospermum hypophyllocarpodendron* (L.) Druce subsp. *hypophyllocarpodendron*
Proteaceae	*Leucospermum tomentosum* (Thunb.) R.Br.
Proteaceae	*Protea burchellii* Stapf
Proteaceae	*Protea restionifolia* (Salisb. ex Knight) Rycroft
Proteaceae	*Protea scolymocephala* (L.) Reichard
Proteaceae	*Serruria inconspicua* L.Guthrie & T.M.Salter
Proteaceae	*Serruria millefolia* Salisb. ex Knight
Restionaceae	*Calopsis impolita* (Kunth) H.P.Linder
Restionaceae	*Elegia prominens* Pillans
Restionaceae	*Elegia verreauxii* Mast.
Restionaceae	*Ischyrolepis duthieae* (Pillans) H.P.Linder
Restionaceae	*Ischyrolepis paludosa* (Pillans) H.P.Linder
Rhamnaceae	*Phylica harveyi* (Arn.) Pillans
Rutaceae	*Diosma dichotoma* P.J.Bergius
Thymelaeaceae	*Gnidia spicata* (L.f.) Gilg
Thymelaeaceae	*Lachnaea capitata* (L.) Crantz
Thymelaeaceae	*Lachnaea grandiflora* (L.f.) Baill.
Thymelaeaceae	*Lachnaea uniflora* (L.) Crantz

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Table 7-9: Red Data Listed Plant Species for Quarter Degree Square 3418BA

FAMILY	SPECIES
Extinct	
Ericaceae	*Erica pyramidalis* Sol. var. *pyramidalis*
Fabaceae	*Aspalathus variegata* Eckl. & Zeyh.
Extinct In The Wild	
Ericaceae	*Erica verticillata* P.J.Bergius
Critically Endangered	
Asteraceae	*Arctotheca forbesiana* (DC.) K.Lewin
Asteraceae	*Arctotis angustifolia* L.
Asteraceae	*Cadiscus aquaticus* E.Mey. ex DC.
Asteraceae	*Cotula filifolia* Thunb.
Ericaceae	*Erica capillaris* Bartl. var. *capillaries*
Ericaceae	*Erica margaritacea* Sol.
Fabaceae	*Psoralea glaucina* Harv.
Hyacinthaceae	*Lachenalia arbuthnotiae* W.F.Barker
Iridaceae	*Gladiolus griseus* Goldblatt & J.C.Manning
Iridaceae	*Moraea angulata* Goldblatt
Iridaceae	*Watsonia humilis* Mill.
Malvaceae	*Hermannia procumbens* Cav. subsp. *procumbens*
Mesembryanthemaceae	*Lampranthus tenuifolius* (L.) N.E.Br.
Orchidaceae	*Corycium microglossum* Lindl.
Orchidaceae	*Disa barbata* (L.f.) Sw.
Proteaceae	*Diastella proteoides* (L.) Druce
Proteaceae	*Leucadendron floridum* R.Br.
Proteaceae	*Leucadendron levisanus* (L.) P.J.Bergius
Proteaceae	*Leucadendron verticillatum* (Thunb.) Meisn.
Proteaceae	*Protea caespitosa* Andrews
Proteaceae	*Serruria aemula* Salisb. ex Knight
Proteaceae	*Serruria hirsuta* R.Br.
Proteaceae	*Serruria trilopha* Salisb. ex Knight
Endangered	
Amaryllidaceae	*Hessea cinnamomea* (L'Hér.) T.Durand & Schinz
Ericaceae	*Erica ferrea* P.J.Bergius
Fabaceae	*Lebeckia meyeriana* Eckl. & Zeyh.
Iridaceae	*Babiana villosula* (J.F.Gmel.) Ker Gawl. ex Steud.
Iridaceae	*Gladiolus jonquilliodorus* Eckl. ex G.J.Lewis
Iridaceae	*Gladiolus quadrangulus* (D.Delaroche) Barnard
Iridaceae	*Romulea eximia* M.P.de Vos
Isoetaceae	*Isoetes capensis* A.V.Duthie
Mesembryanthemaceae	*Dorotheanthus clavatus* (Haw.) Struck
Mesembryanthemaceae	*Erepsia dunensis* (Sond.) Klak
Mesembryanthemaceae	*Lampranthus debilis* (Haw.) N.E.Br.

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FAMILY	SPECIES
Mesembryanthemaceae	*Lampranthus explanatus* (L.Bolus) N.E.Br.
Mesembryanthemaceae	*Lampranthus scaber* (L.) N.E.Br.
Orchidaceae	*Disa draconis* (L.f.) Sw.
Orchidaceae	*Disa lugens* Bolus var. *lugens*
Orchidaceae	*Disa venusta* Bolus
Plumbaginaceae	*Limonium depauperatum* (Boiss.) R.A.Dyer
Polygalaceae	*Muraltia mitior* (P.J.Bergius) Levyns
Proteaceae	*Leucospermum grandiflorum* (Salisb.) R.Br.
Proteaceae	*Protea stokoei* E.Phillips
Proteaceae	*Serruria cyanoides* (L.) R.Br.
Restionaceae	*Ischyrolepis sabulosa* (Pillans) H.P.Linder
Rosaceae	*Cliffortia ericifolia* L.f.
Rosaceae	*Cliffortia hirta* Burm.f.
Rosaceae	*Cliffortia marginata* Eckl. & Zeyh.
Rutaceae	*Agathosma corymbosa* (Montin) G.Don
Rutaceae	*Agathosma glabrata* Bartl. & H.L.Wendl.
Rutaceae	*Macrostylis villosa* (Thunb.) Sond. subsp. *villosa*
Santalaceae	*Thesium ecklonianum* Sond.
Thymelaeaceae	*Passerina paludosa* Thoday
Vulnerable	
Apiaceae	*Notobubon capense* (Eckl. & Zeyh.) Magee
Aponogetonaceae	*Aponogeton angustifolius* Aiton
Asteraceae	*Cotula duckittiae* (L.Bolus) K.Bremer & Humphries
Asteraceae	*Steirodiscus tagetes* (L.) Schltr.
Boraginaceae	*Echiostachys incanus* (Thunb.) Levyns
Fabaceae	*Aspalathus ternata* (Thunb.) Druce
Hypoxidaceae	*Spiloxene alba* (Thunb.) Fourc.
Iridaceae	*Geissorhiza brehmii* Eckl. ex Klatt
Iridaceae	*Geissorhiza tenella* Goldblatt
Iridaceae	*Gladiolus meliusculus* (G.J.Lewis) Goldblatt & J.C.Manning
Mesembryanthemaceae	*Antimima aristulata* (Sond.) Chess. & Gideon F.Sm.
Mesembryanthemaceae	*Lampranthus filicaulis* (Haw.) N.E.Br.
Mesembryanthemaceae	*Lampranthus glaucus* (L.) N.E.Br.
Orchidaceae	*Acrolophia bolusii* Rolfe
Polygalaceae	*Muraltia macropetala* Harv.
Proteaceae	*Diastella divaricata* (P.J.Bergius) Rourke subsp. *montana* Rourke
Proteaceae	*Leucadendron linifolium* (Jacq.) R.Br.
Proteaceae	*Leucospermum hypophyllocarpodendron* (L.) Druce subsp. *hypophyllocarpodendron*
Proteaceae	*Protea scolymocephala* (L.) Reichard
Proteaceae	*Protea scorzonerifolia* (Salisb. ex Knight) Rycroft
Proteaceae	*Serruria glomerata* (L.) R.Br.

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FAMILY	SPECIES
Restionaceae	*Elegia verreauxii* Mast.
Rhamnaceae	*Phylica harveyi* (Arn.) Pillans
Rosaceae	*Cliffortia longifolia* (Eckl. & Zeyh.) Weim.
Rutaceae	*Diosma dichotoma* P.J.Bergius
Thymelaeaceae	*Gnidia spicata* (L.f.) Gilg
Thymelaeaceae	*Lachnaea capitata* (L.) Crantz
Thymelaeaceae	*Lachnaea grandiflora* (L.f.) Baill.
Thymelaeaceae	*Lachnaea uniflora* (L.) Crantz
Thymelaeaceae	*Passerina ericoides* L.

Table 7-10: Red Data Listed Plant Species for Quarter Degree Square 3418BB

FAMILY	SPECIES
Extinct	
Ericaceae	*Erica foliacea* Andrews subsp. *fulgens* (Klotzsch) E.G.H.Oliv. & I.M.Oliv.
Fabaceae	*Aspalathus complicata* (Benth.) R.Dahlgren
Fabaceae	*Psoralea gueinzii* Harv.
Critically Endangered, Possibly Extinct	
Ericaceae	*Erica viscaria* L. subsp. *gallorum* (L.Bolus) E.G.H.Oliv. & I.M.Oliv.
Critically Endangered	
Asteraceae	*Arctotheca forbesiana* (DC.) K.Lewin
Asteraceae	*Arctotis angustifolia* L.
Asteraceae	*Cotula filifolia* Thunb.
Ericaceae	*Erica cabernetea* E.G.H.Oliv.
Ericaceae	*Erica extrusa* Compton
Ericaceae	*Erica karwyderi* E.G.H.Oliv.
Ericaceae	*Erica latiflora* L.Bolus
Ericaceae	*Erica sociorum* L.Bolus
Ericaceae	*Erica ustulescens* Guthrie & Bolus
Ericaceae	*Erica vallis-aranearum* E.G.H.Oliv.
Fabaceae	*Amphithalea ericifolia* (L.) Eckl. & Zeyh. subsp. *erecta* Granby
Fabaceae	*Aspalathus dasyantha* Eckl. & Zeyh.
Iridaceae	*Ixia versicolor* G.J.Lewis
Iridaceae	*Moraea angulata* Goldblatt
Iridaceae	*Watsonia amabilis* Goldblatt
Iridaceae	*Watsonia humilis* Mill.
Orchidaceae	*Corycium microglossum* Lindl.
Orchidaceae	*Disa physodes* Sw.
Proteaceae	*Diastella buekii* (Gand.) Rourke
Proteaceae	*Leucadendron levisanus* (L.) P.J.Bergius
Proteaceae	*Mimetes hottentoticus* E.Phillips & Hutch.
Proteaceae	*Mimetes stokoei* E.Phillips & Hutch.

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FAMILY	SPECIES
Proteaceae	*Protea caespitosa* Andrews
Proteaceae	*Protea odorata* Thunb.
Proteaceae	*Serruria aemula* Salisb. ex Knight
Proteaceae	*Serruria hirsuta* R.Br.
Proteaceae	*Sorocephalus palustris* Rourke
Rutaceae	*Agathosma orbicularis* (Thunb.) Bartl. & H.L.Wendl.
Scrophulariaceae	*Freylinia longiflora* Benth.
Endangered	
Agapanthaceae	*Agapanthus africanus* (L.) Hoffmanns. subsp. *walshii* (L.Bolus) Zonneveld & G.D.Duncan
Aizoaceae	*Tetragonia caesia* Adamson
Amaryllidaceae	*Haemanthus pumilio* Jacq.
Asteraceae	*Athanasia capitata* (L.) L.
Asteraceae	*Cullumia squarrosa* (L.) R.Br.
Boraginaceae	*Echiostachys spicatus* (Burm.f.) Levyns
Boraginaceae	*Lobostemon hottentoticus* Levyns
Campanulaceae	*Merciera azurea* Schltr.
Campanulaceae	*Merciera brevifolia* A.DC.
Campanulaceae	*Merciera tetraloba* C.N.Cupido
Cyperaceae	*Ficinia micrantha* C.B.Clarke
Ericaceae	*Erica banksii* Andrews subsp. *comptonii* (T.M.Salter) E.G.H.Oliv. & I.M.Oliv.
Ericaceae	*Erica filiformis* Salisb. var. filiformis
Ericaceae	*Erica irregularis* Benth.
Fabaceae	*Liparia bonaespei* A.L.Schutte
Fabaceae	*Liparia boucheri* (E.G.H.Oliv. & Fellingham) A.L.Schutte
Fabaceae	*Podalyria argentea* Salisb.
Fabaceae	*Xiphotheca lanceolata* (E.Mey.) Eckl. & Zeyh.
Fabaceae	*Xiphotheca reflexa* (Thunb.) A.L.Schutte & B.-E.van Wyk
Geraniaceae	*Monsonia speciosa* L.
Hyacinthaceae	*Lachenalia bachmannii* Baker
Hyacinthaceae	*Lachenalia liliflora* Jacq.
Hypoxidaceae	*Spiloxene minuta* (L.) Fourc.
Iridaceae	*Aristea biflora* Weim.
Iridaceae	*Aristea lugens* (L.f.) Steud.
Iridaceae	*Babiana villosula* (J.F.Gmel.) Ker Gawl. ex Steud.
Iridaceae	*Geissorhiza setacea* (Thunb.) Ker Gawl.
Iridaceae	*Gladiolus quadrangulus* (D.Delaroche) Barnard
Iridaceae	*Gladiolus vigilans* Barnard
Iridaceae	*Ixia monadelpha* D.Delaroche
Iridaceae	*Klattia stokoei* L.Guthrie
Iridaceae	*Moraea tricolor* Andrews
Iridaceae	*Moraea tulbaghensis* L.Bolus

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FAMILY	SPECIES
Isoetaceae	*Isoetes capensis* A.V.Duthie
Mesembryanthemaceae	*Lampranthus dilutus* N.E.Br.
Mesembryanthemaceae	*Lampranthus explanatus* (L.Bolus) N.E.Br.
Mesembryanthemaceae	*Lampranthus leptaleon* (Haw.) N.E.Br.
Mesembryanthemaceae	*Lampranthus scaber* (L.) N.E.Br.
Orchidaceae	*Disa brachyceras* Lindl.
Orchidaceae	*Disa draconis* (L.f.) Sw.
Orchidaceae	*Disa lugens* Bolus var. *lugens*
Orchidaceae	*Disa tenella* (L.f.) Sw. subsp. Tenella
Oxalidaceae	*Oxalis falcatula* T.M.Salter
Penaeaceae	*Stylapterus barbatus* A.Juss.
Poaceae	*Pentaschistis ecklonii* (Nees) McClean
Poaceae	*Prionanthium pholiuroides* Stapf
Polygalaceae	*Muraltia mitior* (P.J.Bergius) Levyns
Proteaceae	*Leucadendron elimense* E.Phillips subsp. *elimense*
Proteaceae	*Leucadendron lanigerum* H.Buek ex Meisn. var. *lanigerum*
Proteaceae	*Leucospermum cordatum* E.Phillips
Proteaceae	*Leucospermum grandiflorum* (Salisb.) R.Br.
Proteaceae	*Mimetes arboreus* Rourke
Proteaceae	*Mimetes argenteus* Salisb. ex Knight
Proteaceae	*Mimetes capitulatus* (L.) R.Br.
Proteaceae	*Protea lacticolor* Salisb.
Proteaceae	*Protea rupicola* Mund ex Meisn.
Proteaceae	*Protea stokoei* E.Phillips
Proteaceae	*Serruria brownii* Meisn.
Proteaceae	*Serruria deluvialis* Rourke
Proteaceae	*Sorocephalus clavigerus* (Salisb. ex Knight) Hutch.
Proteaceae	*Sorocephalus tenuifolius* R.Br.
Proteaceae	*Spatalla prolifera* (Thunb.) Salisb. ex Knight
Proteaceae	*Spatalla propinqua* R.Br.
Restionaceae	*Ischyrolepis pratensis* Esterh.
Restionaceae	*Restio harveyi* Mast.
Rhamnaceae	*Phylica plumosa* L. var. *squarrosa* (Vent.) Sond.
Rosaceae	*Cliffortia hirta* Burm.f.
Rosaceae	*Cliffortia marginata* Eckl. & Zeyh.
Rutaceae	*Macrostylis villosa* (Thunb.) Sond. subsp. *villosa*
Vulnerable	
Apiaceae	*Centella caespitosa* Adamson
Apiaceae	*Notobubon capense* (Eckl. & Zeyh.) Magee
Asteraceae	*Dimorphotheca walliana* (Norl.) B.Nord.
Asteraceae	*Othonna ciliata* L.f.
Asteraceae	*Steirodiscus tagetes* (L.) Schltr.

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FAMILY	SPECIES
Asteraceae	*Syncarpha lepidopodium* (Bolus) B.Nord.
Asteraceae	*Ursinia caledonica* (E.Phillips) Prassler
Boraginaceae	*Echiostachys incanus* (Thunb.) Levyns
Boraginaceae	*Lobostemon capitatus* (L.) H.Buek
Boraginaceae	*Lobostemon regulareflorus* (Ker Gawl.) M.H.Buys
Bruniaceae	*Staavia brownii* Dummer
Bruniaceae	*Thamnea massoniana* Dummer
Campanulaceae	*Merciera tenuifolia* (L.f.) A.DC.
Colchicaceae	*Wurmbea inusta* (Baker) B.Nord.
Cyperaceae	*Ficinia elatior* Levyns
Cyperaceae	*Ficinia pinguior* C.B.Clarke
Cyperaceae	*Isolepis venustula* Kunth
Ericaceae	*Erica capitata* L.
Ericaceae	*Erica marifolia* Sol.
Ericaceae	*Erica multiflexuosa* E.G.H.Oliv.
Ericaceae	*Erica nana* Salisb.
Ericaceae	*Erica niveniana* E.G.H.Oliv.
Ericaceae	*Erica pilosiflora* E.G.H.Oliv. subsp. *pilosiflora*
Ericaceae	*Erica purgatoriensis* H.A.Baker
Ericaceae	*Erica squarrosa* Salisb.
Ericaceae	*Erica stokoeanthus* E.G.H.Oliv.
Eriospermaceae	*Eriospermum spirale Schult*.
Fabaceae	*Amphithalea virgata* Eckl. & Zeyh.
Fabaceae	*Aspalathus acanthiloba* R.Dahlgren
Fabaceae	*Aspalathus globulosa* E.Mey.
Fabaceae	*Aspalathus lebeckioides* R.Dahlgren
Fabaceae	*Aspalathus recurva* Benth.
Fabaceae	*Indigofera psoraloides* (L.) L.
Fabaceae	*Liparia rafnioides* A.L.Schutte
Fabaceae	*Liparia splendens* (Burm.f.) Bos & de Wit subsp. *splendens*
Fabaceae	*Podalyria cordata* R.Br.
Hypoxidaceae	*Spiloxene alba* (Thunb.) Fourc.
Iridaceae	*Aristea cantharophila* Goldblatt & J.C.Manning
Iridaceae	*Geissorhiza lithicola* Goldblatt
Iridaceae	*Gladiolus recurvus* L.
Iridaceae	*Gladiolus trichonemifolius* Ker Gawl.
Iridaceae	*Klattia flava (G*.J.Lewis) Goldblatt
Iridaceae	*Moraea versicolor (*Salisb. ex Klatt) Goldblatt
Iridaceae	*Moraea villosa* (Ker Gawl.) Ker Gawl. subsp. *elandsmontana* Goldblatt
Iridaceae	*Moraea villosa* (Ker Gawl.) Ker Gawl. subsp. *villosa*
Malvaceae	*Hermannia rugosa* Adamson
Mesembryanthemaceae	*Antimima aristulata* (Sond.) Chess. & Gideon F.Sm.

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FAMILY	SPECIES
Mesembryanthemaceae	*Erepsia patula* (Haw.) Schwantes
Mesembryanthemaceae	*Erepsia ramosa* L.Bolus
Mesembryanthemaceae	*Lampranthus filicaulis* (Haw.) N.E.Br.
Mesembryanthemaceae	*Ruschia geminiflora* (Haw.) Schwantes
Orchidaceae	*Disa atrorubens* Schltr.
Orchidaceae	*Disa longicornu* L.f.
Orchidaceae	*Satyrium foliosum* Sw.
Orchidaceae	*Satyrium striatum* Thunb.
Penaeaceae	*Glischrocolla formosa* (Thunb.) R.Dahlgren
Penaeaceae	*Stylapterus micranthus* R.Dahlgren
Polygalaceae	*Muraltia guthriei* Levyns
Polygalaceae	*Muraltia macropetala* Harv.
Proteaceae	*Diastella divaricata* (P.J.Bergius) Rourke subsp. *montana* Rourke
Proteaceae	*Leucadendron coniferum* (L.) Meisn.
Proteaceae	*Leucadendron linifolium* (Jacq.) R.Br.
Proteaceae	*Leucadendron platyspermum* R.Br.
Proteaceae	*Leucospermum hypophyllocarpodendron* (L.) Druce subsp. *hypophyllocarpodendron*
Proteaceae	*Mimetes hirtus* (L.) Salisb. ex Knight
Proteaceae	*Orothamnus zeyheri* Pappe ex Hook.f.
Proteaceae	*Protea aspera* E.Phillips
Proteaceae	*Protea burchellii* Stapf
Proteaceae	*Protea longifolia* Andrews
Proteaceae	*Protea scolymocephala* (L.) Reichard
Proteaceae	*Protea scorzonerifolia* (Salisb. ex Knight) Rycroft
Proteaceae	*Serruria flagellifolia* Salisb. ex Knight
Proteaceae	*Serruria glomerata* (L.) R.Br.
Proteaceae	*Serruria inconspicua* L.Guthrie & T.M.Salter
Proteaceae	*Serruria kraussii* Meisn.
Restionaceae	*Elegia verreauxii* Mast.
Restionaceae	*Hypodiscus alternans* Pillans
Restionaceae	*Ischyrolepis duthieae* (Pillans) H.P.Linder
Restionaceae	*Restio nuwebergensis* Esterh.
Restionaceae	*Staberoha multispicula* Pillans
Restionaceae	*Thamnochortus dumosus* Mast.
Rhamnaceae	*Phylica ampliata* Pillans
Rhamnaceae	*Phylica strigulosa* Sond.
Rosaceae	*Cliffortia phillipsii* Weim.
Rosaceae	*Cliffortia recurvata* (Weim.) C.M.Whitehouse
Rosaceae	*Cliffortia tenuis* Weim.
Rosaceae	*Cliffortia viridis* Weim.
Rutaceae	*Acmadenia nivea* I.Williams

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FAMILY	SPECIES
Rutaceae	*Adenandra multiflora* Strid
Rutaceae	*Agathosma pulchella* (L.) Link
Rutaceae	*Diosma demissa* I.Williams
Rutaceae	*Diosma dichotoma* P.J.Bergius
Rutaceae	*Euchaetis schlechteri* Schinz
Thymelaeaceae	*Gnidia spicata* (L.f.) Gilg
Thymelaeaceae	*Lachnaea grandiflora* (L.f.) Baill.

7.10 AVIFAUNA

7.10.1 Vegetation

Table 7-11~~Table 7-11~~ shows the vegetation composition of the relevant Quarter-Degree Grid Cells (QDGC) (Harrison *et al.* 1997). It is generally accepted that vegetation structure, rather than the actual plant species, influences bird species distribution and abundance (Harrison *et. al* 1997). Therefore, the vegetation description below does not focus on lists of plant species, but rather on factors which are relevant to bird distribution. The description makes extensive use of the work of Harrison *et al.* (1997). This source presents a vegetation classification that is between that of Acocks' 70 Veld types (1953) and Rutherford & Westfall's seven "biomes" (1986).

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The criteria used to amalgamate botanically defined vegetation units, or to keep them separate were:

- clear differences in vegetation structure, **likely to be relevant to birds**, and
- the results of published community studies on **bird/vegetation associations**.

No new vegetation unit boundaries were created and only previously published data was used.

Table 7-11: Vegetation Composition of 3418BA (Harrison *et al.*, 1997)

BIOME	VEGETATION TYPE	3418BA
Fynbos	Fynbos	100%

The proposed developments are situated in 3418BA and 3318DC, which falls 100% within the Fynbos biome (Harrison *et al*. 1997). The Fynbos biome is characterised by a high diversity in plant species composition and endemism. This diversity is not paralleled in its avifaunal composition, and Fynbos is regarded as relatively poor in avifaunal diversity compared to other Southern African biomes.

The endemic Fynbos avifauna consists of the Cape Rockjumper (*Chaetops frenatus*), Victorin's Warbler (*Cryptillas victorini*), Cape Sugarbird (*Promerops cafer*), Orangebreasted Sunbird (*Anthobaphes violacea*), Protea Seedeater (*Crithagra leucopterus*) and Cape Siskin (*Crithagra totta*). The Black Harrier (*Circus maurus*), a Southern African endemic species, also uses the Fynbos biome extensively for breeding.

The remaining natural Fynbos habitat along the proposed Transmission power lines and substation sites is highly degraded. The original indigenous vegetation has been invaded by

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alien woody plants, specifically Port Jackson (*Acacia saligna*) trees, which have transformed the habitat considerably (see **Section** 7.9.3~~7.9.3~~). In some places, the trees have formed dense, almost impenetrable stands. Very few patches of Fynbos remain relatively intact – the best conserved area is in the DNR.

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Although the DNR is also subject to impacts such as constant pedestrian traffic, illegal dumping and trampling by cattle, it does serve as a refuge for a variety of non-Red Data avifauna or at least has done so in the recent past. Table 7-12~~Table 7-12~~ lists the avifauna recorded in the study area in alphabetical order.

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Table 7-12: Avifauna Recorded in DNR (ADU, 2010)

SPECIES	SCIENTIFIC NAME
Black-necked Grebe	*Podiceps nigricollis*
Little Grebe	*Tachybaptus ruficollis*
Reed Cormorant	*Phalacrocorax africanus*
African Darter	*Anhinga rufa*
Grey Heron	*Ardea cinerea*
Little Egret	*Egretta garzetta*
Yellow-billed Egret	*Egretta intermedia*
Cattle Egret	*Bubulcus ibis*
Little Bittern	*Ixobrychus minutus*
African Sacred Ibis	*Threskiornis aethiopicus*
Glossy Ibis	*Plegadis falcinellus*
Hadeda Ibis	*Bostrychia hagedash*
Egyptian Goose	*Alopochen aegyptiacus*
Yellow-billed Duck	*Anas undulata*
Cape Teal	*Anas capensis*
Black-shouldered Kite	*Elanus caeruleus*
Common Moorhen	*Gallinula chloropus*
Red-knobbed Coot	*Fulica cristata*
Blacksmith Lapwing	*Vanellus armatus*
Barn Owl	*Tyto alba*
Red-faced Mousebird	*Urocolius indicus*
Pied Kingfisher	*Ceryle rudis*
Pied Crow	*Corvus albus*
Cape Crow	*Corvus capensis*
White-necked Raven	*Corvus albicollis*
Cape Bulbul	*Pycnonotus capensis*
Cape Robin-Chat	*Cossypha caffra*
Grey-backed Cisticola	*Cisticola subruficapilla*
Cape Wagtail	*Motacilla capensis*
Common Fiscal	*Lanius collaris*
Southern Boubou	*Laniarius ferrugineus*
Common Starling	*Sturnus vulgaris*
Red-winged Starling	*Onychognathus morio*

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SPECIES	SCIENTIFIC NAME
Malachite Sunbird	*Nectarinia famosa*
Southern Double-collared Sunbird	*Cinnyris chalybeus*
Cape Sparrow	*Passer melanurus*
Cape Weaver	*Ploceus capensis*
Cape Canary	*Serinus canicollis*

7.10.2 Bird Micro Habitats

While much of the distribution and abundance of the bird species in the study area can be explained by the description of the broad vegetation type, it is even more important to examine the micro habitats available to birds, given the high level of transformation in the study area.

These are generally evident on a much smaller spatial scale than the vegetation types, and are determined by a host of factors such as vegetation type, topography, land use and manmade infrastructure. Large sections of the habitat within the study area, but particularly between the existing Philippi, proposed Mitchell's Plain and existing Stikland substations, have been completely transformed through dense human settlements, industrial development and massive stands of alien vegetation, particularly Port Jackson trees, leaving only isolated areas of indigenous vegetation, which can be utilised by birds.

The most important bird micro-habitats that were identified via a combination of Google Earth satellite imagery and field inspections as follows:

- **Arable lands**: Arable or cultivated land may, at times, represent a significant feeding area for some bird species in any landscape. Through opening up the soil surface, land preparation makes many insects, seeds, bulbs and other food sources suddenly accessible to birds. The crop or pasture plants cultivated are often eaten by birds or attract insects which, in turn, are eaten by birds. During the dry season, arable lands sometimes represent the only green or attractive food sources in an otherwise dry landscape. The study area does contain several areas of old arable lands, which have reverted to a form of grassy area. These areas are mostly found on both sides of the N2 between the existing Firgrove substation and the R310 off-ramp, along the first 7km of the proposed alternative alignments for the Firgrove-Mitchell's Plain project. These grassy areas could be used by Red Data species such as Lesser Kestrel (*Falco naumanni*), Lanner Falcon (*Falco biarmicus*), Peregrine Falcon (*Falco peregrines*) and Black Harrier (*Circus maurus*) as hunting grounds, as well as by non-threatened raptors, e.g. Black-shouldered Kite (*Elanus caeruleus*), Steppe Buzzard (*Buteo vulpinus*) and Jackal Buzzard (*Buteo rufofuscus*). Red Data species recorded by the South African Bird Atlas Project (SABAP) also include Blue Crane (*Anthropoides paradiseus*), Secretarybird (*Sagittarius serpentarius*), Martial Eagle (*Polemaetus bellicosus*) and Marabou Stork (*Leptoptilos crumeniferus*) but these species are only likely to occur as occasional vagrants.
- **Pans, dams and drainage lines**: The most important drainage line in the study area is the Kuils River and its associated wetlands which are bisected by the proposed alternative route alignments for the Firgrove-Mitchell's Plain project. Red Data species that could

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use this habitat are Greater Painted-Snipe (*Rostratula benghalensis*), Half-collared Kingfisher (*Alcedo semitorquata*), Greater Flamingo (*Phoenicopterus ruber*), Lesser Flamingo (*Phoenicopterus minor*), African Marsh-Harrier (*Circus ranivorus*), Great White Pelican (*Pelecanus onocrotalus*), Black Stork (*Ciconia nigra*) and many non-Red Data species of water birds.

Areas that are regarded as sensitive from an avifaunal perspective have been mapped in Figure 7-26~~Figure 7-25~~ and **Figure 7-27~~Figure 7-26~~**.

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7.10.3 Relevant Bird Populations

The total number of species and RDL species that have been recorded in SABAP and SABAP2 are presented in **Table 7-13~~Table 7-13~~**. **Table 7-14~~Table 7-14~~** shows the reporting rates for the Red Data species that have been recorded in 3418BA and 3318DC, where the study area is situated (Harrison *et al.* 1997; ADU, 2009).

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Table 7-13: Species Recorded by SABAP and SABAP2

DESCRIPTION	NUMBER OF SPECIES		RED DATA SPECIES*	
	3418BA	3318DC	3418BA	3318DC
SABAP	254	217	10	16
SABAP2	182	190	7	12

** excluding marine species*

These species could have been recorded anywhere within the QDGC, not necessarily only along the proposed route alignments. Report rates are essentially the number of times a species was recorded in a QDGC as a percentage of the number of times that cell was counted. The QDGCs in the study area were not equally well covered by the two atlas projects, so a comparison of the two datasets should be made with caution.

For 3418BA, a total of 684 and 83 checklists were completed for SABAP and SABAP2 respectively. For 3318DC, 686 and 244 checklists were completed for SABAP and SABAP2 respectively.

Although this study will focus on the impact of the proposed Transmission power line on the Red Data species, the non-Red Data species in the study area are also taken into account. Power line-sensitive non-Red Data species recorded in the study area includes various raptors, terrestrial species and water birds.

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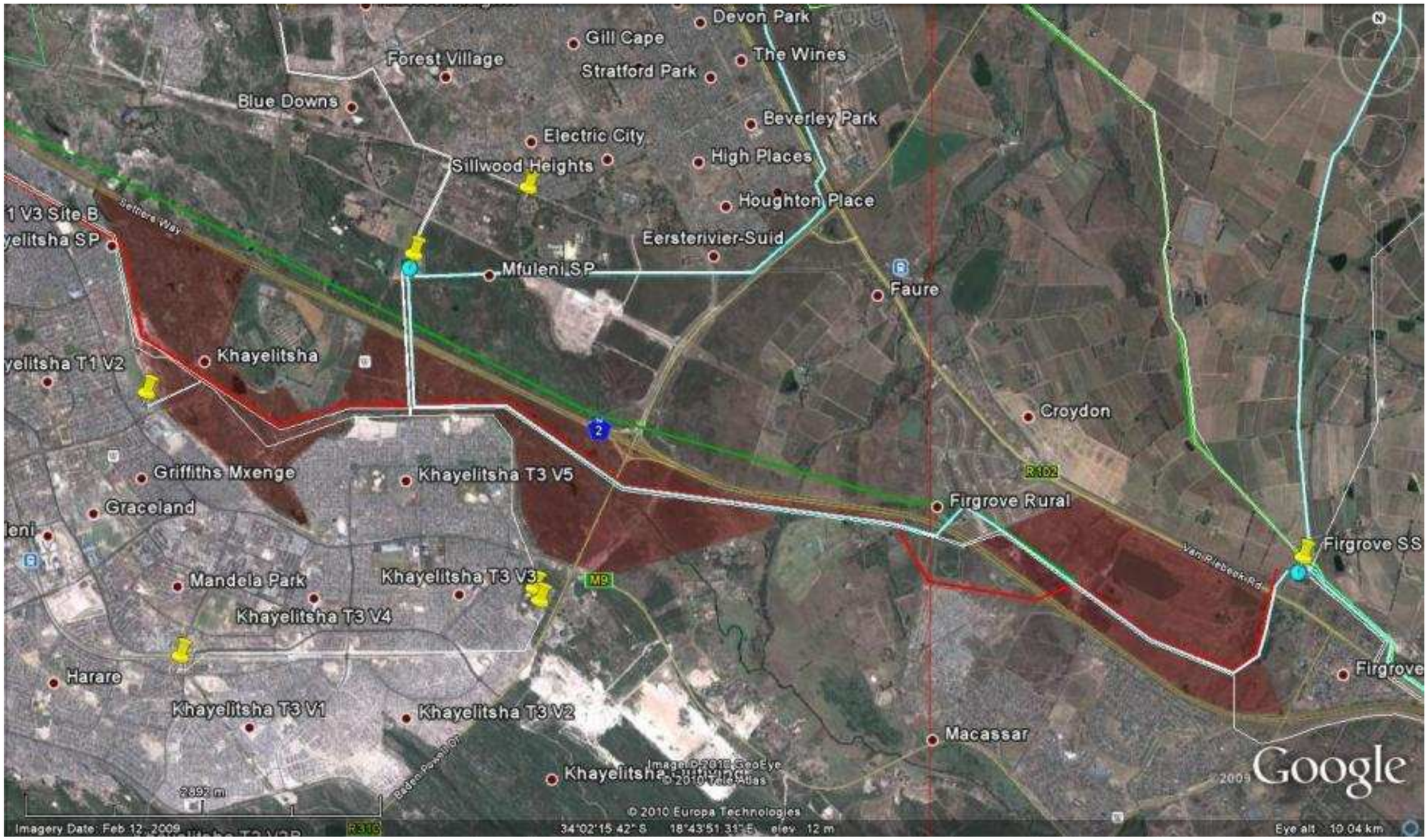

Figure 7-26: Sensitive Avifaunal Areas along FM-A

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Figure 7-27: Sensitive Avifaunal Areas along MS-D

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Table 7-14: Red Data Species Report Rates (%) (Harrison *et al.*, 1997; ADU, 2009)

SPECIES	CONSERVATION STATUS	3418BA REPORTING RATE		3318DC REPORTING RATE		HABITAT REQUIREMENTS[5]
		SABAP	SABAP2	SABAP	SABAP2	
Great White Pelican *Pelecanus onocrotalus*	Vulnerable	69.2	75.9	26.5	21.3	Large water bodies (inland and at the coast).
Black Stork *Ciconia nigra*	Near threatened	0.7	-	1.3	-	Cliffs for roosting and breeding, and rivers and dams for foraging.
Lanner Falcon *Falco biarmicus*	Near threatened	2.2	1.2	5.8	2.9	Generally prefers open habitat, but exploits a wide range of habitats. Will nest in wooded areas if there are suitable cliffs.
Greater Flamingo *Phoenicopterus ruber*	Near threatened	61.7	77.1	1.3	0.4	Open shallow, euthropic wetlands.
Lesser Flamingo *Phoenicopterus minor*	Near threatened	20.2	1.2	0.9	-	Open shallow, euthropic wetlands. Can tolerate more saline and alkaline conditions than the Greater Flamingo.
African Marsh-Harrier *Circus ranivorus*	Vulnerable	42.8	44.6	3.5	1.6	Large permanent wetlands with dense reed beds. Sometimes forages over smaller wetlands and grassland.
Black Harrier *Circus maurus*	Near threatened	0.1	-	1.7	1.6	In the study area, they are most likely to be found in Fynbos and old lands.
Peregrine Falcon *Falco peregrinus*	Near threatened	0.4	12	0.1	36.0	A wide range of habitats, but cliffs (or tall buildings) are a prerequisite for breeding.
Greater Painted-snipe *Rostratula benghalensis*	Near threatened	2	1.2	0.3	4.1	Usually found close to the fringes of reed beds along shorelines of marshes, swamps, ponds and streams. Rather shy and retiring, skulking close to the vegetation so that they can retreat to cover if disturbed.
Aghulhas Long-billed Lark *Certhilauda brevirostris*	Near threatened	0.1	-	0.6	-	Fallow and recently ploughed fields, sparse shrubland dominated by renosterveld
Secretarybird *Sagittarius serpentarius*	Near threatened	-	-	0.6	Vagrant	Grassland, old lands, open woodland.
Caspian Tern *Sterna caspia*	Near threatened	-	-	1.2	0.4	Mainly estuaries, but also large inland water bodies.

5 Barnes 2000; Hockey *et al.* 2005; Harrison et al 1997; and personal observations

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SPECIES	CONSERVATION STATUS	3418BA REPORTING RATE		3318DC REPORTING RATE		HABITAT REQUIREMENTS[5]
		SABAP	SABAP2	SABAP	SABAP2	
Martial Eagle *Polemaetus bellicosus*	Vulnerable	-	-	-	0.8	Wide range of habitats, from open woodland to semi-desert.
Half-collared Kingfisher *Alcedo semitorquata*	Near threatened	-	-	0.1	-	Fast-flowing streams with clear water and well-wooded banks.
Barlow's Lark *Calendulauda barlowi*	Near threatened	-	-	0.1	-	Sparse shrub land and well-grassed dunes.
Lesser Kestrel *Falco naumanni*	Vulnerable	-	-	0.9	-	Grassland and agricultural fields
Blue Crane *Anthropoides paradiseus*	Vulnerable	-	-	2.0	16.4	Grassland and agricultural fields
Marabou Stork *Leptoptilos crumeniferus*	Vulnerable	-	-	-	0.4	Rare outside game reserves, mostly in the semi-arid areas

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7.11 CURRENT AND PLANNED LAND USE

7.11.1 Current Land Use

Agricultural activities are limited to small-scale labour-intensive farming of fresh produce crops. Agricultural lands within the study area have been left fallow, awaiting development approvals for estate developments, with exceptions including the Vergenoegd Wine Estate. Small-scale subsistence agriculture has been noted adjacent to the N2 within the DNR. In addition, livestock farming occurs with cattle being seen grazing within the Nature Reserve.

The study area contains a mix of land uses dedicated to conservation, agriculture, industry and human settlement. The area has a well defined road network, along the R300 and N2 highways provide corridors along which the Transmission power lines have been proposed. These Class 1 roads provide direct access to large portions of the proposed Transmission power lines.

The Khayelitsha and Mitchell's Plain areas in Cape Town are characterised by dense settlements that lack sufficient services and infrastructure. The CoCT will embark on the upgrading and renewal of these areas which will entail a major investment in affordable housing, poverty alleviation, training and education as well as investment in public and economic infrastructure (2007b).

In terms of residential development, the area has a range of established, largely formal residential neighbourhoods, including much of Mitchell's Plain (although there are significant numbers of backyard dwellers), and parts of Khayelitsha. The types of dwellings vary from detached single residential units, semi detached units and flats in areas of Mitchell's Plain and, in a more limited form in Khayelitsha and Philippi. There is also a large informal settlement area, varying in terms of levels of access to services (CoCT, 2009c).

The DNR to the north of Khayelitsha and west of Mfuleni is a provincial nature reserve managed by Cape Nature. Small-scale subsistence agriculture has been seen adjacent to the N2 within the DNR. In addition, livestock farming occurs with cattle being seen grazing within the DNR. Various high-density informal settlements are situated on the boundaries of this reserve, which increases the socio-economic pressure on the future potential of this area.

The current land use in the study area is presented in Table 7-15~~Table 7-15~~ and Figure 7-28~~Figure 7-27~~.

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Table 7-15: Current Land Use in Study Area

LAND USE	FM-A	MS-C & MS-D	TOTAL
Vergenoegd Wine Estate	225.7ha	-	225.7ha
Cultivated Lands	482.0ha	139.9ha	621.9ha
Forestry	28.9ha	-	28.9ha
Residential	1 558.1ha	5 622.1ha	7 180.2ha
Denel (Pty) Ltd (Manufacturer of defence equipment in RSA)	176.5ha	-	176.5ha
Commercial/Industrial	-	203.7ha	203.7ha
Vacant/Unspecified	1 707.3ha	2 094.9ha	3 802.2ha
TOTAL	**4 178.5ha**	**8 100.6ha**	**12 279.1ha**

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Natural forest and shrub lands are found on approximately 29ha of the study area, with built-up areas occupying approximately 1 558ha. Approximately 3 800 ha of the study area is classified as vacant/unspecified.

7.11.2 Planned Land Use

In District E, the area surrounding Mfuleni (Portions of the so-called Extensions 1 and 2 located at Mfuleni Main Road) provides opportunities for further higher-density residential developments. The Strategic Development Plan (SDP) for the area also indicates that remnants of vacant land, including the Happy Valley, Wimbledon Estate, Hagley and Rondevallei areas located between Stellenbosch Arterial Road (M12) and Hindle Road, offer ample opportunity for infill development. Smallholdings in the Kalkfontein area, which do not function as smallholdings anymore, have also been identified for possible future higher-density residential development (CoCT, 2009b).

Future extensions of the Blackheath Industrial area are planned to provide additional employment opportunities for the residents of Blue Downs (CoCT, 2009b).

According to CoCT (2009b), two portions of land within the DNR are being proposed for higher-density residential infill development in order to accommodate the informal settlements of Greenpark and Los Angelos. This housing process is underway and is driven by the Provincial Housing Development Board (CoCT, 2009b). Various urban uses are proposed in the Khayelitsha area to strengthen and reinforce the Khayelitsha business district. The planned land uses for the study area are shown in **Figure 3-7**~~**Figure 3-5**~~.

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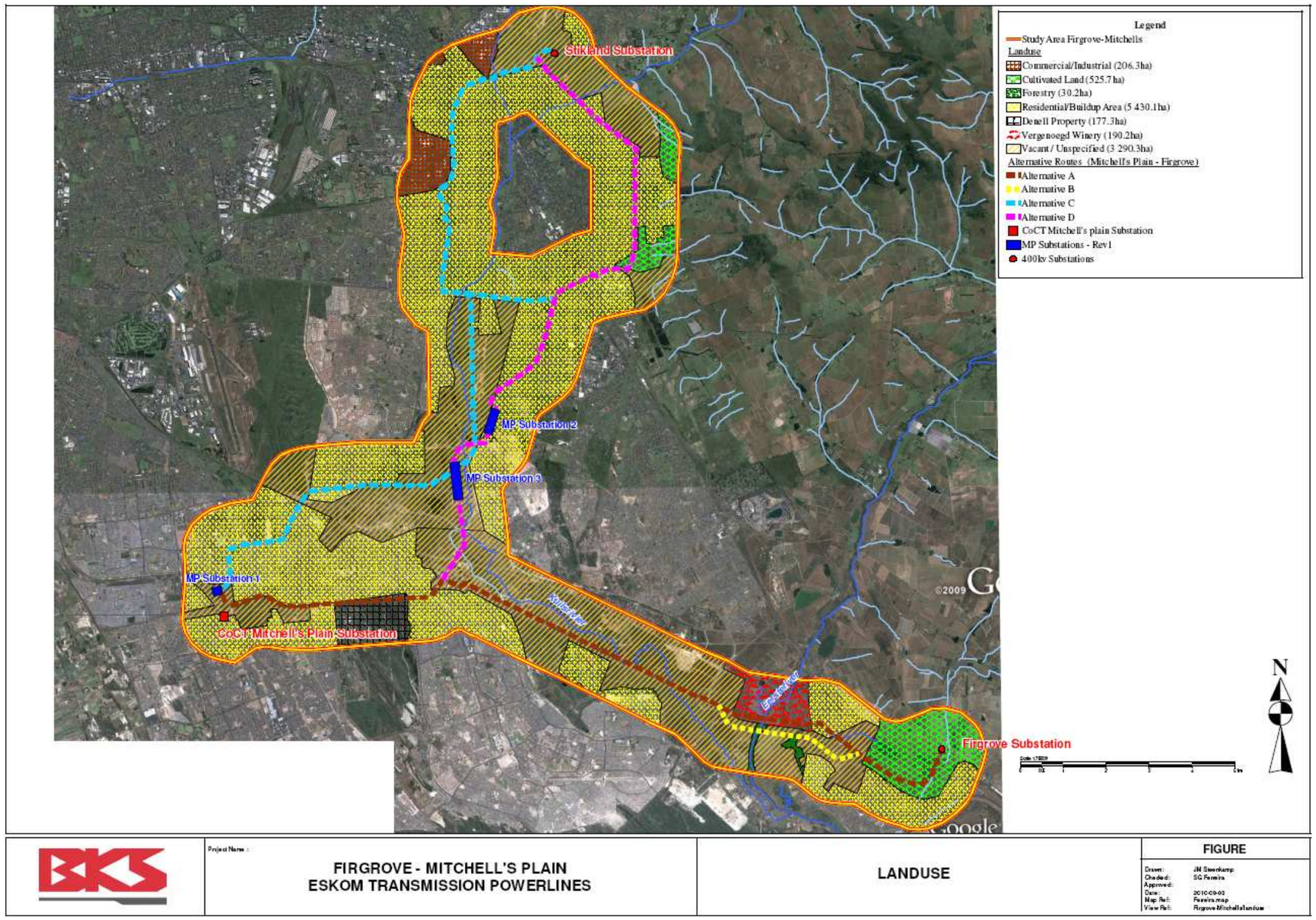

Figure 7-28: Current Land Use in Study Area

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7.12 SOCIAL AND ECONOMIC

The Khayelitsha and Mitchell's Plain district includes areas like Crossroads, Khayelitsha and Mitchell's Plain and is bordered by the N2 and Lansdowne Road to the north, Weltevreden Road to the west, the coastline to the south and Baden Powell Drive and the Macassar Dunes to the south-east. These areas have been extensively developed since the 1970s. Cape Town International Airport is to the north. This area falls within District D of the CoCT.

The study area from Mitchell's Plain to Firgrove Substation includes sections of Khayelitsha, open undeveloped land and agricultural land such as the Vergenoegd Wine Estate. The study area to the north of Mitchell's Plain and Khayelitsha mainly includes Delft South, the DNR, Mfuleni, the Blackheath Industrial Area, the Saxenburg Industrial Park, Hagley and the greater Kuilsrivier area, as well as the Stikland Industrial area. These areas form part of District F of the CoCT.

7.12.1 Economic Sectors

Khayelitsha and Mitchell's Plain are typical examples of historical settlement patterns. These suburbs are isolated from the rest of the CoCT and from each other. Khayelitsha and Mitchell's Plain show poor levels of economic investment and weak preconditions for local economic activity, resulting in a lack of local employment (CoCT, 2007e). Very little economic activity occurs in the Delft South and Mfuleni areas, which also forms part of the south eastern section of the metropolitan area (CoCT, 2007e).

The larger Mitchell's Plain area consists of various subsections, which reflect different economic classes. Some townships are wealthier than others, and in the poorer areas gang-related activities and drug trafficking among the youth are ever-present, which severely affects the quality of life of the residents in the area (CoCT, 2007e).

Another business area in the study area is the Khayelitsha business district. Various urban uses are proposed in this area to strengthen and reinforce the centre. Many employed residents commute long distances outside the district. Informal trading around transport interchanges is an important feature of the local economy.

The key economic sector in District E is the Kuils River area which houses the Blackheath Industrial area, Saxenburg Industrial Park, as well as the Stikland Industrial area.

7.12.2 Demographic and Socio-Economic Characteristics

The Spatial Development Plan and Environmental Management Framework for the District F area stated that there are 719 512 residents in the Mitchell's Plain and Khayelitsha district, which constitutes 24% of the CoCT's population. The population of District F reflects the highest population density of the eight planning districts. This is distributed across the area with most of the population concentrated in Khayelitsha (2001 population: 329 000), followed by Mitchell's Plain (2001 population: 283 196) (see **Table** 7-16

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~~Table 7 16~~ for breakdown of each district). Almost a quarter of the population of the CoCT resides in Planning District F. Planning Districts D and G each house nearly 18% of the population. In all the Planning Districts the number of females is more than the number of males (CoCT, 2007c).

Table 7-16: Population Figures for Affected Planning Districts

Planning District	Male	% of all Districts	Female	% of all Districts	Total	% of all Districts
District D	241,789	8.36	267,474	9.25	509,263	17.61
District E	164,279	5.68	174,159	6.02	338,438	11.70
District F	346,487	11.98	373,025	12.90	719,512	24.88
District G	242,728	8.39	270,230	9.34	512,958	17.74

The majority of the population are youths (36% are under the age of 17 but if the age category of 18-34 years is included this figure is increased to 72%). Unemployment is also high (38%). There would thus be a definite need for social activities, recreational facilities, sports and educational facilities, youth development, training and employment opportunities in the area.

Khayelitsha is situated far from the centres of economic opportunity (located approximately 27 kilometres from Cape Town), and is located on a land that is costly to develop and to habit (has high water table and is sandy) (CoCT, 2005).

Khayelitsha forms part of the City of Cape Town's Metro South East Region, commonly known as Cape Town's 'poverty trap'. Whereas the community of Khayelitsha is not homogenous, the majority is classified as being poor. Despite numerous attempts to change the situation, the community of Khayelitsha is still living under appalling conditions and is engulfed by numerous social ills (CoCT, 2005).

Mitchell's Plain is bounded by the Philippi Horticultural area to the west, the False Bay Coastline to the south, Khayelitsha to the east separated by a buffer area along the alignment of Swartklip Road and the R300 and Philippi to the North. There is a rail corridor running north south with three stations, including Lentegeur, Mitchell's Plain and Kapteinsklip Stations.

Mitchell's Plain CBD is a thriving economic centre with a significant informal trading sector. A significant proportion of the economically active portion of the population utilizes public transport (bus, train and taxi) with Mitchell's Plain being the third busiest modal interchange in the Metropolitan Area (75 000 commuters in morning and evening peak hours). Mitchell's Plain is predominantly developed with formal housing with a small informal component in Tafelsig and backyard dwellers scattered throughout.

Khayelitsha is characterised mostly by informal housing facilities, whereas Mitchell's Plain is dominated by more formal-type dwellings. Approximately 43% of the homes in the district are informal. The district reflects some of the highest residential densities in the city and many of these settlements lack access to basic services.

Khayelitsha is characterised mostly by informal housing facilities, whereas Mitchell's Plain and Philippi is dominated by more formal-type dwellings. Approximately 43% of the homes in the district are informal. The district reflects some of the highest residential densities in the city and many of these settlements lack access to basic services.

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With regard to health and safety the prevalence of TB and HIV is high (Khayelitsha reflects twice the national average infection rate) and socio-economic conditions contribute to the spread of communicable diseases. Crime levels are also high, and public open spaces are not safe.

District F, which include areas such as Kuils River, Blue Downs, Mfuleni, Driftsands, Macassar, Firgrove and Eerste River, has a total population of 338 438 people (2001), with an average age of 26 years. It has the largest ratio of youth and aged that are dependent on the potential labour force. Over half of the households (55.9%) have either 3-4 or 5-6 people per household (CoCT, 2009b). The majority of dwellings in District E consist of formal dwellings (78.6%) and 15.6% informal dwellings, which is the second-highest percentage of informal dwellings in the CoCT. The district is also the second worst off in terms of provision of services with a 13.04 Service Level Index.

Unemployment is below the City's unemployment rate of 18.2% (CoCT, 2009b) but is still considered high, as 38% of the working-age population are unemployed. There is thus a definite need for social activities, recreational facilities, sports and educational facilities, youth development, training and employment opportunities in the area.

a) Population Density

The population density, based on the 2001 population census, is shown in **Figure 7-29~~Figure 7-28~~**. Planning District F has the highest population densities (CoCT, 2007c).

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b) Population Stability

Mitchell's Plain was planned and built as a completely new town in the 1970s to alleviate housing shortages in the Coloured communities of Cape Town at a time when communities were being relocated in terms of apartheid legislation. The town was planned to accommodate approximately 250 000 people and in terms of the 2001 census, had grown to 289,554 people, including Strandfontein. It was planned as a self-sufficient segregated dormitory town far from the White areas of the city (20 km) and also isolated from its Indian and Black neighbours. It is located over the centre of a large and potentially invaluable aquifer.

Before 2000, Khayelitsha showed an in-migration of the majority of the population from the Eastern Cape. Since the period between 2000 and 2005, migration flows show a change from primarily in-migration from the Eastern Cape to internal migration within Khayelitsha, together with in-migration from areas within the CoCT (CoCT, 2007d).

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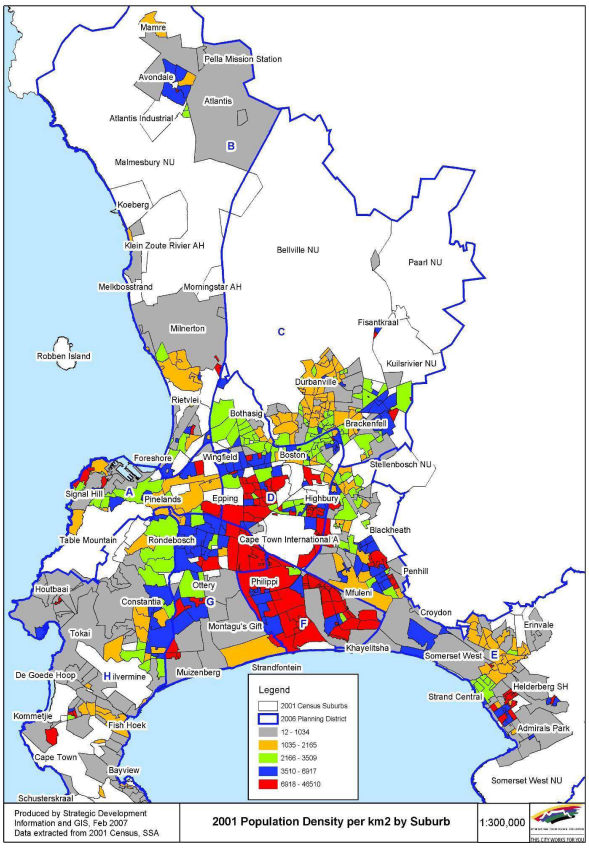

Figure 7-29: Population Density

c) Education Levels

The level of education is an important concept in measuring social and economic well-being in a specific area. Table 7-17~~Table 7-17~~ provides the percentage of adults (20+) with the highest educational level which is less than matric (grade 12) for each affected planning districts.

Table 7-17: Education Levels

PLANNING DISTRICT	% ADULTS (20+) IN ALL OF THE COCT DISTRICTS WITH THE HIGHEST QUALIFICATION LESS THAN MATRIC
District D	63.63
District E	61.67
District F	76.72
District G	70.52

In each case, the higher the score on the indicator or index, the worse off is the district concerned. District F: Mitchell's Plain / Khayelitsha is the worst off at 76.72 followed by District G: Klipfontein / False Bay at 70.52 (CoCT, 2007c).

Programmes to change the poor socio-economic status should thus focus on these districts (or areas within districts) which are worse off. To achieve this, the three spheres of government and civil society should work together to ensure a range of coordinated interventions that maximise opportunities for human and economic capital development at

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all stages of life. This may include improving the level of education through expanded training programmes and youth development programmes, integrated health action and social capital development programmes which support community-based organizations (CoCT, 2007c).

d) Employment and Income Levels

The economically active are those people aged 15 to 65 who are employed or actively looking for employment. There is a large variation in the unemployment levels across the Planning Districts. Planning District F has the highest level of unemployment at 45.16% followed by Planning District G at 31.05%. The lowest level of unemployment (23.19%) occurs in Planning District D (Table 7-18~~Table 7-18~~).

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Table 7-18: Emploment Levels

PLANNING DISTRICT	EMPLOYED	%	UNEMPLOYED	%	TOTAL
District D	169,221	76.81	51,101	23.19	220,322
District E	112,439	73.15	41,279	26.85	153,718
District F	185,443	54.84	152,697	45.16	338,140
District G	153,626	68.95	69,197	31.05	222,823

7.12.3 Service Infrastructure

a) Housing

At just over 90%, Planning District D has the largest percentage of formal dwellings followed by Planning Districts F and G at 95%. Informal dwellings include those in back yards. Planning District F has the highest percentage of informal dwellings at 43.74% followed by Planning District E (15.62%) and Planning District G (15.19%). The district reflects some of the highest residential densities in the city and many of these settlements lack access to basic services (CoCT, 2007c).

The category "Other" includes traditional dwellings, caravans, tents, private ships or boats and institutions. Table 7-19~~Table 7-19~~ shows the dwelling types for each Planning District.

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Table 7-19: Dwelling Types

PLANNING DISTRICT	District D	District E	District F	District G
FORMAL DWELLING	116,111	72,286	95,839	94,735
%	91.44	78.65	53.31	79.50
INFORMAL DWELLING	5,629	14,557	78,629	18,097
%	4.43	15.62	43.74	15.19
OTHER	5,239	5,332	5,312	6,335
%	4.13	5.72	2.95	5.32
TOTAL	**126,979**	**93,175**	**179,780**	**119,167**

b) Basic Services

The majority of households in the City of Cape Town area have access to basic services. However, in order to highlight those households that lack access to basic services, the 2001 Census indicators were used to determine the percentage of households with no access to certain levels of services. The higher the score on the average or index, the worse off is the Planning District concerned (CoCT, 2007c). As indicated in

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Table 7-20~~Table 7-20~~ it is clear that Planning District F is the worst off with a value of 26.37% followed by Planning District E with a value of 13.04%. With a value of 3.30%, Planning District D is the best off.

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Table 7-20: Service Levels

PLANNING DISTRICT	District D	District E	District F	District G
% HOUSEHOLDS LIVING IN INFORMAL DWELLINGS	4.43 %	15.62 %	43.74 %	15.19 %
% HOUSEHOLDS WITH NO ACCESS TO ELECTRICITY FOR LIGHTING	2.30 %	12.41 %	22.54 %	8.96 %
% HOUSEHOLDS WITH NO FLUSH OR CHEMICAL TOILET	3.28 %	11.63 %	27.43 %	12.61 %
% HOUSEHOLDS WITH NO POTABLE WATER ON-SITE OR IN-DWELLING	5.26 %	17.59 %	29.98 %	14.95 %
% HOUSEHOLDS WITH NO REFUSE REMOVAL BY LOCAL AUTHORITY WEEKLY OR LESS	1.21 %	7.93 %	8.15 %	2.80 %
SERVICE INDEX	**3.30 %**	**13.04%**	**26.37 %**	**10.90 %**

c) Roads, Airport and Railways

The area has a well defined road network, where the R300, N2 highways and Stellenbosch Arterial Road provide corridors along which the Transmission power lines have been proposed. These Class 1 roads provide direct access to large portions of the study area. The N2 is a major access route to and from Cape Town. It links the city with various other towns such as the Strand, Somerset West, and Stellenbosch and also serves as link to other towns further afield. The N2 is used on a daily basis by people commuting to and from work, especially those individuals living outside or on the outskirts of the city, but who is working within the city.

Other major regional infrastructure in the study area includes Cape Town International Airport, which is located in a strategic position in the centre of the metropolitan area. As the airport becomes busier, its traffic and environmental health implications may become cause for concern. For this reason, plans for further expansion of the airport on the existing site are being discussed with the Airports Company of South African (ACSA) (CoCT, 2007b).

d) Health and Safety Services

Poverty in the city remains a concern. From 1996 to 2005 the number of households living below or marginally above the household poverty line increased from 25% to 38%. This is worsened by the increasing HIV prevalence among women visiting public health clinics (from 1.2% in 1994 to 15% in 2005) and increasing tuberculosis cases (from 13 870 in 1997 to 26 754 in 2005) (CoCT, 2007d).

In terms of levels of living, District F (Mitchell's Plain/Khayelitsha) is the worst off. Programmes to address the poor socio-economic status should prioritise some of districts (and areas within districts) that are the worst off (CoCT, 2007e).

From the above it is clear that the poor socio-economic conditions contribute to the spread of communicable diseases.

7.12.4 Land Use

The Khayelitsha and Mitchell's Plain areas in Cape Town are characterised by dense settlements lacking sufficient services and infrastructure. The City of Cape Town will thus embark on the upgrading and renewal of these areas which will entail a major investment in affordable housing, poverty alleviation, training and education as well as investment in public and economic infrastructure (CoCT, 2007b).

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In terms of residential development, the area has a range of established largely formal residential neighbourhoods including much of Mitchell's Plain (although there are significant numbers of backyard dwellers), and parts of Khayelitsha. The type of dwellings varies from detached single residential units, semi detached units and flats in areas of Mitchell's Plain and in a more limited form in Khayelitsha and Philippi. There is also a large informal settlement area, varying in terms of levels of access to services (CoCT, 2009c).

In District E, the area surrounding Mfuleni (Portions of the so-called Extension 1 and 2 located at Mfuleni Main Road) provides opportunities for further higher-density residential developments. The SDP for the area also indicates that remnants of vacant land, including the Happy Valley, Wimbledon Estate, Hagley and Rondevallei areas located between Stellenbosch Arterial Road (M12) and Hindle Road, offer ample opportunity for infill development. Smallholdings in the Kalkfontein area, which do not function as smallholdings anymore has also been identified for possible future higher-density residential development (CoCT, 2009b).

The DNR to the north of Khayelitsha and west of Mfuleni is a provincial nature reserve managed by Cape Nature. Various high-density informal settlements are situated on the boundaries of this reserve, which increase the socio-economic pressure on the future potential of this area. According to the SDP for District E, two portions of land within the nature reserve are being proposed for higher-density residential infill development in order to accommodate the informal settlements of Greenpark and Los Angelos. This housing process is underway and is driven by the Provincial Housing Development Board (CoCT, 2009b).

7.12.5 Crime

Crime levels within the study area are high, even though the incidence of murder shows a decreasing trend over the past five years. This situation worsens the socio-economic conditions of the residents of Mitchell's Plain, Khayelitsha and the larger Mfuleni and Kalkfontein areas.

7.12.6 Regional and Local Economy

In 2006, Cape Town's formal economy contributed about 11.1% (or R123.58 billion) to South Africa's Gross Domestic Product (GDP) (CoCT, 2007d). Between 1995 and 2006, the city contributed 15,9% of South Africa's economic growth, and 82% of new provincial economic growth. Unemployment has grown from 13% in 1997 to almost 29% in 2001, with a drop in 2005 to 20,7%.

There is a large variation in the unemployment levels across the districts. District F (Mitchell's Plain/Khayelitsha) has the highest level of unemployment (45.1%), followed by District G (Klipfontein/False Bay) at 31%. A key challenge to be addressed in the city, and particularly in the districts with high unemployment, is to implement strategies which will achieve shared growth. In order to address the high unemployment rate, job opportunities should be promoted by implementing training programmes to ensure the right skills for the economy. In addition to more employment opportunities for local people, it will also reduce the need to travel as residents would be able to work within the district. To this effect,

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public funding should be invested at locations which can act as potential catalyst for private investment.

The city's economy, however, is distorted. Cape Town, Bellville, Claremont and Century City appear to be the main generators of commercial investment. The three former areas support 46% of total business turnover and contain 42% of formal businesses in the city (CoCT, 2007d).

Commercial development data shows continuing investment in Districts A, B, C, D, E and H and relatively little investment in Districts G and F. Significant concentrations of building plan submissions are evident in the Cape Town CBD/Foreshore, Tableview, Somerset West, Durban Road and Claremont, with Voortrekker Road subjected to a high number of relatively small building plan submissions. Districts B and D have the greatest value of industrial building plans submitted and continued industrial investment is taking place in Montague Gardens, Parow and Airport Industria. Districts E, F and G play a local retail function while the other districts have better developed office-based sectors (CoCT, 2007d).

Despite the trends in the formal economy, the city's second economy will, for many years to come, remain a strong feature of life in the city involving many people from less affluent communities. Increasing numbers of people will have to "invent" a livelihood for themselves and their families, given the lack of formal-sector jobs and the high levels of competition for employment.

7.13 HERITAGE

7.13.1 Natural Environment

The area was traditionally used as a grazing ground for Khoi herders, with indigenous hunter gatherers and early colonial settlers using the area to hunt. Today, the area falls within the CoCT's most marginalised communities, resulting in heavy impacts on the natural environment. Isolated remnants of the natural dune and wetland systems remain within designated or protected areas.

7.13.2 Cultural and Historic Resources

Certain cultural and historical sites within the study area reflect activities associated with the recent past and cultural activities. Mitchell's Plain's cultural history is linked with the many areas associated with the recent history and includes shebeens, gardens and sports facilities. Other features of cultural importance include scenic drives associated with New Eisleben Road, Stock Road and Weltevreden Expressway. Buildings and avenues of trees of historical and cultural importance are located along these roads.

Khayelitsha was established as a product of the previous political dispensation and therefore has a young and limited history. This has resulted in a community with a very young and transient culture. Cultural activities associated with Khayelitsha include the keeping of livestock, the collection of firewood and medicinal plants, as well as circumcision initiations.

7.13.3 Driftsands Nature Reserve

All alternative route alignments pass close to and within the DNR, as do Alternatives 2 and 3 of the proposed Mitchell's Plain Substation.

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Numerous historical records attest to the bleakness of the Cape Flats – miles of undulating sandy dunes interspersed with wetlands. The physical characteristics of this area made the Cape Peninsula an isolated enclave separated from the hinterland of the country by a landscape that was very difficult to cross on foot, horseback or by wagon. Numerous archaeological and cultural HIAs have now been completed for development and sand mining operations on the Cape Flats. The findings of these studies indicate that even in pre-colonial times the area was sparsely inhabited.

In the 17th and 18th centuries the Cape Flats was largely avoided by the colonists. Until the early 20th Century, what is now known as Voortrekker Road served as the historical route for crossing the Cape Flats as it followed a shallow spine of high hard ground between Cape Town and Bellville.

In the 19th Century most of the arable agricultural land that fringed the peninsula was cultivated and was becoming increasingly urbanised. Due to the ever-increasing demand for agricultural land, areas of the Cape Flats were used for grazing, which further de-stabilised the dune systems. By 1870, the colonial government had loaned or sold portions of the Cape Flats for farming purposes. However, in every instance the land reverted back to the crown as successions of would-be farmers failed to achieve a viable result (Bloomer 1959).

John X Merriman, the then minister of Crown Land, believed that the Cape Flats could be stabilised by introducing vegetation that could be used for growing windbreaks, and various Australian species were introduced with great effect. In 1877, a number of families of poor German immigrants were deposited on the Cape Flats equipped with tents, two weeks rations and instructed to start farming. Initially they endured severe hardship but by 1883 (Cape of Good Hope General Directory) many of these families had enjoyed some measure of success by creating fields between Port Jackson and willow windbreaks. Descendents of these German settlers continue to farm in the Philippi vegetable-growing areas of the Cape Flats to this day.

The historical record attests to the difficulty of managing land on the Cape Flats. In the late 19th Century the government declared certain areas "forest reserves". The motivation for these declarations was to exclude livestock that were overgrazing dune vegetation, exacerbating sand mobility that threatened the newly formed farming areas (Cape Archives 1/468).

By the beginning of the 20th Century agriculture had become established around the fringes of the Cape Flats; however, most of the area was largely undeveloped. Stabilising of the Cape Flats was a local issue for many years to the extent that in the late 19th Century a series of temporary railways was built onto the flats towards what is now the Airport Industrial area. The City's domestic waste was transported by train and dumped in the dune slacks (or inter-dune area) as a means of stabilising the shifting sands (Lastovica 1974).

The earliest accurate map depicting the Cape Flats is an 1890 map of the South Western Districts. Although this map is highly detailed, the DNR area is indicated as being "drift sands" (see **Appendix E~~Appendix E~~** for historical maps). The Kuils River appears to have followed an irregular course; however, this is to be expected in a landscape characterised by seasonal flooding.

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In 1941 the Driftsands area was bounded by the Bellville Forest Reserve to the east and the Eerste River Forest Reserve to the West and the Strandfontein Forest Reserve to the south (1941 Chief Director Surveys and Mapping). The Kuils River flowed through the area in a course different to its current course, entering a large inland delta known as the "Buffelsvlei" to the south. According to the first title deed diagrams of the area (SG No. 205/1948), the Kuils River never exited to the sea at this time but sank away into the sands of the Cape Flats, perhaps breaking through to the Eerste River in times of flood.

By 1958-59 (1959 Chief Director Surveys and Mapping), Driftsands had hardly changed. However, the Buffelsvlei to the south was beginning to be transformed with the establishment of the Eerste River Aerodrome and a work colony. By 1979, the beginnings of the Mfuleni Township had been established, although the Driftsands area was relatively unchanged. Aerial photographs taken in 1988 show that it was at this time that the first major transformation took place within what is now the reserve itself – a large sand mine had been opened in the central area and the Medical Research Facility was in place. In the ensuing years the retention dam was built and the sand mine has reverted to a small lake and wetland inhabited by birds and amphibians.

The massive transformations that saw informal settlements encroach on Driftsands occurred after 1994, while the Buffelsvlei delta has been impacted by the development of Khayelitsha. The Kuils River has become a permanent tributary of the Eerste River.

The environmental history of the site points to a dynamic landscape of dunes and wetlands, the Kuils River meandering through following a course that best suited the prevailing volume of water according to seasons and the movements of mobile dunes.

Apart from the 20th Century dam, the Medical Research Facility and deductions for housing purposes (Sikhumbule), the DNR has never been subject to any formal development or been owned by any private person or organisation. The history of deeds transfer indicates that it was initially owned by the Union of South Africa (first deed 1942) and the "Division of the Cape". In recent years, portions have been subtracted for the use of the hospital facility (1972) while the whole remaining portion was transferred to the Municipality of Cape Town in 1985 (Deeds Transfers SG Folio 544/1-5). It is currently owned by the Provincial Government.

The dense suburban development that characterises "The Flats" today largely took place after 1960 when, as a result of South Africa's apartheid policies, people of colour were forcibly re-settled in a series of new townships. A massive influx of people to urban areas after 1994 resulted in the rise of informal settlements to the extent that today there is very little left of the original Cape Flats landscape. DNR is the last enclave which, although transformed in places, imparts a sense of the ancient dune landscape.

Indications are that the DNR was never formally settled (apart from Sikhumbule) – its existence is an "accident of history" in that it was a piece of land that nobody wanted or valued.

7.13.4 Zeekoeivlei Historical Site

Originally known as Vogelsang, the land was granted in 1702 to Sarah Tas, the sister of Adam Tas (the famous freeburgher who was instrumental in bringing the corrupt governor Willem

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Adriaan Van der Stel, to justice). At the time, Sara Tas was unmarried – a fact which has caused some speculation as it was very unusual for an unmarried woman to be granted land. For many years the farm was owned by people who were the elite of the 18th Century colony. In 1720 the land was owned by Johannes Swellengrebel (father of Governor Hendrik Swellengrebel) who also owned Zandvliet in Macassar. Later, the farm was owned by Hendrik Cloete who later sold it and several other farms in the district before taking up ownership of Groot Constantia on the Peninsula.

By 1800 Vogelsang had taken on the name of the Vlei on the property – Zeekoeivlei, the name which it has retained to this day. In 1818 the farm once again was owned by the Cloete family when Pieter Lourens Cloete (fifth son) acquired the farm. Sometime later in the 19th Century the farm came into the possession of Mr C Allderman whose descendants have owned the property until the present day.

It is highly likely that the land was initially used for cattle farming; however we can surmise that Hendrik Cloete may well have started vine cultivation on the land as this was a particular interest of his. Vine cultivation was practiced by the Allderman family until 1985, after which it reverted to dairy farming.

The main homestead at Zeekoeivlei (**Figure 7-30~~Figure 7-29~~**) and associated outbuildings form a significant complex of historical structures which, together with the yard and garden and access routes, form a highly conservation-worthy cultural environment.

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The approach to this complex is via a causeway through the surrounding wetlands. The homestead which has a separate gateway is hidden behind trees and a well-established hedge. The access road continues around the rear of the outbuildings into the lands. The main homestead and outbuildings form a tightly associated cluster of structures contained within beautifully maintained surroundings, wetlands and dams.

The homestead is a large house laid out in the typical T-shape of vernacular dwellings of the 18th – early 19th Century. It has a thatched roof with a full length width solder, and half hipped (wolfneus) end-gables, but no front gable. There is a front patio. The joinery (fenestration, internal shutters, doors) is Georgian and early Victorian (early-mid 19th Century) and is generally in very good condition.

The internal layout of the building is atypical of what would be expected in T-shaped houses in that extensive use has been made of corridors throughout (a British borrowing), allowing separate access to individual rooms. The front portion of the "T" appears to have had a more typical symmetrical layout with rooms on either side of the front entrance way. The rooms and corridors are lofty and spacious, the original imported pine (probably North European) ceiling boards and grooved beams exist throughout.

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Figure 7-30: Zeekoeivlei – Main Homestead

Two later Victorian additions were made to the building while 20th Century alterations have been restricted to the moving of some internals walls and doorways. A garage or *waenhuis* built from stone and attached to the end of the "T" is probably a pre-Victorian feature.

The building is well cared for, and is surrounded by a beautifully maintained and tranquil garden set among wetlands, ponds and established trees and hedges.

The homestead has not been logged in the SAHRA National database, which means that it is unlikely to have been formally described or published in any of the key volumes on architectural heritage. Fransen and Cooke mention the Zeekoeivlei briefly in their book covering the combination of early Victorian and vernacular elements. Cooke believes that the homestead was built in 1849 – a date consistent with the style of joinery and finishes abundant in the house today[6]. The T-shaped layout of the building is either a borrowing from earlier vernacular floor plan styles, or indicates that the house may have been built substantially earlier but was extensively rebuilt in the early-mid 19th Century.

The homestead is a really interesting and comparatively rare example of a transitional style of architecture that reflects both vernacular architectural values and the influence of British architectural styles that were increasingly adopted by residents of the Cape after the British take-over in 1806. The house incorporates intact vernacular, Georgian and Victorian elements that reflect its development over time.

6 Mrs. Joan Allderman, Pers. Comm.

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7.13.5 Wine Estates

a) Vergenoegd Wine Estate

The Vergenoegd farm has been owned by the Faure family for six generations since the 1820s. This farm was granted rights in 1772, and is considered to be an important heritage site of provincial significance (Fransen 2006). The Cape Dutch homestead consists of a yard and complex of vernacular buildings of high architectural importance on the edge of the winelands. Recently restored, it is a celebrated heritage site and a popular wine route stop-off point.

b) Zevenwacht Wine Estate

Part of the Zevenwacht Wine Estate is situated within the study area. Zevenwacht is famous for its historical homestead, its gardens and views towards Table Mountain. It is a declared heritage site and a part of the Cape Winelands Cultural Landscape.

c) Langverwacht Wine Estate

Part of the Langverwacht Wine Estate is situated within the study area. The oldest building on the estate is from the period of 1720. However, the building is not listed as a provincial heritage site. Tin was mined on the Langverwacht Farm until the 1930s. The tin was brought to the house to be washed. The farm buildings, vineyard and landscape have since been restored.

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8 ASSESSMENT METHODOLOGY

Each issue identified during the Scoping Phase consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative and from the project onto the environment or from the environment onto the project. The significance of the potential impacts for the study sites will be considered before and after identified mitigation is implemented.

8.1 IMPACT ASSESSMENT CRITERIA

The criteria used for the assessment of the potential impacts of the proposed development are described in Table 8-1~~Table 8-1~~. In addition, cumulative impacts will be included as part of the Impact Assessment Process.

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Table 8-1: Impact Assessment Criteria

CRITERIA	DESCRIPTION
Nature	Includes a description of what causes the effect, what will be affected and how it will be affected.
Extent	The physical and spatial scale of the impact.
Duration	The lifetime of the impact is measured in relation to the lifetime of the proposed development.
Intensity	Examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment.
Probability	This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time.
Status	Description of the impact as positive, negative or neutral, and direct or indirect.
Significance	A synthesis of the characteristics described above and assessed as low, medium or high. A distinction will be made for the significance rating without the implementation of mitigation measures and with the implementation of mitigation measures.

8.1.1 Extent

The physical and spatial scale of the impact is classified below.

DESCRIPTION	EXPLANATION	SCORING
Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
Site	The impact could affect the whole, or a significant portion of the site.	2
Regional	The impact could affect the area around the site including neighbouring farms, transport routes and adjoining towns.	3
National	The impact could have an effect that expands throughout the country (South Africa).	4
International	The impact has international ramifications that go beyond the boundaries of South Africa	5

8.1.2 Duration

The lifetime of the impact is measured in relation to the lifetime of the proposed development.

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DESCRIPTION	EXPLANATION	SCORING
Short term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than any of the development phases.	1
Short to medium term	The impact will be relevant through to the end of the construction phase	2
Medium term	The impact will last up to the end of the development phases, where after it will be entirely negated.	3
Long term	The impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.	4
Permanent	This is the only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient	5

8.1.3 Intensity

This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.

DESCRIPTION	EXPLANATION	SCORING
Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.	2
Low-Medium	The impact alters the affected environment in such a way that the natural processes or functions are slightly affected.	4
Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.	6
Medium-High	The affected environment is altered, and the functions and processes are modified immensely.	8
High	Function or process of the affected environment is disturbed to the extent where the function or process temporarily or permanently ceases.	10

8.1.4 Probability

This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time. The classes are rated as follows:

DESCRIPTION	EXPLANATION	SCORING
Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is thus zero (0%).	1
Possible	The possibility of the impact occurring is very low, either due to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.	2
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.	3
Highly likely	It is most likely that the impacts will occur at some stage of the Development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.	4
Definite	The impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied upon. The chance of this impact occurring is defined as 100%.	5

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8.1.5 Confidence

The level of knowledge/information, the EAP or a specialist had in their judgement, and is rated as follows:

Description	Explanation
Low	The judgement is based on intuition and not on knowledge or information.
Medium	The judgement is based on common sense and general knowledge.
High	The judgement is based on scientific and/or proven information.

8.1.6 Level of Significance

Based on the above criteria, the significant of issues will be determined. The following formula has been used to determine the Level of Significance:

Significance = (Scale + Duration + Intensity) × Probability

Each pylon position was assigned a rating calculated in terms of the physical extent and time scale, and is described in Table 8-2. Based on the findings of the specialist studies (**Section 10~~10~~**) the following studies were assigned a weighting factor of 2:

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- Social
- Ecology
- Wetland
- Avifauna
- Soil and Agricultural Potential

Table 8-2: Pylon Position Significance Rating

SIGNIFICANCE	DESCRIPTION	SPECIALIST RATING	AVERAGE SIGNIFICANCE	SCORING
No Impact	There is no impact.	0	0 – 0.4	0-29
Low	The impacts are less important, but some mitigation is required to reduce the negative impacts.	1	0.5 – 1.4	30-49
Medium	The impacts are important and require attention; mitigation is required to reduce the negative impacts.	2	1.5 – 2.4	50-69
High	The impacts are of high importance and mitigation is essential to reduce the negative impacts.	3	2.5>	70-100

The calculation of the average significance rating for each pylon position was thereafter used as a basis to determine the significance rating of each route alignment.

8.2 MITIGATION

The purpose of mitigation measures is to reduce the significance level of the anticipated impact. Therefore, the reduction in the significance level after mitigation is directly related to the scores used in the impact assessment criteria. Mitigation for significant issues will be incorporated into the EMP. The level of significance after mitigation will indicate whether an impact can be reversed or may cause irreplaceable loss of resources.

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8.3 CUMULATIVE IMPACTS

The possible cumulative impacts will also be considered. Cumulative impact, in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

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9 ASSESSMENT OF IDENTIFIED ISSUES

A description of all environmental issues that were identified during the Scoping phase of the EIA process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation are presented in **Section 9.1~~9.1~~**. The potential social conflict is presented in **Section 9.2**. The cumulative impacts anticipated for the proposed development is presented in **Section 9.3~~9.3~~**. A summary assessment of the potentially significant impacts is presented in **Section Error! Reference source not found.**.

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9.1 IDENTIFIED IMPACTS

The impacts identified in the Scoping Report for the study area are as follows:

- Biophysical impacts
  - Air quality impact
  - Geotechnical impact
  - Impact on the soil
  - Impact on the agriculture
  - Impact on the groundwater
  - Impact on the wetlands
  - Impact on the fynbos ecology
  - Impact on the avifauna
- Social impacts
  - Impact on the heritage resources
  - Impact on the traffic
  - Impact on the visual integrity
  - Safety risks
- Waste-related impact
- Potential social conflict
- Economic impacts
- Potential cumulative impacts

9.1.1 Climatic Impact on Transmission Power Line

The maximum distance between each pylon is 350m. A horizontal swing could occur on the power line due to the above average wind speed experienced in the Cape Town area.

The vertical sag can be defined as the distance between the highest point of the power line and the lowest point at the horizontal curve of the power line. The vertical sag is thus dependent on the ambient temperature due to thermal expansion of the power line. It is understood that the larger the vertical sag, the less efficient the power line capabilities. Taking into consideration the temperature variations experienced in the Cape Region, the power lines cannot be placed more than 350m apart.

In addition to the vertical sag, the climate has an impact on the power line in the form of the wind conditions. The average wind speed is 15m/s, which means that the vertical sag (as explained above) will cause the power line to swing in a horizontal direction. This horizontal

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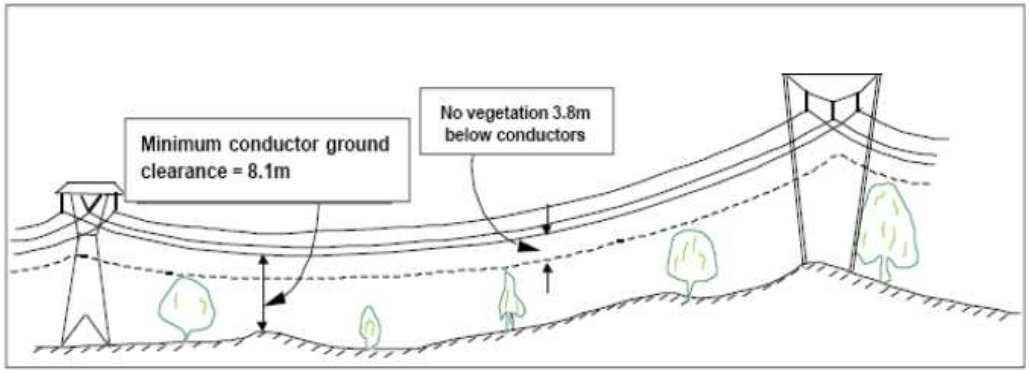
swinging of the power line will place a further risk within the servitude area, and has such been taken into consideration as part of the requested servitude width of maximum 55m. The shorter the distance between towers, the shorter the horizontal swinging will be.



9.1.2 Air Quality

Within the CoCT, air quality has been identified as a concern and priority issue. This has resulted in the air quality within the study area being continuously monitored as part of the Air Quality Management Programme of the CoCT (2007a).

Air pollution in the study area is mostly caused by the burning of fuel wood for heating and cooking purposes in the residential areas; as well as industrial and dust emissions within the industrial and commercial areas.

According to the CoCT (2007a), atmospheric pollutants within the study area of the proposed development contributed to unacceptably high atmospheric pollution levels, e.g. the air pollution levels for more than 150 days in 2006 were higher than internationally accepted standards. These levels were compounded by the extremely low "temperature inversion layer" as experienced during the winter months (CoCT, 2007a).

According to Roberge (2011), the coastal regions extending some 4-5 km inland tend to be most corrosive due to the effect of wind swept chlorides. High humidity levels tend to exacerbate the detrimental effects of such chlorides. In addition to industrial pollution, low-level atmospheric pollution often results from coal combustion in stoves, as well as coal-heated boilers that are found in hospitals and factories. Only pylons FM-A-27B to FM-A-58 of the study area are located within 5km of the coastal region.

The nature and rate of atmospheric corrosion of a metal or alloy depend on the properties of surface formed electrolytes, related to the level and type of gaseous and particulate pollutants in the atmosphere and to the duration of their action on the metal surface. Data on the corrosivity of the atmosphere are essential for development and specification of optimised corrosion resistance for manufactured products.

The time of wetness (TOW) of a corroding surface is a key parameter, directly determining the duration of the electrochemical corrosion processes. This is a complex variable, since all the means of formation and evaporation of the surface electrolyte solution must be

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considered. The TOW refers to the period of time during which the atmospheric conditions are favourable for the formation of a surface layer of moisture on a metal or alloy.

Sulphur dioxide, a product of the combustion of Sulphur containing fossil fuels, plays an important role in atmospheric corrosion in urban and industrial type atmospheres. It is adsorbed on metal surfaces, has a high solubility in water and tends to form sulphuric acid (acid rain) in the presence of moisture films. Sulphur dioxide may be expressed either in terms of a deposition rate or an airborne concentration. Annual levels of Sulphur dioxide measured at various monitoring stations in Richards Bay range from 10 to 25 µg/m³. Concentrations are expected to be even lower at Empangeni.

Atmospheric salinity distinctly increases atmospheric corrosion rates. Apart from enhancing surface electrolyte formation by hygroscopic action, direct participation of chloride ions in the electrochemical corrosion reactions is likely. Metals such as zinc and copper, whose chloride salts tend to be less soluble than those of iron, generally display lower chloride induced corrosion rates. The initiation and propagation of localized corrosion damage under the influence of chloride ions is most important. Pitting and crevice corrosion in passivating alloys such as stainless steel, aluminium alloys or titanium are examples of such damage. No chloride deposition rate was available for Empangeni.

This study classified the finding according to the International Organisation of Standardisation (ISO) 9223 classes. For the atmospheric conditions in the Empangeni region the following corrosion rates are predicted according to the ISO corrosion classes

THEME	**AIR QUALITY**	
Impact focal point	The impact of the ambient air quality levels on the surrounding communities	
Phase	**Construction Phase**	**Operational Phase**
Nature of impact	Smoke from fires or badly-maintained vehicles and dust generation in the study area	Smoke from fires or badly-maintained vehicles
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Short-Medium Term (2)	Long term (4)
Intensity of impact	Medium (6)	Low (2)
Probability	Likely (3)	Possible (2)
Confidence	Medium	
Status	Negative	
Calculation	(3+2+6) × 3 = 33	(3+4+2) × 2 = 18
Level of significance	Low impact	No impact
Pylon Positions	No specific pylon	No specific pylon

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THEME	**AIR QUALITY**	
Impact focal point	The impact of the ambient air quality levels on the surrounding communities	
Phase	**Construction Phase**	**Operational Phase**
Mitigation measures	Vehicles and machinery will be maintained in good running condition. Stockpiles (e.g. soil) should be maintained for as short a time as possible and should be enclosed by wind-break enclosures of a similar height to the stockpile. Stockpiles should be situated away from the site boundary, water resources and nearby receptors, and should take the predominant wind direction into account. During the transfer of material to stockpiles, the drop heights should be minimised to control the dispersion of materials. The Contractor will be solely responsible for the management and mitigation of dust generation. The Contractor shall routinely spray all dust-generating surfaces with water, a dust suppressing agent or similar substance to prevent dust generation. Potable water will not be used as a dust-suppressing agent and only recycled and/or rain water is to be used, when available. All vehicles transporting material that can be blown off (e.g. soil and rubble) must be covered with a tarpaulin. Handling of soils is not to be conducted during high winds.	
Level of significance after mitigation	Low Impact	No Impact

THEME	**AIR QUALITY**	
Impact focal point	The impact of the ambient air quality levels on the Transmission power line infrastructure	
Phase	**Construction Phase**	**Operational Phase**
Nature of impact	Corrosive properties of the pollution within the study could affect the power line infrastructure	Corrosive properties of the pollution within the study could affect the power line infrastructure
Extent of impact	Footprint (1)	Site (2)
Duration of impact	Short-Medium Term (2)	Long term (4)
Intensity of impact	Low (2)	Low (2)
Probability	Possible (2)	Possible (2)
Confidence	Medium	Medium
Status	Negative	Negative
Calculation	(1+2+2) × 2 = 10	(2+4+2) × 2 = 16
Level of significance	No impact	No impact

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THEME	**AIR QUALITY**	
Impact focal point	The impact of the ambient air quality levels on the Transmission power line infrastructure	
Phase	**Construction Phase**	**Operational Phase**
Pylon Positions	No specific pylon	• FM-A-27B • FM-A-28 • FM-A-29 • FM-A-30 • FM-A-31 • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-36 • FM-A-37 • FM-A-38 • FM-A-39 • FM-A-40 • FM-A-41 • FM-A-42 • FM-A-43 • FM-A-44 • FM-A-45 • FM-A-46 • FM-A-47 • FM-A-48 • FM-A-49 • FM-A-50 • FM-A-51 • FM-A-52 • FM-A-53 • FM-A-54 • FM-A-55 • FM-A-56 • FM-A-57 • FM-A-58
Mitigation measures		
Level of significance after mitigation	No Impact	No Impact

Comment [BG2]: Eskom to provide mitigation measures for corrosive impacts on power lines

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9.1.3 Geotechnical Impact

The Quaternary Deposits generally comprise sandy soils and are located in approximately 93% of the study area for route alignments FM-A, and the entire study area for route alignments MS-C and MS-D.

Much of the expected settlement in these soils will be elastic/immediate settlement, which will occur during construction. However, these soils are prone to collapse settlement and are termed collapsible soils. A collapsible soil is a partially saturated material, which exhibits additional settlement upon wetting up. This generally occurs without any increase in applied pressure. Structures founded on collapsible material may exhibit no signs of distress for many years until an inundation of some sort occurs and produces sudden, unexpected settlement. This sudden settlement is associated with a change in soil structure. Essentially, the soil structure collapses in on itself thereby inducing the potential impact of the settlement of sandy soils. In addition, these Quaternary sands are generally unconsolidated and thus have a relatively low *in situ* bearing capacity.

Occasionally, peaty soils are evident in the Springfontyn Formation. Should these peaty soils be encountered, it is likely that they will be highly compressible and that there will be a shallow water table associated with their occurrence, which explains the number of wetland systems within the study area. It is possible for peat to compress to as little as 10% of its original volume under load. Water from peat deposits is usually highly acidic and aggressive to concrete. When the water table is lowered and the peat is allowed to dry out, spontaneous combustion may occur. Hence, the potential impact that can occur is spontaneous combustion of peaty soils.

The Malmesbury Group is characterised by variations in rock type. These variations often occur within a very short distance such that there may be a variation under individual foundations. In addition, the rocks are often very steeply dipping and this can lead to problems when excavating for foundations as there may be a potential impact of instability within the sidewalls, should the excavation intercept unfavourably dipping rock.

The residual soils formed by the *in situ* weathering of the Malmesbury Group are variable in composition. However, the soils generally comprise stiff silts and clays which are generally not expansive. Furthermore, the transported soils derived from the residual Malmesbury soils have been found to be expansive. Therefore, the expansive nature and the instability in excavations of residual Malmesbury soils are identified as potential impacts.

Instability in excavations through the residual Malmesbury soils has been noted. This is probably due to the silt/clay composition, which may be affected by the relict bedding, which may form steep surfaces along which release surfaces may form. This is aggravated by the presence of a shallow water table or seepage.

Problems may be experienced in foundation trenches intercepting Malmesbury Group rocks and residual soils due to the, often, steeply dipping bedding planes and relict planes. In addition the clayey/silty nature of the soils affects the sidewall stability especially where there is seepage or a shallow water table. Care, therefore, needs to be exercised in these materials.

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However, most of the foundation footings for Alternative FM-A and all the trenches for Alternative MS-C and MS-D will be in Quaternary sands. Few problems with sidewall stability are expected provided that a sidewall batter of 1:1 is used for the temporary case. This would need to be verified for individual bases and flattened should any seepage be evident.

The granite and granitic rocks of the Cape Granite Suite weather to silts and clays along the coastal region as the weathering has been mainly chemical. Occasionally, small pockets of expansive soils are found, but this is not a common feature of the soil.

THEME	**GEOTECHNICAL IMPACTS**	
Impact focal point	Geotechnical impacts on the foundations of pylon structures used within the study area	
Phase	**Construction Phase**	
Site Description	**FM-A, MS-C, MS-D**	
Nature of impact	Collapsible soils and foundation trench stability	Seismicity
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low-Medium (4)	Medium-High (8)
Probability	Highly Likely (4)	Improbably (1)
Confidence	High	High
Status	Negative	Negative
Calculation	(3+2+4) × 4 = 36	(3+4+8) × 1 = 15
Level of significance	Low	No Impact

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THEME	GEOTECHNICAL IMPACTS	
Impact focal point	Geotechnical impacts on the foundations of pylon structures used within the study area	
Phase	**Construction Phase**	
Site Description	**FM-A, MS-C, MS-D**	
Mitigation measures	The most common wasy of dealing with the presence of collapsible soils, in an excavation is as follows: • Remove the *in situ* material to a width and depth equal to 1.5B, where B is the width of the foundation. In general, 1:1 side slopes are stable for the short-term case, providing the sands are dry *in situ*. Flatter side slopes would be required should any seepage be encountered. • Compact the base of the excavation to approximately 93% Mod AASHTO at -1% to +2% of optimum moisture content. • Place the removed material back into the excavation in layers of 150mm each one being compacted to at least 95% of Mod AASHTO at -1% to +2% of the optimum moisture content. Compaction with the addition of water will effectively break down the collapsible fabric of the soil and will increase the bearing capacity of the material immediately below the footings. The areas underlain by peaty soils are expected to be limited in extent and the options available are either to completely remove the peaty layer or to simply place the foundation for the mast or pole at a different location. Should expansive soils be encountered along the route an assessment would need to be carried out of the amount of expected heave. Providing the clays and silts are not highly expansive, then removal of a certain thickness of clay/silt and replacing it with layers of imported well compacted fill would allow the masts and poles to be suitably founded. However the efficacy of this would have to be analysed for individual bases, materials and founding conditions. Cognisance must be taken of the study area that is classified as Category VII (Modified Mercalli Scale) in the design of the foundations, masts and poles. In high water table areas, the founding requirements for poles and masts must be taken into account. Removal and replacement of the *in situ* material and perhaps temporary dewatering will be required, if it is not possible to relocate individual bases out of the wetland areas.	
Level of significance after mitigation	Low	No Impact

9.1.4 Impact on Soil

The sandy soils that predominate in the study area (deep Namib soils) have a low to moderate agricultural potential. Although these sandy soils are freely-drained and easy to work in, they are prone to droughtiness, due to the low clay content (often <10%), and are not very fertile – most of the nutrients have been leached out. They may also be susceptible to wind erosion, caused by the fine to medium grade of sand, if exposed. However, adding organic matter and fertiliser to these sandy soils can often make them productive.

The duplex soils (mainly Kroonstad, occasionally Estcourt) have a sandy topsoil, abrupt subsoil clay horizon (often at a shallow depth), which can often result in a wetness/flooding

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hazard, so these duplex soils have a low agricultural potential. This is prevalent in the lowest parts of the landscape, especially close to the rivers.

THEME	**SOILS**			
Impact focal point	Impact on soils in study area			
Phase	**Construction Phase**		**Operational Phase**	
Site Description	**FM-A**	**MS-C, MS-D**	**FM-A**	**MS-C, MS-D**
Nature of impact	Construction of new pylon structures in study area.		Eskom maintenance of Transmission power lines.	
Extent of impact	Regional (3)		Regional (3)	
Duration of impact	Short-Medium term (2)		Long term (4)	
Intensity of impact	Low-Medium (4)	Medium (6)	Low (2)	Low-Medium (4)
Probability	Definite (5)		Improbably (1)	
Confidence	High		High	
Status	Negative		Negative	
Calculation	(3+2+4) × 5 = 45	(3+2+6) × 5 = 55	(3+4+2) × 1 = 9	(3+4+4) × 1 = 11
Level of significance	Low	Medium	No Impact	No Impact
Mitigation measures	Ensure there is no wind blown dust in the servitude areas during construction by continual wetting of open sandy soils.			
Level of significance after mitigation	Low	Medium	No Impact	No Impact

9.1.5 Impact on Agriculture Economic Potential

It is known that Eskom allows agricultural activities to be exercised within the servitude area of power lines as long as the agricultural crops and equipment do not touch the power lines; the maximum operational height under the tower conductors is 5.5 metres. The potential impact of the proposed power lines on crop production has been identified and as such, farmers could oppose power lines intersecting existing farms.

The agricultural potential sites of the alternative Mitchell's Plain Substation sites will depend on the quantity and quality of groundwater on these sites as well as the potential low agricultural potential of the soils.

During the construction phase activities will interfere with the daily farming operations in areas where power lines intersect cultivated land such as Vergenoegd and other irrigation farms. Existing crops will be removed and land owners need to be compensated for loss in production. This compensation will be additional to compensation for servitude rights. It is difficult to give an indication for loss in production as it will be determined by the type of crop and its stage of development. Compensation for loss in production will increase as

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harvesting dates are approached. The impact is of a short term nature for annual and long term crops during construction phase. Mitigation measures will involve the assessment of loss in production and the owner should be compensated accordingly.

Eskom may require access/service roads for the maintenance phases which will imply the removal of long term crops as well as seizing production of annual crops on service roads. With regard to long term crops such as vineyards as well as annual crops, the owners should also be compensated for a loss in long term income where vineyards are removed. This should be included in the servitude value. Vineyards may have a productive life in excess of 20 years.

Although maintenance will not be executed regularly at short intervals it will have a long-term impact on farming operations with intensive crop production. Eskom may enter the property in future to execute maintenance. Access and activities should always be carried out with due respect for the landowner. The presence of vehicles and workers during maintenance may interfere with farming operations such as crop spraying. This will be more annoying than anything else. The impact is however low. The servitude amount will also provide for future inconveniences.

THEME	**AGRICULTURAL ECONOMIC POTENTIAL**			
Impact focal point	Impact on agriculture in study area from an economic perspective			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**FM-Ab, MS-Db, MS-Dc**	**FM-Aa, MS-C, MS-Da**	**FM-Ab, MS-Db, MS-Dc**	**FM-Aa, MS-C, MS-Da**
Nature of impact	Loss in production due to construction of new pylon structures		Lon-term interference with farming operations due to Eskom maintenance of Transmission power lines	
Extent of impact	Site (2)		Site (2)	
Duration of impact	Short-Medium term (2)		Long term (4)	
Intensity of impact	Medium-High (8)	Low (2)	Medium (6)	Low (2)
Probability	Highly Likely (4)		Likely (3)	
Confidence	Medium			
Status	Negative			
Calculation	(2+2+8) × 4 = 48	(2+2+2) × 4 = 24	(2+4+6) × 3 = 36	(2+4+2) × 3 = 24
Level of significance	Low	No Impact	Low	No Impact

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THEME	AGRICULTURAL ECONOMIC POTENTIAL			
Impact focal point	Impact on agriculture in study area from an economic perspective			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**FM-Ab, MS-Db, MS-Dc**	**FM-Aa, MS-C, MS-Da**	**FM-Ab, MS-Db, MS-Dc**	**FM-Aa, MS-C, MS-Da**
Pylon Positions	• FM-A-37 • FM-A-38 • FM-A-39 • FM-A-40 • FM-A-58a • FM-A-58b • MS-D-33B • MS-D-34B • MS-D-35 • MS-D-36 • MS-D-37			
Mitigation measures	Compensation of loss in production due to construction of power lines on property to be negotiated with the respective landowner. Compensation of loss in production due to construction of access/roads through property for maintenance purposes to be negotiated with the respective landowner. Farming practices can still continue within the power line servitudes in between the pylon positions. The maximum operational height under the conductors is 5.5 metres.			
Level of significance after mitigation	Low	No Impact	Low	No Impact

9.1.6 Impact on Wetlands

Generally, the ecological sensitivity along the alternative routes was found to be low or degraded. However, there are some important areas of ecological significance along these routes, notably several wetlands associated with the Kuils River, some sections of the DNR, and the existing servitude west of Zevenwacht wine estate. *Lampranths explanatus* (Endangered) has been recorded from sandy soils in the existing servitude south of the Stikland substation, west of the Zevenwacht wine estate.

THEME	WETLAND	
Impact focal point	Impact on the Kuils River floodplain, Driftsands Wetland and Mitchell's Plain wetland	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-Dc**	**FM-A, MS-C, MS-Dc**
Nature of impact	Construction of the Transmission power lines	Maintenance of the Transmission power line along servitude

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THEME	**WETLAND**	
Impact focal point	Impact on the Kuils River floodplain, Driftsands Wetland and Mitchell's Plain wetland	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-Dc**	**FM-A, MS-C, MS-Dc**
Extent of impact	Footprint (2)	Site (2)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Medium-High (8)	Medium-High (8)
Probability	Highly Likely (4)	Likely (3)
Confidence	Medium	
Status	Negative	
Calculation	(2+2+8) × 4 = 48	(2+4+8) × 3 = 42
Level of significance	Low	Low
Pylon Positions	• FM-A-13B • FM-A-26a & b • FM-A-29 • FM-A-30 • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-36B • FM-A-37B • FM-A-42 • FM-A-49B • FM-A-56B • MS-C-1 • MS-C-35B • MS-D-1Ba & b • MS-D-12Ba & b • MS-D-13a • MS-D-14Ba • MS-D-24a • MS-D-24Bb • MS-D-24Bc • MS-D-26Bb • MS-D-27a & b & c	

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THEME	WETLAND	
Impact focal point	Impact on the Kuils River floodplain, Driftsands Wetland and Mitchell's Plain wetland	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-Dc**	**FM-A, MS-C, MS-Dc**
Mitigation measures	Construction in all ecologically sensitive areas should be undertaken in the dry season (October – April), where possible, in order to minimise damage to seasonal vegetation and to reduce the chances of erosion and wetland sedimentation. No ancillary activity such as temporary housing, temporary ablution, storing of equipment or waste disposal may be permitted in the areas mapped or classified as ecologically sensitive.	
Level of significance after mitigation	No Impact	No Impact

9.1.7 Impact on Fynbos Ecology

a) Alternative Route Alignment Impacts

The DNR is an area of concern because it is the only section along the route that represents the Cape Flats Dune Strandveld. Some potential impacts, such as destruction of the vegetation cover and over-utilisation, are visible in localised areas of the nature reserve. Few alien species are found in this nature reserve.

The potential for any Red Data Species to be within the study area is not identified as an issue of concern because of the fragmentation of the habitat within the study area.

The impacts on the fynbos ecology for the proposed route alignment are likely to occur at both the construction and operational phases.

Construction phase impacts will be permanent loss of natural vegetation within the footprint of the pylons, and long term (5-15 yrs recovery period) damage to vegetation where it is driven over by construction vehicles. It is noted that only trees and shrubs (if necessary) in the servitude will be cut. The grassy areas in the servitude will be cut instead of cleared. The access roads and servitude areas will be ripped and rehabilitated.

Operational phase impacts involve damage to natural vegetation within the servitudes, especially where this is regularly bushcut (which is common Eskom practise). This damage may be significant if the servitude still supports natural vegetation. In both construction and operational phases a limited number of plant SCC may occur within the footprint of the Transmission power line in the identified sensitive areas, and the impacts may include loss of the local sub-populations of these species. The only plant SCC known to occur within the proposed servitude of any of the alternatives assessed is the *Lampranthus explanatus*, which is Red Listed as Endangered (Raimondo *et al*, 2009), and occurs between proposed pylons MS-D-37 and MS-D-40.

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THEME	**FYNBOS ECOLOGY**			
Impact focal point	Construction and operation impacts of the 400kV Transmission power line on the fynbos ecology in the study area			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**MS-C, MS-Db**	**FM-A, MS-Da, MS-Dc**	**MS-C, MS-Db**	**FM-A, MS-Da, MS-Dc**
Nature of impact	Vegetation clearance for the construction of Transmission power lines and its servitudes		Vegetation clearance for the maintenance of Transmission power lines servitude areas	
Extent of impact	Regional (3)	Regional (3)	Regional (3)	Regional (3)
Duration of impact	Short-Medium term (2)	Short-Medium term (2)	Long term (4)	Long term (4)
Intensity of impact	Low (2)	Medium-High (8)	Low-Medium (4)	Medium-High (8)
Probability	Possible (2)	Highly Likely (4)	Likely (3)	Highly Likely (4)
Confidence	High			
Status	Negative			
Calculation	(3+2+2) × 2 = 14	(3+2+8) × 4 = 52	(3+4+4) × 3 = 33	(3+4+8) × 4 = 60
Level of significance	No impact	Medium	Low	Medium

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THEME	**FYNBOS ECOLOGY**			
Impact focal point	Construction and operation impacts of the 400kV Transmission power line on the fynbos ecology in the study area			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**MS-C, MS-Db**	**FM-A, MS-Da, MS-Dc**	**MS-C, MS-Db**	**FM-A, MS-Da, MS-Dc**
Pylon Positions	• MS-C-8B • MS-C-14 • MS-C-15 • MS-C-30Ba & b • MS-C-31 • MS-C-33 • MS-C-35B • MS-C-12Ba & b • MS-C-13a • MS-C-14Ba & b • MS-C-15b • MS-C-21a & b • MS-C-22 • MS-C-23b & c • MS-C-Gantry 3a	• FM-A-19B • FM-A-21 • FM-A-22 • FM-A-23 • FM-A-24 • FM-A-25 • FM-A-26a & b • FM-A-27B • FM-A-29 • FM-A-30 • FM-A-31 • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-37B • MS-D-1Bb • MS-D-3 • MS-D-35 • MS-D-36 • MS-D-37 • MS-D-39 • MS-D-40 • MS-D-41B • MS-D-42B • MS-D-43 • MS-D-44	• MS-C-8B • MS-C-14 • MS-C-15 • MS-C-30Ba & b • MS-C-31 • MS-C-33 • MS-C-35B • MS-C-12Ba & b • MS-C-13a • MS-C-14Ba & b • MS-C-15b • MS-C-21a & b • MS-C-22 • MS-C-23b & c • MS-C-Gantry 3a	• FM-A-19B • FM-A-21 • FM-A-22 • FM-A-23 • FM-A-24 • FM-A-25 • FM-A-26a & b • FM-A-27B • FM-A-29 • FM-A-30 • FM-A-31 • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-37B • MS-D-1Bb • MS-D-3 • MS-D-35 • MS-D-36 • MS-D-37 • MS-D-39 • MS-D-40 • MS-D-41B • MS-D-42B • MS-D-43 • MS-D-44

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THEME	FYNBOS ECOLOGY			
Impact focal point	Construction and operation impacts of the 400kV Transmission power line on the fynbos ecology in the study area			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**MS-C, MS-Db**	**FM-A, MS-Da, MS-Dc**	**MS-C, MS-Db**	**FM-A, MS-Da, MS-Dc**
Mitigation measures	A detailed site-specific survey of the pylon positions by an experienced Fynbos botanist during the optimum season (August-Setember) to identify potential occurrences of threatened plant species. If existing access roads are present, these must be used during construction to minimise the construction of new roads. Construction in all ecologically sensitive areas should be undertaken in the dry season (October-April), where possible, in order to minimse damage to seasonal vegetation and to reduce the chances of erosion and wetland sedimentation. Disturbance footprints for pylons in sensitive areas should be minimised to 10m × 10m (100m^2). All areas of natural vegetation outside the immediate construction footprints must be regarded as no-go areas. These areas may not be accessed by people or vehicles. No ancillary activity, such as temporary housing, temporary ablution, storing of equipment or waste disposal may be permitted in the areas mapped or classified as ecologically sensitive. Due to the extreme sensitivity of the remaining natural vegetation along these route alignments it is recommended that these parts of the selected route be rehabilitated and maintained as conservation areas, as suggested by Section 8 of the Eskom Transmission Vegetation Management Guideline Document (2006). If the power line servitude is revegetated with appropriate fynbos species and alien invasive vegetation is minimised and well managed, the servitudes could provide valuable ecological corridors, connecting important fragments of natural vegetation. However, it is recognised that Eskom is unlikely to engage in Fynbos rehabilitation as this is not their core business, and more feasible recommendations are made below. • All servitudes should be cleared of woody invasive alien vegetation on an annual basis, using appropriate methodology. Appropriate methodology does not mean sending in a "bossieslaner" tractor, as this causes many woody alien species to resprout vigorously. Work should be undertaken by well trained teams who are familiar with the DWA approved alien clearing methodology. All woody alien invasive vegetation in the servitudes should be cut as close to ground level as possible, using hand tools or chainsaws, and the cut stumps must be hand painted with an appropriate Triclopyr herbicide (containing a dye so treated stumps can be seen) within ten minutes of felling, in order to prevent resprouting. Felled material should be stacked in a pyramid, with cut ends facing upwards, or removed from site, or chipped. Small seedlings may be hand pulled. No herbicide should be sprayed unless alien vegetation cover is greater than 80%, and then only under appropriate conditions (no wind or rain), as collateral damage of non- target plants may be significant. • Identified ecologically sensitive areas should not be bushcut, as this encourages alien vegetation and damages the remaining Fynbos, effectively increasing the fire threat rather than reducing it, which is the usual reason for bushcutting of servitudes. Bushcutting in ares that have no sensitive wetlands or natural vegetation should not be a problem. • Operational access tracks should not be created in areas mapped as being ecologically sensitive, and existing tracks used during the construction phase should instead be used. The creation of tracks should be minimised thoughout servitudes.			
Level of significance after mitigation	No Impact	Medium	Low	Medium

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b) Mitchell's Plain Substation Impacts

Alternative 1 for the proposed Mitchell's Plain substation is in an area that is covered exclusively by the alien invasive plant, *Acacia saligna*. All alien species have a certain degree of impact on the biodiversity of the ecosystems and, as such, pose a threat to the natural biodiversity of the fynbos biome. The impact of *A. saligna* and *Pennisetum clandestinum* is extensive and, in some areas, these species have replaced the natural vegetation entirely. The overall impact of this site from a fynbos ecological perspective is of low significance.

The south section of Alternative 2 for the proposed Mitchell's Plain substation is located in a potential wetland area, and is assessed in **Section 9.1.6~~9.1.6~~**.

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The DNR, where Alternative 3 of the proposed Mitchell's Plain Substation is located, is situated opposite informal settlements in Khayelitsha, and the area is therefore exposed to impacts from human activities, which is apparent in localised sections of the reserve. The DNR is not fenced, resulting in the prevalence of footpaths due to easy access. The nature reserve is also used for illegal waste dumping and cows were seen to be grazing in certain sections.

The vegetation on the proposed Switching Station site is moderately to heavily degraded, with low indigenous plant diversity, and may have all been ploughed in the distant past. The site is currently heavily grazed and impacted by illegal dumping, alien invasive vegetation, and too frequent fires. The site has poor ecological connectivity in all directions, and no intact seasonal or permanent wetlands occur on the site. Development of this site is likely to have a low negative botanical impact.

The construction of the proposed Mitchell's Plain Substation and switching station will result in total loss of all natural vegetation currently within the development footprints. In the case of Mitchell's Plain Substation alternatives 1 and 2, and probably also for the switching station site, no plant SCC are likely to occur within the development footprint. Operational phase impacts on the surrounding vegetation should not be significant.

THEME	**FYNBOS ECOLOGY**			
Impact focal point	Construction and operation impacts of the Mitchell's Plain Substation and the Switching Station on the fynbos ecology in the study area			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**Alternative 1, 2 (North), Switching Station**	**Alternative 2 (South), 3**	**Alternative 1, 2 (North), Switching Station**	**Alternative 2 (South), 3**
Nature of impact	Vegetation clearance for the construction of the Mitchell's Plain Substation and the Switching Station		Vegetation clearance for the maintenance of the Mitchell's Plain Substation and the Switching Station	
Extent of impact	Site (2)	Site (2)	Site (2)	Site (2)
Duration of impact	Short-Medium term (2)	Short-Medium term (2)	Long term (4)	Long term (4)

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THEME	FYNBOS ECOLOGY			
Impact focal point	Construction and operation impacts of the Mitchell's Plain Substation and the Switching Station on the fynbos ecology in the study area			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**Alternative 1, 2 (North), Switching Station**	**Alternative 2 (South), 3**	**Alternative 1, 2 (North), Switching Station**	**Alternative 2 (South), 3**
Intensity of impact	Low (2)	High (10)	Low-Medium (4)	High (10)
Probability	Possible (2)	Highly Likely (4)	Likely (3)	Highly Likely (4)
Confidence	High			
Status	Negative			
Calculation	(2+2+2) × 2 = 12	(2+2+10) × 4 = 56	(2+4+4) × 3 = 30	(2+4+10) × 4 = 64
Level of significance	No impact	Medium	Low	Medium
Alternative Site	None	• Alternative 3	None	• Alternative 3

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THEME	FYNBOS ECOLOGY			
Impact focal point	Construction and operation impacts of the Mitchell's Plain Substation and the Switching Station on the fynbos ecology in the study area			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**Alternative 1, 2 (North), Switching Station**	**Alternative 2 (South), 3**	**Alternative 1, 2 (North), Switching Station**	**Alternative 2 (South), 3**
Mitigation measures	A detailed site-specific survey of the pylon positions by an experienced Fynbos botanist during the optimum season (August-Setember) to identify potential occurrences of threatened plant species. If existing access roads are present, these must be used during construction to minimise the construction of new roads. Construction in all ecologically sensitive areas should be undertaken in the dry season (October-April), where possible, in order to minimse damage to seasonal vegetation and to reduce the chances of erosion and wetland sedimentation. Disturbance footprints for pylons in sensitive areas should be minimised to 10m × 10m (100m^2). All areas of natural vegetation outside the immediate construction footprints must be regarded as no-go areas. These areas may not be accessed by people or vehicles. No ancillary activity, such as temporary housing, temporary ablution, storing of equipment or waste disposal may be permitted in the areas mapped or classified as ecologically sensitive. Due to the extreme sensitivity of the remaining natural vegetation along these route alignments it is recommended that these parts of the selected route be rehabilitated and maintained as conservation areas, as suggested by Section 8 of the Eskom Transmission Vegetation Management Guideline Document (2006). If the power line servitude is revegetated with appropriate fynbos species and alien invasive vegetation is minimised and well managed, the servitudes could provide valuable ecological corridors, connecting important fragments of natural vegetation. However, it is recognised that Eskom is unlikely to engage in Fynbos rehabilitation as this is not their core business, and more feasible recommendations are made below. • All servitudes should be cleared of woody invasive alien vegetation on an annual basis, using appropriate methodology. Appropriate methodology does not mean sending in a "bossieslaner" tractor, as this causes many woody alien species to resprout vigorously. Work should be undertaken by well trained teams who are familiar with the DWA approved alien clearing methodology. All woody alien invasive vegetation in the servitudes should be cut as close to ground level as possible, using hand tools or chainsaws, and the cut stumps must be hand painted with an appropriate Triclopyr herbicide (containing a dye so treated stumps can be seen) within ten minutes of felling, in order to prevent resprouting. Felled material should be stacked in a pyramid, with cut ends facing upwards, or removed from site, or chipped. Small seedlings may be hand pulled. No herbicide should be sprayed unless alien vegetation cover is greater than 80%, and then only under appropriate conditions (no wind or rain), as collateral damage of non- target plants may be significant. • Identified ecologically sensitive areas should not be bushcut, as this encourages alien vegetation and damages the remaining Fynbos, effectively increasing the fire threat rather than reducing it, which is the usual reason for bushcutting of servitudes. Bushcutting in ares that have no sensitive wetlands or natural vegetation should not be a problem. • Operational access tracks should not be created in areas mapped as being ecologically sensitive, and existing tracks used during the construction phase should instead be used. The creation of tracks should be minimised thoughout servitudes.			
Level of significance after mitigation	No Impact	Medium	Low	Medium

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9.1.8 Impact on Avifauna during Construction Phase

a) Collision with Conductors and Earth Wires

There is a limited collision threat that will be posed by the proposed Transmission power lines. From a biological significance perspective, the biggest threat will be in the wetland and the arable lands (particularly old lands that have reverted to grassland), as those areas are most likely to attract any of the remaining Transmission power line sensitive Red Data species. Cultivated lands might attract Lanner Falcon, Peregrine Falcon, Black Harrier and (possibly) Blue Crane and Secretarybird, but the latter two species are likely to be vagrants. There is also a possibility of collisions at wetlands and water bodies, which may potentially affect flamingos, pelicans, Black Stork, African Marsh-Harrier and various non-Red data species.

THEME	**BIRDS**			
Impact focal point	Bird mortality through collisions with the earth wires of the 400kV Transmission power lines			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**FM-A, MS-C, MS-Db**			
Nature of impact	Construction of new pylon structures		Bird mortality through collisions with the earth wires of the 400kV Transmission power lines	
Extent of impact	Regional (3)	No impact	Regional (3)	No impact
Duration of impact	Short-Medium term (2)	No impact	Long term (4)	No impact
Intensity of impact	Low (2)	No impact	Low-Medium (4)	No impact
Probability	Possible (2)	No impact	Possible (2)	No impact
Confidence	High		High	
Status	Negative	No impact	Negative	No impact
Calculation	(3+2+2) × 4 = 28	-	(3+4+4) × 2 = 22	-
Level of significance	No impact	No Impact	No impact	No Impact
Pylon Positions	• MS-C-32 • MS-C-33 • MS-C-34 • MS-C-35B • MS-D-12 • MS-D-13 • MS-D-14 • MS-D-15 • MS-D-16 • MS-D-17	None	• MS-C-32 • MS-C-33 • MS-C-34 • MS-C-35B • MS-D-12 • MS-D-13 • MS-D-14 • MS-D-15 • MS-D-16 • MS-D-17	None

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THEME	**BIRDS**			
Impact focal point	Bird mortality through collisions with the earth wires of the 400kV Transmission power lines			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**FM-A, MS-C, MS-Db**			
	• MS-D-18 • MS-D-47 • MS-D-48 • FM-A-19 • FM-A-20 • FM-A-21 • FM-A-22 • FM-A-23 • FM-A-24 • FM-A-25 • FM-A-26 • FM-A-27 • FM-A-28 • FM-A-29 • FM-A-30 • FM-A-31 • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-36 • FM-A-37 • FM-A-38 • FM-A-41 • FM-A-42 • FM-A-43 • FM-A-44 • FM-A-50 • FM-A-51 • FM-A-52 • FM-A-53 • FM-A-54 • FM-A-55 • FM-A-56 • FM-A-57 • FM-A-58		• MS-D-18 • MS-D-47 • MS-D-48 • FM-A-19 • FM-A-20 • FM-A-21 • FM-A-22 • FM-A-23 • FM-A-24 • FM-A-25 • FM-A-26 • FM-A-27 • FM-A-28 • FM-A-29 • FM-A-30 • FM-A-31 • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-36 • FM-A-37 • FM-A-38 • FM-A-41 • FM-A-42 • FM-A-43 • FM-A-44 • FM-A-50 • FM-A-51 • FM-A-52 • FM-A-53 • FM-A-54 • FM-A-55 • FM-A-56 • FM-A-57 • FM-A-58	

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THEME	BIRDS			
Impact focal point	Bird mortality through collisions with the earth wires of the 400kV Transmission power lines			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**FM-A, MS-C, MS-Db**			
Mitigation measures	The sections of the proposed power line listed below must be marked with Bird Flight Diverters (BFD's). They must be placed on both earth wires, 10 metres apart, staggered, alternating black and white. The recommended diverter is the Double Loop Bird Flight Diverter: • MS-C-32 to MS-C-35B • MS-D-12 to MS-D-18Ba • MS-D-47 to MS-D-48 • FM-A-19B to 38B • FM-A-41 to FM-A-44 • FM-A-50 to FM-A-58			
Level of significance after mitigation	No Impact	No Impact	No Impact	No Impact

b) Disturbance

The study area has existing impacts that are significant dur to the dense human population. Disturbance is therefore already a factor in the few remaining areas of natural vegetation, even in protected areas such as the DNR. Therefore, disturbance will not have a significant impact on the birds in the study area.

THEME	BIRDS	
Impact focal point	Disturbance of birds	
Phase	**Construction Phase**	**Operational Phase**
Nature of impact	Disturbance of birds, particularly RDL species, by the activities associated with the construction of the Transmission power line	Disturbance of birds, particularly RDL species, by the activities associated with the maintenance of the Transmission power line
Extent of impact	Site (2)	Site (2)
Duration of impact	Long term (4)	Long term (4)
Intensity of impact	Low-Medium (4)	Low-Medium (4)
Probability	Possible (2)	Possible (2)
Confidence	High	High
Status	Negative	Negative
Calculation	(2+4+4) × 2 = 20	(2+4+4) × 2 = 20
Level of significance	No impact	No impact

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THEME	BIRDS	
Impact focal point	Disturbance of birds	
Phase	**Construction Phase**	**Operational Phase**
Cumulative Impacts	Existing impacts in the area are significant due to the dense human population. Disturbance is therefore an existing factor which is already impacting on birds in the study area, even in nominally protected areas such as the DNR.	
Mitigation measures	Construction and maintenance activities must be limited to the footprint area, and the construction of new access roads must be avoided, if possible.	
Level of significance after mitigation	No Impact	No Impact

c) Habitat Destruction

During the construction phase of the Transmission power lines and particularly substations, habitat destruction and alteration inevitably takes place on the site. This happens with the construction of access roads, the clearing of the site itself and any associated infrastructure. The power line servitude has to be maintained free of any intruding trees or alien shrubs, to minimise the risk of fire amongst other reasons. These activities have an impact on birds using the servitude and substation site for breeding, foraging and roosting. The proposed Mitchell's Plain Substation site will also entail the clearing of vegetation, which could have an impact on birds occurring there.

Due to the heavy existing impacts in the study area (even in officially protected areas such as Driftsands Nature Reserve), namely urbanisation (both formal and informal), industrialisation, agriculture, alien infestation and illegal dumping in open spaces, the clearing of vegetation is likely to have a limited effect on bird habitat. All the alternative substation sites for the proposed Mitchell's Plain Substation show evidence of the above impacts to a greater or lesser degree.

All of the proposed site alternatives for the Mitchell's Plain Substation show evidence of heavy impacts and degradation, but Alternative 1 is situated entirely in an urban environment, with virtually no natural habitat remaining. Alternative 2 is situated next to a drainage line in a degraded open area, and Alternative 3 is situated in a degraded area of natural vegetation in the DNR. The extent of the habitat transformation which is already evident makes Alternative 1 an obvious choice from a bird impact perspective.

THEME	BIRDS	
Impact focal point	Displacement of birds through habitat destruction on the Mitchell's Plain Substation site	
Phase	**Construction Phase**	**Operational Phase**
Nature of impact	Displacement of birds through habitat destruction, particularly of RDL species, through the construction of the proposed Mitchell's Plain Substation	Displacement of birds through habitat destruction, particularly of RDL species, through the maintenance of the proposed Mitchell's Plain Substation

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THEME	BIRDS	
Impact focal point	Displacement of birds through habitat destruction on the Mitchell's Plain Substation site	
Phase	**Construction Phase**	**Operational Phase**
Extent of impact	Site (2)	Site (2)
Duration of impact	Long term (4)	Long term (4)
Intensity of impact	Low-Medium (4)	Low-Medium (4)
Probability	Likely (3)	Likely (3)
Confidence	High	High
Status	Negative	Negative
Calculation	(2+4+4) × 3 = 30	(3+4+4) × 3 = 30
Level of significance	Low	Low
Cumulative Impacts	Existing impacts in the area are significant due to the dense human population. Habitat transformation is therefore an existing factor which is already impacting on birds in the study area, even in nominally protected areas such as the DNR.	
Mitigation measures	Construction and maintenance activities must be limited to the footprint area, and the construction of new access roads, particularly in areas of remaining indigenous vegetation, must be avoided if possible. See also the prescribed mitigation measures for ecological impacts (**Section 9.1.7**).	
Level of significance after mitigation	No Impact	No Impact

9.1.9 Socio-economic Impacts

During the construction period various teams could be deployed along the length of the line. There will thus be different teams working at different points along the line undertaking different activities at each point. Impacts associated with this phase of the project is thus of a short duration, temporary in nature, but could have long-term effects on the surrounding environment. This section discusses and assesses the socio-economic impacts identified for the construction and operational phases of the project.

a) Land Use at the Mitchell's Plain Substation Site

The 14ha of land for the proposed Mitchells Plain Substation Alternative 1 is currently oned as rural and not utilised, although comments (**Appendix F~~Appendix F~~**) have been made that the site has some developmental potential and could be suitable for housing. The Mitchell's Plain Substation needs to be 12.5ha. Developing the substation on this site could thus result in a loss of a potential land use of 12.5ha, depending on the type of substationto be used and the exact requirements of Eskom. It should, however, also be noted that the substation site could in future require additional space for future power lines to come out of this site.

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If any of Alternatives 2 or 3 of the Mitchell's Plain Substation are recommended it would be necessary for the CoCT to construct additional 132kV Distribution power lines from on of these substations to the City's Mitchells Plain Substation (opposite Mitchell's Plain Substation Alternative 1) which would result in additional visual and social impacts. The negative social impacts anticipated with another Distribution power line (which does not form part of this EIA process) would thus be mitigated through the location of the Mitchells Plain Substation at Alternative 1.

Mitchell's Plain Substation Alternative 2 is in close proximity to the Silversands residential suburb and the Silversands Primary School. As learners at schools are viewed as sensitive receptors to electrical infrastructure, it is not ideal to construct a substation site so close to the school (a precedent has been created with the Philippi Substation, which is located next to the Crystal High School – refer to corresponding section of the Mitchell's Plain-Philippi project Draft EIA Report).

Mitchells Plain Substation Alternative 3 is located within the DNR. The DNR is under severe pressure due to the encroachment of settlements onto the reserve and negative social impacts as a result thereof (as stated in **Section 7.12.2~~7.12.2~~**). Due to the size of a substation footprint and its visual nature it is anticipated that it would have an impact on the character of the nature reserve, possibly on future developments within the nature reserve, and the overall development and protection of the nature reserve. The possible requirement for an access road to the substation site would intensify the negative impact.

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It is doubtful that grazing rights have been awarded to the cattle owners of the livestock, which has been noticed within the DNR. Even though this could be an illegal activity, the loss of grazing land would result in a loss of income for those dependent on these cattle. From a social perspective, it is thus not recommended that the Mitchell's Plain Substation be located within the DNR.

THEME	**EXISTING LAND USE OF MITCHELL'S PLAIN SUBSTATION**	
Impact focal point	Impact of the Mitchell's Plain Substation on the existing and potential land use of the alternative sites	
Phase	**Construction Phase**	
Alternative Alignment	**Alternative 1**	**Alternative 2, 3**
Nature of impact	Establishment of the Mitchell's Plain Substation	
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Long term (4)	Long term (4)
Intensity of impact	Medium (6)	Medium-High (8)
Probability	Likely (3)	Highly Likely (4)
Confidence	Medium	
Status	Negative	

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THEME	EXISTING LAND USE OF MITCHELL'S PLAIN SUBSTATION	
Impact focal point	Impact of the Mitchell's Plain Substation on the existing and potential land use of the alternative sites	
Phase	**Construction Phase**	
Alternative Alignment	**Alternative 1**	**Alternative 2, 3**
Calculation	(3+4+6) × 3 = 39	(3+4+8) × 4 = 60
Level of significance	Low	Medium
Cumulative Impacts	Construction of additional 132kV Distribution power lines to feed into the existing CoCT Substation, should Alternatives 2 or 3 be recommended, with additional social impacts. Possible loss of land use for possible future housing development for Alternative 1 and 3. Possible negative health impacts on school learners for Alternative 2.	
Mitigation measures	Eskom should discuss the layout of the Mitchell's Plain Substation site with the CoCT to limit any possible negative impacts on the potential future land use and surrounding property owners within 100m.	
Level of significance after mitigation	Low	Medium

b) Land Acquisitions for the Mitchell's Plain Substation Site

Mitchell's Plain Substation Alternative 1 belongs to the Stock Road Community Trust. Alternatives 2 and 3 are under the jurisdiction of Shoprite and the Western Cape Department of Public Works and Transport, respectively. Selling of the land to Eskom will thus result in a once-off financial benefit for the landowner. However, if the negotiation with the landowner for the recommended site is not successful, expropriation of the land will become an option.

THEME	LAND ACQUISITION
Impact focal point	Economic impact due to land acquisition of the Mitchell's Plain Substation site
Phase	**Construction Phase**
Alternative Alignment	**Alternatives 1, 2 and 3**
Nature of impact	Construction of Mitchell's Plain Substation
Extent of impact	Site (2)
Duration of impact	Long term (4)
Intensity of impact	Medium (6)
Probability	Highly Likely (4)
Confidence	Medium
Status	Positive
Calculation	(2+4+6) × 4 = 48

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THEME	LAND ACQUISITION
Impact focal point	Economic impact due to land acquisition of the Mitchell's Plain Substation site
Phase	**Construction Phase**
Alternative Alignment	**Alternatives 1, 2 and 3**
Level of significance	Low (Positive)
Cumulative Impacts	None anticipated.
Mitigation measures	No mitigation measures prescribed.
Level of significance after mitigation	Low (Positive)

c) Switching Station

From a social perspective the impacts of the proposed Switching Station would be very limited. During the construction phase the influx of workers and jobseekers could result in social conflict and intrusion on the daily living and movement patterns of residents in close proximity of the Switching Station site.

The possible negative impacts with the inflow of workers and jobseekers are discussed in Section 10.1.11e below, and remain applicable for this issue, although at a lower intensity due to less people involved with the construction phase and the expectation that fewer jobseekers would gather at the construction site due to the scale of the construction activities and the socio-economic profile of the surrounding communities.

The Switching Station could be viewed as a static operation and therefore very limited social impacts associated with such facility are foreseen.

The visual intrusion of the proposed switching station could have a negative impact on the sense of place as it is proposed less than 2km of the Zevenwacht and Langverwacht Wine Estates. Due to its small footprint, and the fact that the Polkedraai Road (M12) could possibly screen it from the agricultural areas, including the Zevenwacht and Langverwacht Wine Estates, the impact is considered to be of a low to medium intensity. The area is furthermore surrounded by trees which could again reduce the visual impact.

The area to be used for the Switching Station is currently used as a grazing area. Illegal dumping also takes place. The grazing area would thus be reduced by the construction of a Switching Station. It is unclear whether there are formal agreements in place for the grazing taking place. Even though this could be undertaken without the consent of the property owner the social impact in this regard should still be noted.

Possible safety and security risks such as fires could be a source of concern for those properties within 100m of the Switching Station.

THEME	SWITCHING STATION

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Impact focal point	Social impacts associated with the Switching Station	
Phase	**Construction Phase**	**Operational Phase**
Nature of impact	Construction of the Switching Station	Maintenance of the Switching Station
Extent of impact	Site (2)	Site (2)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low-Medium (4)	Medium (6)
Probability	Possible (2)	Possible (2)
Confidence	Medium	
Status	Neutral Possibly negative due to visual impacts	Neutral Possibly negative due to visual impacts and grazing activities
Calculation	(2+2+4) × 2 = 16	(2+4+6) × 2 = 24
Level of significance	No Impact	No Impact
Mitigation measures	Landscaping surrounding the proposed Switching Station could limit the negative visual intrusion. If formal agreements are in place for grazing on site, alternative grazing areas should be sought. Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process. The recruitment process and the use of contractors should be clearly communicated to the local communities. The communication strategy should ensure that unrealistic employment expectations are not created. A representative of Eskom could liaise with the local councillors to either attend key community meetings arranged within the various wards to discuss the employment and recruitment process; or liaise with the local councillors to ensure that the correct information regarding this issue is portrayed to the communities via the councillors.	
Level of significance after mitigation	No Impact	No Impact

d) Employment

Construction of a Transmission power line requires specific skills and equipment. Typically, the construction activities would entail the following:

- clearing of trees and shrubs along the centre line;
- line pegging;
- establishment of access roads (in the form of tracks that need to ripped and rehabilitated);
- gate installations;
- clearing of trees and shrubs for the assembly and erection of towers;
- establishment of foundations;
- assembly and erection of towers;
- stringing of lines; and
- general rehabilitation of the construction areas.

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Opportunities for skilled workers, semi-skilled workers and unskilled labourers exist for the construction of the proposed Transmission power line. Some of the type of jobs required could include project and construction managers, contract supervisors, construction foremen and general labourers (skilled and semi-skilled).

Limited employment opportunities could be created during the construction phase of the project (e.g. the erection of fences if required (at power line and at substation), digging of trenches/foundations and so forth). There is thus the opportunity for locals with the necessary construction related skills to become involved, as it is foreseen that a limited number of subcontractors with the required construction related experience could be involved in the process.

It is not expected that unemployed persons without the necessary skills would be employed. The proposed project would thus not assist in reducing the unemployment rate in the Khayelitsha, Mitchell's Plain and larger Kuils River areas. The positive impacts in this regard would therefore not focus on the unemployed persons in the area as such, but could indirectly positively impact on those unemployed family members relying on the income of relatives such as these contractors. One should however note that even if this is the case, the additional income derived from the project could result in short-term positive economic injections which could be the life saver for those selected few dependent on the income of these subcontractors. This aspect is thus still rated as a positive impact especially in the area with its high unemployment rates.

It is not expected that the project will create any long-term job opportunities for locals. Existing Eskom employees would be responsible for the maintenance of the Transmission power line and servitude, which would include route inspections, servitude maintenance (e.g. removal of vegetation and invasive species), as well as monitoring of possible erosion at the tower footprints or along the access roads. Some temporary maintenance work could therefore be undertaken by locals (e.g. upgrading of access roads or repairing of fences etc.).

THEME	**EMPLOYMENT CREATION**	
Impact focal point	Impact on employment creation and opportunities within the study area and beyond	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**	
Nature of impact	Construction of Transmission power line	Maintenance of power lines.
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low-Medium (4)	Low (2)
Probability	Highly Likely (4)	Possible (2)
Confidence	Medium	Medium
Status	Positive	Negative

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THEME	EMPLOYMENT CREATION	
Impact focal point	Impact on employment creation and opportunities within the study area and beyond	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**	
Calculation	(3+2+4) × 4 = 36	(3+4+2) × 2 = 18
Level of significance	Low	No Impact
Cumulative Impacts	Improvement in quality of life for a selected few, even if only for a short duration. Possible economic downfall of those individuals after the period of employment has lapsed as they have become used to a certain income level. Possible indirect job opportunities and economic growth.	
Mitigation measures	Ward councillors and officials from the CoCT could assist in determining local sub-contractors and/or labourers that should be considered for possible employment e.g. those sub-contractors residing in the affected areas with the necessary skills, local labourers who are on the Indigent List or who have family members on the local Indigent Lists. The tender documentation should stipulate the use of local labourers or enterprises. The use of local labour should be maximised. Where local skills are not available for the operation and maintenance of the Transmission power line, Eskom should consider capacity building and training to ensure that locals are employable. It is recommended that Eskom should implement a skills audit and develop a skills database. It should be ensured that contractors use local skills, or train semi-skilled people or re-skill appropriate candidates for employment purposes where possible. On-site training should focus on the development of transferable skills (technical, marketing of their own skills and entrepreneurial skills) to ensure long term benefits to the individuals involved.	
Level of significance after mitigation	Low (Positive)	No Impact

Construction of a substation is highly technical. Construction workers would thus probably be coming from elsewhere in South Africa or even abroad. Limited direct opportunities for local entrepreneurs and SMMEs would thus materialise.

In cases where goods and materials can be sourced from local companies, some indirect economic benefits could accrue to select individuals in the Cape Peninsular or even further afield.

The management of the new proposed Mitchells Plain Substation would still be coordinated by the existing Eskom employees, thereby not resulting in additional employment opportunities. No permanent workforce at the substation site is foreseen. An opportunity for a local security company, however, exists to undertake the security work at the substation.

THEME	EMPLOYMENT CREATION	
Impact focal point	Impact on employment creation and opportunities during construction of the Mitchell's Plain substation	
Phase	**Construction Phase**	**Operational Phase**

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Alternative Location	**Alternative 1, Alternative 2, Alternative 3**	
Nature of impact	Construction of Transmission power line	Maintenance of power lines.
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low-Medium (4)	Low-Medium (4)
Probability	Highly Likely (4)	Possible (2)
Confidence	Medium	Medium
Status	Positive	Negative
Calculation	(3+2+4) × 4 = 36	(3+4+4) × 2 = 22
Level of significance	Low	No Impact
Cumulative Impacts	Improvement in quality of life for a selected few, even if only for a short duration. Possible economic downfall of those individuals after the period of employment has lapsed as they have become used to a certain income level.	
Mitigation measures	Ward councillors and officials from the CoCT could assist in determining local sub-contractors and/or labourers that should be considered for possible employment e.g. those sub-contractors residing in the affected areas with the necessary skills, local labourers who are on the Indigent List or who have family members on the local Indigent Lists. The tender documentation should stipulate the use of local labourers or enterprises. The use of local labour should be maximised. It should be ensured that contractors use local skills, or train semi-skilled people or re-skill appropriate candidates for employment purposes where possible. On-site training should focus on the development of transferable skills (technical, marketing of their own skills and entrepreneurial skills) to ensure long term benefits to the individuals involved. Employ locals for the security services to ensure some local economic benefits.	
Level of significance after mitigation	Low (Positive)	No Impact

e) Inflow of job seekers

Select areas within the study area such as the Khayelitsha and Delft South areas are already experiencing tremendous pressure from an in-migration of people from the rest of South Africa, especially the Eastern Cape (**Section** 7.12~~7.12~~). Due to the economic and political climate in most southern African countries and the global economic fluctuations, this situation is expected to continue. However, jobseekers are thus not only outsiders coming from areas surrounding the local communities and construction sites, but also local jobseekers already residing in the area who are moving from one construction site to another.

The inflow of jobseekers is challenging as it is difficult to foresee the extent of the impact and to avoid the impact from occurring by pro-active mitigation measures. The influx of jobseekers could even materialise prior to the construction phase when people become aware of the proposed project.

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Due to the population density of the area, the unemployment profile of the local population and the existing in-migration pattern, the inflow of jobseekers to certain areas of the study area is quite likely. The impact is anticipated to occur in the areas listed below mainly due to the socio-economic conditions of the majority of the residents in close proximity to the proposed alignments, as well as the large number of youths found in the study area:

- Khayelitsha area including Victoria Merge, Village 3 North, Bongani, Bongweni, Ikwezi Park, Mandalay, Tembani
- Delft South
- Macassar
- Areas in the middle of the study area to the north of the N2 such as Mfuleni, High Gate, Brentwood Park, Diepwater (Wesbank), Hagley, Silversands, Happy Valley, Wembly Park, Wimbledon, Happy Valley 2, Cormac Park, Vogelvlei, Nooiensfontein, Gersham, Highbury
- Areas of Kuils River closest to the proposed alignment such as Kalkfontein, Sarepta, Voëlvlei, Mabille Park, Drosdy Park
- Philippi area including a section of Philippi East

The presence of outside jobseekers in the area might lead to conflict with the local community members actually residing in the area and those in search of employment. The number of jobseekers could lessen once construction has started and once the individuals have realised that additional jobs would not necessarily become available.

It is expected that the influx of jobseekers to the construction site for the proposed substation would be more noticeable than for the Transmission power lines, as there would be more visible stationary construction activities within one place for a long period of the time.

The anticipated impacts for all three substation sites and the Switching Station site, however, are similar as all the sites are surrounded by communities with high population profiles, the number of youths in the areas surrounding the substation sites and densely grouped dwellings. Even if Substation Alternative 3 is proposed within the DNR, various settlements are encroaching upon the reserve and jobseekers would find it easy to access the construction area within the reserve.

THEME	**INFLOW OF JOB SEEKERS**	
Impact focal point	Inflow of job seekers to work on the Transmission power line and the Mitchell's Plain Substation	
Infrastructure	**Transmission power lines**	**Mitchell's Plain Substation**
Alternative Alignment	**FM-A, MS-C, MS-D**	**Alternatives 1, 2 and 3**
Nature of impact	Construction of Transmission power line	Construction of Mitchell's Plain Substation

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THEME	INFLOW OF JOB SEEKERS	
Impact focal point	Inflow of job seekers to work on the Transmission power line and the Mitchell's Plain Substation	
Infrastructure	**Transmission power lines**	**Mitchell's Plain Substation**
Alternative Alignment	**FM-A, MS-C, MS-D**	**Alternatives 1, 2 and 3**
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Short-Medium term (2)	Short-Medium term (2)
Intensity of impact	Low-Medium (4)	Low-Medium (4)
Probability	Highly Likely (4)	Highly Likely (4)
Confidence	Medium	Medium
Status	Negative	Negative
Calculation	(3+2+4) × 4 = 36	(3+2+4) × 4 = 36
Level of significance	Low	Low
Cumulative Impacts	Added pressure on service delivery and the existing infrastructure with resultant additional socio-economic burdens for the CoCT and surrounding property owners should the jobseekers come from outside the study area, but permanently remain in the area after the construction period has ceased.	
Mitigation measures	Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process. The recruitment process and the use of contractors should be clearly communicated to the local communities. The communication strategy should ensure that unrealistic employment expectations are not created. A representative of Eskom could liaise with the local councillors to either attend key community meetings arranged within the various wards to discuss the employment and recruitment process; or liaise with the local councillors to ensure that the correct information regarding this issue is portrayed to the communities via the councillors.	
Level of significance after mitigation	Low	Low

f) Inflow of Temporary Workers

Transmission power line construction does not create large-scale job opportunities. For the construction of the proposed Transmission power line opportunities for skilled workers, semi-skilled workers and unskilled labourers could become available. Some of the type of jobs required could include project and construction managers, contract supervisors, construction foremen and general labourers (skilled and semi-skilled).

It is anticipated that the contractor appointed by Eskom would, for the larger part of the construction team, make use of its own experienced labourers. Different numbers of individuals would be involved in the construction activities at the various stages of the construction of the proposed transmission line. The inflow of these temporary workers could result in negative social impacts occurring, thus particularly during peak construction periods when the number of workers are also at its peak. These impacts normally relate to:

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- Intrusion of workers with regard to the daily activities undertaken by residents: The distances and routes, in this regard, would differ on a daily basis as the workers would have to travel from the construction camp site to the particular construction site where work is undertaken at any one stage. The intensity of the impact and focus of the impact across the study area due to worker movement and construction vehicle movement would thus differ during the different stages of the construction phase. It is, however, clear that the construction activities would have a negative intrusion impact on the residents close to the construction and servitude areas, especially in the high density neighbourhoods nearest to the proposed alignments, such as Victoria Merge and Village 3 North (Alternative FM-A). It is anticipated that the residential areas of Bongweni, the largest section of Ikwezi Park, Mandalay, and Tembani would be screened from the direct intrusion impacts by the railway line and Landsdowne Road (Alternative FM-A). The eastern section of Ikwezi Park, and the Bongani area, however could be affected should Alternative MS-D be implemented. Other areas where this impact is anticipated to materialise include Mfuleni, Fountain Village, Happy Valley (Wimbledon area), Saxenburg Industrial Park, sections of Zevendal and the newer eastern extensions of Amandelrug (Alternative MS-D). With regard to Alternative MS-C, there could be a possible impact on Philippi East, Delft South, and Mfuleni.
- Possible conflict between workers and the resident population: In this regard, it is again anticipated that the potential for conflict would be high in the densely populated suburbs as indicated above. Care should, however, be taken to avoid conflict between the local communities and the outside workforce that would be working inside the local settlements. Although the construction period would be of a very short duration at one area, it should be kept in mind that the construction teams could interfere with the social networks and daily living patterns of the residents due to the proximity of the construction areas to the houses. Construction would literally take place on the local residents' doorsteps.
- Noise generated by the workers.
- General noise and dust created as a result of the construction activities.
- Littering: Littering by workers could be raised as a concern and could materialise as a negative collective impact, as littering and illegal dumping are already major sources of pollution throughout the study area.

Should resettlement of residents occur, there could also be some form of social mobilisation against the project, which could be projected to the outside workforce. The safety of these workers would thus also have to be ensured by the Contractor.

THEME	INFLOW OF TEMPORARY WORKERS
Impact focal point	Inflow of temporary skilled, semi-skilled and unskilled workers

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Phase	Construction Phase
Alternative Alignment	**FM-A, MS-C, MS-D**
Nature of impact	Construction of Transmission power line
Extent of impact	Regional (3)
Duration of impact	Short-Medium term (2)
Intensity of impact	Low-Medium (4)
Probability	Highly Likely (4)
Confidence	Medium
Status	Negative
Calculation	(3+2+4) × 4 = 36
Level of significance	Low
Cumulative Impacts	Additional pressure on existing infrastructure. Possible increase in criminal activities in the area due to criminals taking advantage of the presence of outsiders being in the area. Impacts associated with the construction camp.
Mitigation measures	Local labourers should be employed, where possible. Before construction commences, representatives from the CoCT and community leaders (e.g. councillors) and community-based organisations, should be informed of the details of the contractors, size of the workforce and construction schedules. Should a large number of temporary workers not form part of the local community members, the contractor should make certain that the outside workforce carry identification tags or uniforms to be easily identifiable. It should furthermore be ensured that the inflow of workers and their presence in the high density settlements do not create conflict within these surrounding communities. Local community organisations and policing forums/neighbourhood watches must be informed of the presence of an outside workforce (where relevant). Working hours should be kept to normal working hours (08:00 to 17:00 Mon-Sat). Workers should ensure good conduct at all times. Littering should be prevented by ensuring adequate facilities at the construction sites to dispose of refuse. Sufficient water and sanitation facilities should be provided for the workers on site during the construction period. No informal vending stations should be allowed on or near the construction sites. Construction workers should preferably receive daily meals and beverages to avoid the need for a vending station.
Level of significance after mitigation	Low

g) Impact of Construction Camp and Equipment Yards

It is unlikely that the construction workforce would be accommodated in a construction camp. Usually with linear projects such as these, one construction camp per 100 km of Transmission power line in rural areas is constructed. The location of such a construction camp can only be determined once a recommended route alignment has been finalised. It is anticipated that the equipment yard would be next to the construction camp. One should,

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however, consider the distances that the workers would have to travel on a daily basis to the areas where construction is focused at any time.

Negative social impacts, usually associated with a construction camp, that could materialise include the following:

- Misbehaviour of construction workers at the construction camp (alcohol abuse, prostitution, temporary sexual relationships with local women with possible unwanted pregnancies, spreading of sexually transmitted diseases and so forth);
- Disrespect for the site-specific local culture (if a large number of the workers include outsiders from other provinces or cultures) and possible social conflict between the local community and outsiders;
- Mismanagement which could result in safety and security concerns;
- Mismanagement which could lead to localised environmental problems (lack of sanitation and waste management, littering and so forth);
- Negative impacts on the environment could result in related health impacts on the surrounding communities such as pollution of water sources due to improper sanitation facilities, solid waste management or wastewater management.
- The development of informal vending "stations" where food and small goods are sold could, if not properly managed, also lead to littering, and possible pollution of water sources.

It is further anticipated that any increase in crime could be attributed by the locals to these outside workers residing in a study area and should therefore be carefully managed.

THEME	**PLACEMENT OF CONSTRUCTION CAMP AND EQUIPMENT YARDS**
Impact focal point	Impact of construction camp and equipment yards on the local population
Phase	**Construction Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**
Nature of impact	Construction of Transmission power line
Extent of impact	Regional (3)
Duration of impact	Short-Medium term (2)
Intensity of impact	Low-Medium (4)
Probability	Definite (5)
Confidence	High
Status	Negative
Calculation	(3+2+4) × 5 = 45
Level of significance	Medium

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THEME	PLACEMENT OF CONSTRUCTION CAMP AND EQUIPMENT YARDS
Impact focal point	Impact of construction camp and equipment yards on the local population
Phase	**Construction Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**
Cumulative Impacts	Consequences of misbehaviour of workers living at the construction camp (as discussed above). Mismanagement which could create environmental and health risks. Possible increase in crime due to criminals taking advantage of the construction camp and workers in the area.
Mitigation measures	No accommodation will be allowed at construction camps The Contractor will require a site office / yard for the duration of the contract period. The Contractor's site camp shall be located within the development footprint, or on a site appropriately zoned and/or authorised for such use and approved by the ECO. The Contractor shall select a location that has easy access and which has already been cleared or disturbed by previous human activity (e.g. previous construction camps or stockpile areas). All construction activities, materials, equipment and personnel will be restricted to within the area specified. During periods when the construction area is far away from the construction camp, formal transport facilities would have to be arranged for these workers for those periods during the construction phase. Should construction start at the end of the year and construction activities be stopped for the festive season in December, the construction camp should not be left vacant to avoid security risks and possible unauthorised entry.
Level of significance after mitigation	Medium

h) Safety and security

Safety and security impacts refer to the increased risks of veld fires in the open space areas or in the dense settlements, because of construction worker practises (e.g. cooking and heating), the increased risk of vehicular and pedestrian accidents because of construction vehicle movements, general risks related to construction activities (e.g. electrocution, risks of falling from working heights and so forth), as well as the perceived increase in crime because of outsiders being in the area.

Light, heavy and abnormal load construction vehicles would be deployed during the construction phase. The number of vehicles is relatively small and it is therefore not anticipated to create major disruptions in the traffic movement in the larger study area. The movement of construction vehicles through the communities though could compromise public safety, especially in areas nearby schools, where the proposed power line would be traversing. In the Khayelitsha, and Mfuleni areas, for example, a large part of the residents in the area do not own motor vehicles and usually walk to their destinations. Special care should thus be taken with regards to the movement of pedestrians along the routes to be used by the construction vehicles, as well as the areas around the construction sites.

Concerns with regards to the possible increase in crime would be dependent on the perceived magnitude of the risk due to the size of the outside workforce that would be present in the area during the construction phase. Whilst this impact is thus largely based on

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a matter of perception, it is still important and should be treated as a sensitive issue. The employment of locals could assist in limiting this impact.

General risks associated with the construction activities should be addressed through compliance with the relevant health and safety procedures and regulations.

Safety and security impacts during the operational phase relate to the maintenance of the Transmission power lines and emergency work to be undertaken. Although this would be done infrequently, maintenance would still have severe negative impacts on the property owners' daily living and movement patterns and their sense of security. The intensity of this impact would be more severe if maintenance personnel access properties without prior notification.

Servitudes could also serve as a route for criminals to gain uncontrolled access to the area. Due to the high crime levels in the study area, security is already an issue. Care should thus be taken that the open servitude area does not worsen the situation by providing an area which could be freely and easily accessed by criminals.

Safety concerns furthermore relate to community members illegally erecting informal housing structures within the servitudes. As this already a serious problem in the study area, especially in the high density settlements of Khayelitsha, this trend is expected to continue with grave social consequences such as uncontrolled land invasions, security problems, additional pressure on the delivery of services and infrastructure to these dwellers, safety concerns with regards to those living in the servitude area, an increased risk of fires and so forth.

With regard to the agricultural activities undertaken within the area, it should be noted that most farming activities can be carried out under the conductors, provided that there is adherence to safe working clearances, building restrictions and restrictions to certain crop types, e.g. tree crops. It is thus anticipated that the Transmission power line would not create severe safety risks to the subsistence and wine farmers.

Due to the encroachment of people into the servitude areas within the high density settlements, and the likelihood of this occurring, the safety and security category receives a high rating. Residents of informal settlements stay beneath power lines as shown in Figure 9-1~~Figure 9-1~~, which results in varying levels of risk. If a power line snaps, the risk of fire will increase.

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Figure 9-1: Khayelitsha Residents Living Beneath Power Lines

The flight zone around Cape Town International Airport stretches across Alternative MS-C, where this alignment runs to the proposed Mitchell's Plain Substation Alternative 1, via Philippi East and Sheffield Road. From a social perspective, this alignment could thus pose some safety and security concerns.

THEME	**SAFETY AND SECURITY**		
Impact focal point	Impact on safety and security of the residents in the study area		
Phase	**Construction Phase**	**Operational Phase**	
Alternative Alignment	**FM-A, MS-C and MS-D**	**FM-A, MS-C and MS-D**	
Nature of impact	Construction of new pylon structures	Eskom Transmission maintenance of power lines.	
Extent of impact	Regional (3)	Regional (3)	
Duration of impact	Short-Medium term (2)	Long term (4)	
Intensity of impact	Low-Medium (4)	Medium-High (8)	
Probability	Possible (2)	Highly Likely (4)	
Confidence	Medium	Medium	
Status	Negative	Negative	
Calculation	(3+2+4) × 2 = 18	(3+4+8) × 4 = 60	(3+4+6) × 3 = 39
Level of significance	No Impact	Medium	

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THEME	SAFETY AND SECURITY	
Impact focal point	Impact on safety and security of the residents in the study area	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C and MS-D**	**FM-A, MS-C and MS-D**
Cumulative Impacts	Increased fire risks. Fires with possible loss of lives (human and animals) and economic losses due to residences being damaged or destroyed. Accidents involving pedestrians. Possible loss of buildings of cultural value (eastern section of the study area) due to possible fires. Possible increase in criminal activities due to servitude being used as route to access properties. Increased pressure on service and infrastructure delivery should people erect dwellings within the servitude. Increased safety risks due to people residing in servitude area. Accidents involving pedestrians.	
Mitigation measures	The movement of construction vehicles through the local communities should be limited to off-peak periods (if possible) to minimise adverse impacts on the movement of pedestrians (schoolchildren and individuals walking to and from work) and to a lesser extent on private vehicular traffic. Signs must be erected at strategic locations throughout the area, warning residents and visitors about the hazards around the construction site and the presence of heavy vehicles. Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce. Screening of workers that apply for work could be useful to lessen perceived negative perceptions about the outside workforce. The servitude management should be monitored on an ongoing basis. Eskom and the contractors should comply to the relevant health and safety procedures and regulations during the construction phase. Eskom should take a strong stance with regards to the illegal squatting within the servitude areas. For safety reasons these dwellers should be moved out of the servitude areas on an ongoing basis. Eskom should, in conjunction with the CoCT, develop an emergency management plan to specifically deal with the increased risk of fires. Detailed discussions should be held with the Air Safety Regulator and Airports Company of South Africa (ACSA) with regards to Alternative MS-C being within 2km of the nearest runway.	
Level of significance after mitigation	No Impact	Medium

The movement of construction vehicles through the communities could compromise public safety, especially in the Silversands area due to the proximity of the Silversands Primary School to the construction site (Mitchell's Plain Substation Alternative 2). The increased risks of veld fires due to the construction worker practices would be a source of concern with regards to Mitchell's Plain Substation Alternative 3 which is situated within the DNR.

Risks associated with the operation of a substation site refer to the possibility of fires and/or explosions due to the overloading of equipment or faulty equipment. The storage of hazardous substances (e.g. fuels) is usually also a concern. Accidents occurring at the site could thus put the surrounding communities, animals and the environment at risk.

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THEME	**SAFETY AND SECURITY**			
Impact focal point	Impact on safety and security of the residents close to the Mitchell's Plain Substation			
Phase	**Construction Phase**		**Operational Phase**	
Site Description	**Alternative 1**	**Alternative 2 and 3**	**Alternative 1**	**Alternative 2 and 3**
Nature of impact	Construction of new pylon structures in study area.		Eskom Maintenance of Transmission power lines.	
Extent of impact	Regional (3)		Regional (3)	
Duration of impact	Short-Medium term (2)		Long term (4)	
Intensity of impact	Low-Medium (4)		Medium (6)	Medium-High (8)
Probability	Likely (3)	Possible (2)	Likely (3)	
Confidence	Medium		Medium	
Status	Negative		Negative	
Calculation	(3+2+4) × 3 = 27	(3+2+4) × 2 = 18	(3+4+6) × 3 = 39	(3+4+8) × 3 = 45
Level of significance	No Impact	No Impact	Low	Low
Cumulative Impacts	Fire risks, with possible loss of lives (human and animal) and economic losses due to residences being damaged or destroyed. Accidents involving pedestrians. Possible increase in crime. Possible destruction of the surrounding natural environment.			
Mitigation measures	The movement of construction vehicles through the local communities should be limited to off-peak periods (if possible) to minimise adverse impacts on the movement of pedestrians (individuals walking to and from work and schoolchildren) and to a lesser extent on private vehicular traffic. Signs must be erected at strategic locations throughout the area, warning residents and visitors about the hazards around the construction site and the presence of heavy vehicles. Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce. Screening of workers that apply for work could be useful to lessen perceived negative perceptions about the outside workforce. The Mitchells Plain District Hospital and Lentegeur Hospital, should, in conjunction with Eskom, prepare emergency plans to cater for any possible accidents and safety risks at the proposed Mitchells Plain Substation Alternative 1. All equipment should be maintained on a regular basis and should be in good working order. Permanent security personnel should be deployed at the Mitchell's Plain Substation.			
Level of significance after mitigation	No Impact	No Impact	Low	Low

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i) Daily Living and Movement Patterns

The construction timeframe for the Transmission power line is estimated to be at least twelve (12) months. This process will include site preparations, vegetation clearance (where required), excavations for tower foundations, assembly and erection of the towers, and stringing of the line. Light vehicles are required for the site preparations and gate installations, whereas heavy construction vehicles would be used to transport material (e.g. steelwork) to the construction sites, mainly during the establishment of the foundations. Abnormal load vehicles would access the sites when the towers are erected by cranes and when stringing of the lines are undertaken. From information gathered it seems as if heavy vehicles would be required for between twelve (12) to twenty (20) days during the construction phase and abnormal vehicles would only be used on approximately nine (9) days. Thus due to the limited number of vehicles and number of days, the negative impacts on the residents' daily living and movement patterns are expected to be of a limited magnitude.

Main routes that could be temporarily negatively affected (possible congestion during peak hours due to heavy and abnormal vehicles) include Stock Road (M36) and A.Z. Berman Drive (M36), Landsdowne Road (M9) (section in Philippi East), Cape Flats Freeway (R300), Mew Way (M44), Swartklip Road, Old Faure Road, Hindle Road, Stellenbosch Road (M12), Van Riebeeck Road (R102), Bottelary Road (M23), Polkadraai Road (M12). Baden Powell Drive (R310), Spine Road (M32) and the N2 could also be affected but to a lesser extent as less road crossings would possibly occur.

The impact on the daily living and movement patterns of private property owners with regard to the possible construction of new access roads would especially be evident in the densely populated areas in Khayelitsha, but also on the agricultural areas located in the south-eastern section of the study area.

Impacts on daily living and movement patterns also refer to the increased noise and dust pollution during construction activities, especially where construction would take place in close proximity to dwellings in the densely populated areas (Khayelitsha, Mfuleni and Kalkfontein). Right-of-way clearing and construction activities, however, will be short term. Noise will thus only be temporary generated and if construction activities adhere to all relevant legislation in this regard and limit construction activities to normal working hours, the impact could be lessened. Agricultural activities undertaken within the south-eastern and north-eastern sections of the study area (subsistence farming and vineyards) could be affected by possible noise and dust pollution, especially when heavy and abnormal load vehicles would be used and in areas where access roads to the construction areas would be required.

During the construction of the Transmission power line, temporary disruptions in the daily living and movement patterns of property owners could thus be foreseen. This impact is expected to occur along all alternatives.

These negative impacts are of a short duration and it is expected that the negative impacts associated with this could thus be successfully mitigated.

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Minimal disruptions in the daily living and movement patterns of residents surrounding the proposed Mitchells Plain Substation are foreseen as the operation and management of a substation could be viewed as a static operation. Due to the limited number of permanent workers on site, people movement through the residential areas and local roads would be negligible. Maintenance of the substation would be undertaken intermittently over periods of time and would thus not impact on daily activities of residents in close proximity to the site. The substation would therefore not change the quality of lives of the surrounding residents through the activities undertaken at the substation site.

THEME	**DAILY LIVING AND MOVEMENT PATTERNS**	
Impact focal point	Impact of daily living and movement patterns of residents due to worker and vehicle movement and noise generated during the construction phase	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**	**Mitchell's Plain Substation Alternatives 1, 2, 3**
Nature of impact	Construction of Transmission power line	Maintenance of the Mitchell's Plain Substation
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low-Medium (4)	Low (2)
Probability	Likely (3)	Possible (2)
Confidence	Medium	
Status	Negative	Neutral
Calculation	(3+2+4) × 3 = 27	(3+4+2) × 2 = 18
Level of significance	No Impact	No Impact
Cumulative Impacts	Possible environmental damage and pollution during construction. Possible conflict between workers and residents.	

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THEME	DAILY LIVING AND MOVEMENT PATTERNS	
Impact focal point	Impact of daily living and movement patterns of residents due to worker and vehicle movement and noise generated during the construction phase	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**	**Mitchell's Plain Substation Alternatives 1, 2, 3**
Mitigation measures	Property owners that would be affected by the Transmission power line construction should be consulted prior to the construction phase with regards to the construction schedules, transportation routes, construction of additional access roads and construction methods to be used. Eskom should keep the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads is very costly, impact on the residents' daily living and movement patterns, and create a potential for erosion. Rehabilitation of new access roads for construction vehicles should be undertaken as soon as the construction process allows. There should be strict adherence to speed limits when using local roads and when travelling through residential areas. Access routes and access points for heavy construction vehicles should be indicated to warn motorists of the movement of these vehicles. Limit the movement of construction vehicles to off-peak periods (where possible). Limit the movement of construction vehicles in areas where sensitive receptors are situated e.g. schools and pedestrians. Machinery and vehicles should be in good working order to limit excessive noise pollution. With regard to the impact on the agricultural activities, the mitigation measures discussed under Section 9.1.11 r) remain relevant. Construction activities must adhere to all relevant legislation. Construction activities should be limited to normal working hours and should preferably not be undertaken during weekends.	
Level of significance after mitigation	No Impact	No Impact

j) Electro-Magnetic Fields

In discussing electric and magnetic fields from overhead power lines it is useful to refer to the maximum field level below the line as well as the field level at the servitude boundary. Maximum field levels are found at the midspan position (the position midway between two adjacent towers), where the conductors are closest to the ground.

The profiles in ~~**Figure 3-4**~~**Figure 3-4** and Figure 3-5~~**Figure 3-5**~~ indicate that the field levels fall to lower values with increasing distance from the Transmission power line. In some instances, power lines may be constructed to run parallel to each other. This concentrates the field levels resulting in reduced EMF levels at the edge of servitudes.

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THEME	ELECTRIC AND MAGNETIC FIELDS IMPACT
Impact focal point	Electric and magnetic fields of Transmission power lines

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Phase	Operational Phase
Alternative Alignment	**FM-A, MS-C, MS-D**
Nature of impact	Presence of Transmission power line outside of servitude area
Extent of impact	Footprint (1)
Duration of impact	Long term (4)
Intensity of impact	Low-Medium (4)
Probability	Possible (2)
Confidence	High
Status	Negative
Calculation	(1+4+4) × 2 = 18
Level of significance	No Impact
Mitigation measures	Ensure that servitudes are kept clear of formal and informal residences.
Level of significance after mitigation	No Impact

k) Visual Impacts

The servitude width required for the Transmission power line varies from 40m to 55m wide, depending on the type of pylon tower required, of which the maximum servitude has been considered for the purpose of this report.

The aim is to portray the perception of I&APs with regard to the visual impact and change to the landscape character due to the proposed Transmission power line.

The critical impact usually associated with Transmission power lines is the permanent impact on the affected parties' visual environment. Transmission lines are usually perceived to have an adverse impact on the aesthetic quality of an area due to the height and extent of the steel structures.

A large part of the study area consist of high density built-up suburbs (Khayelitsha, Mfuleni and Delft South) with an extensive road network, existing power lines, cellular phone masts, telephone pole structures etc. Although additional Transmission power lines in this area would not bring new or different visual impacts to a totally undisturbed area, it would still result in intrusive visual impacts, especially if the new Transmission power line towers are higher than the existing structures. The proximity of the towers to the dwellings and intrusiveness thereof would definitely add to the negative visual impact experienced by some of the residents in this area. One should also note that for some residents living in poor socio-economic circumstances, the Transmission power line could also be associated with upliftment and an improvement in their quality of life should they reap the benefits of the improved power supply.

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Although the more open agricultural holdings in the eastern section of the study area appear to be undisturbed, all the proposed residential developments within this area should be taken into consideration. The Transmission power lines could be seen to visually blend in with the new developments, but the challenge lies within finding sufficient space across these developments for the power line. In some cases, developers have also been in negotiations with Eskom to remove (Eskom and CoCT) Distribution power lines (less than 132kV) across their properties to be developed. Even though new developments are synonymous with the provision of electricity infrastructure, the stakeholders operating in this area, and therefore possibly prospective buyers too, would be opposed to the placement of the Transmision power lines to form part of their development or be in close proximity to the development, as this could possibly impact on the potential land use and visual quality of the area.

From a social perspective, however, it is difficult to determine the intensity of the visual impact. The reasons being that various social factors play a critical role in determining an individual's "sense of place" as it is influenced by their mindset, preferences, emotions, linkages with the environment, but also by cultural influences. As explained above some I&APs could perceive the visual impact in a very negative light, whilst others could have a neutral to positive experience.

Based on the above possible difference in viewpoints with regards to the visual impact, the intensity is rated similar for the whole study area, although the probability of this occurring could differ.

Sensitive areas along Alternative FM-A, where a Transmission power line would not easily blend in with the surroundings would include the Vergenoegd Wine Estate, the Sitari Golf Fields Development, the Croydon Olive Estate, the Croydon Vineyard Estate, the Zeekoeivlei property with its historical homestead, as well as the Sitari Golf Fields Development. Along Alternative MS-C, the visual intrusion of a Transmission power line within the dense settlements such as Khayelitsha, Delft South, the DNR and the Kuils River areas also remain a concern. Other negative visual impacts to be expected with the alignment along Alternative MS-D would include the DNR, the Zevenwacht and Langverwacht Wine Estates, larger Mfuleni area and residential areas of the larger Kuils River areas.

The areas surrounding the Mitchells Plain Substation Alternative 1 and 2 are densely built-up with various types of infrastructure such as roads, railway lines, existing power lines etc. Due to the character of the area surrounding these substation alternatives, it is not anticipated that the proposed Mitchell's Plain Substation would severely change the visual environment and subsequently the sense of place of these areas.

However, the sense of place is expected to change considerably should the Mitchells Plain Substation be constructed within the DNR. Even though the DNR is in a degraded state and the fact that various settlements are located on the border of the DNR, the substation is in conflict with the visual backdrop of a nature reserve.

THEME	VISUAL IMPACT
Impact focal point	Visual impact and experience of viewer

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Phase	**Operational Phase**		
Alternative Alignment	**FM-A, MS-C, MS-D**	**Alternatives 1, 2**	**Alternative 3**
Nature of impact	Maintenance of power lines.	Maintenance of Mitchell's Plain Substation	
Extent of impact	Regional (3)	Regional (3)	
Duration of impact	Long term (4)	Long term (4)	
Intensity of impact	Medium (6)	Medium (6)	Medium-High (8)
Probability	Likely (3)	Highly Likely (4)	
Confidence	Medium	Medium	
Status	Negative	Negative	
Calculation	(3+4+6) × 3 = 39	(3+4+6) × 4 = 52	(3+4+8) × 4 = 60
Level of significance	Low	Medium	Medium
Cumulative Impacts	Possible devaluation of properties within the agricultural areas and impact on sense of place. Construction of additional 132kV Distribution power lines, should alternatives 2 or 3 be recommended, with additional social and visual impacts.		
Mitigation measures	A less visually intrusive pylon should be used where possible, through the affected residential areas. Careful consideration should be given to the tower placement to mitigate the negative visual impact. Careful consideration should be given to the tower design and the final route alignments to limit intrusive visual impacts on the properties in the dense settlements. In the rural agricultural areas, towers should not be in close proximity to dwellings. The mitigation measures and recommendations of the Visual Impact Assessment should be implemented. Eskom should consider constructing a Gas Insulated Substation for the Mitchell's Plain Substation. This type of substation has a smaller footprint compared to an Air Insulated Substation, and are perceived by some to be more visually appealing.		
Level of significance after mitigation	Low	Medium	Medium

l) Intrusion Impacts

Intrusions associated with the construction of a substation would refer to the noise and dust created during the undertaking of the construction activities (site clearing, vehicular movement transporting goods and materials etc.).

Cumulative impacts with regards to the Mitchell's Plain Substation Alternative 1 could occur if the construction activities of the substation concur with the construction phases of the Watergate Development and Mitchell's Plain District Hospital.

Care should be taken to limit any noise and dust impacts, and to avoid impacting on the learning environment of the Silversands Primary School (Mitchell's Plain Substation Alternative 2).

Mitchell's Plain Substation Alternative 1 fronts onto Stock Road. Access to this site would therefore, not be problematic as access could be gained from Stock Road, aligned opposite

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the existing access on Stock Road which serves the Philippi East suburb. No severe intrusions in this regard are thus foreseen.

Substation Alternative 2 is surrounded by three roads, Hindle Road, the future Saxdowne Road and Hockenheim Street. Access cannot be allowed from Hindle Road due to it being categorised as a Class 2 road. Access would have to be from Hockenheim Street. During construction, however, heavy vehicles should not make use of the latter and rather be routed via Saxdownes Road to the site (as recommended by the CoCT in **Appendix ~~FAppendix F~~**). This should be negotiated with the CoCT. Limited intrusions on the surrounding communities are thus anticipated.

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Access roads to the proposed Mitchells Plain Substation Alternative 3 would probably be required which would worsen the intrusion impact on the DNR. With regard to Alternatives 1 and 2, it is anticipated that no new access roads would have to be created due to the sites' location next to the Hindle and Stock Roads, respectively. Only internal roads within the substation site area would be necessary.

THEME	**INTRUSION IMPACTS OF MITCHELL'S PLAIN SUBSTATION**	
Impact focal point	Creation of dust and noise during the construction of the Mitchell's Plain Substation	
Phase	**Construction Phase**	
Alternative Alignment	**Alternative 1**	**Alternative 2, 3**
Nature of impact	Construction of Mitchell's Plain Substation	
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Short-Medium term (2)	Short-Medium term (2)
Intensity of impact	Low-Medium (4)	Low-Medium (4)
Probability	Likely (3)	Possible (2)
Confidence	Medium	
Status	Negative	
Calculation	(3+2+4) × 3 = 27	(3+2+4) × 2 = 18
Level of significance	No Impact	No Impact
Cumulative Impacts	Cumulative noise and dust due to other construction activities also taking place in the area surrounding Alternative 1 (Watergate Development and Mitchells Plain District Hospital).	
Mitigation measures	Suitable dust suppression methods should be applied. Noise should be kept to a minimum. Construction hours should be limited to normal working hours. Special care with regards to limiting noisy activities should be taken near the Silversands School to avoid impacting on the learning environment. Access to this site Alternative 1 could be gained from Stock Road aligned opposite the existing access on Stock Road which serves the Philippi East suburb. During construction of substation Alternative 2 heavy vehicles should not make use of the Hockenheim Street but rather be routed via Saxdownes Road to the site, which should be negotiated with the CoCT.	

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THEME	INTRUSION IMPACTS OF MITCHELL'S PLAIN SUBSTATION	
Impact focal point	Creation of dust and noise during the construction of the Mitchell's Plain Substation	
Phase	**Construction Phase**	
Alternative Alignment	**Alternative 1**	**Alternative 2, 3**
Level of significance after mitigation	No Impact	No Impact

m) Noise

During the construction phase of the proposed project the main noise impacts are anticipated to originate from the construction activities where heavy machinery would be used. Noise would also be created by the increase in heavy vehicular traffic through the areas with general low ambient noise levels such as the smallholdings. Although this would have a negative impact on the landowners and residents, it would be of a short duration.

Another source of noise pollution would be from the construction camp. The proximity of residences, communities and businesses to the construction sites and construction camp would determine the intensity of this impact. At this stage no location for such a construction camp has been established.

Noise can be created during the operational phase of the project as a result of water droplets forming on a conductor and causing a crackling sound (breakdown of air molecules). This noise is generally referred to as corona and can usually only be heard within the servitude area. The possible noise impact is thus only anticipated to occur in areas where encroachment within the servitude areas could materialise. Noise levels, however, can increase during wet conditions such as the rainy winter months in the Cape area.

In this regard the possible noise impact within the densely populated areas of Khayelitsha remains a concern, as well as in the low ambient noise areas such as the Firgrove area.

Noise can also be created by the steel mono pole masts, especially during windy conditions. As the structure is hollow, any air that passess through the structure will cause a whistling noise, which could be heard within 100m of the pylon.

THEME	NOISE IMPACT	
Impact focal point	Creation of noise due to construction vehicle movement and construction activities.	Possible noise impact on property owners in close proximity to th servitude or on illegal dwellers found within the servitude.
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**	**FM-A, MS-C, MS-D**

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THEME	NOISE IMPACT	
Impact focal point	Creation of noise due to construction vehicle movement and construction activities.	Possible noise impact on property owners in close proximity to th servitude or on illegal dwellers found within the servitude.
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A, MS-C, MS-D**	**FM-A, MS-C, MS-D**
Nature of impact	Construction of Transmission power line	Maintenance of power lines.
Extent of impact	Regional (3)	Site (2)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low-Medium (4)	Low-Medium (4)
Probability	Likely (3)	Possible (2)
Confidence	Medium	Medium
Status	Negative	Negative
Calculation	(3+2+4) × 3 = 27	(2+4+4) × 2 = 20
Level of significance	No Impact	No Impact
Mitigation measures	The exposure of workers and residents to high level noise especially near engines and machinery should be minimised. Workers should wear the necessary protective devices. Noise created by the loading and off loading of construction material should be limited as far as possible. Construction should take place during normal working hours. The construction schedules should be communicated to potentially affected parties, landowners and residents. Machinery should be maintained in a road-worthy condition. The power line should be designed to minimise the formation of corona discharge. Eskom should ensure that no people stay within the servitude area.	
Level of significance after mitigation	No Impact	No Impact

n) Dust Creation

The construction activities such as the movement of construction related vehicles on gravel roads, the clearing of vegetation and the digging of the foundations for the towers are expected to create dust. It is anticipated that some gravel roads would be used in the agricultural areas within the south-eastern section of the study area. Due to the density of the remaining sections of the study area, the dust created during the construction activities in this area also remain a source of concern.

The impact is thus rated similar for all alternatives assessed. Furthermore, the impact would be intermittent and of a temporary nature, and for that reason it receives a no impact overall rating.

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THEME	DUST CREATION
Impact focal point	Creation of dust due to construction vehicle movement and construction activities
Phase	**Construction Phase**
Alternative Alignment	**PM-1, PM-2, PM-3, PM-4**
Nature of impact	Construction of Transmission power line
Extent of impact	Regional (3)
Duration of impact	Short-Medium term (2)
Intensity of impact	Low-Medium (4)
Probability	Possible (2)
Confidence	Medium
Status	Negative
Calculation	(3+2+4) × 2 = 18
Level of significance	No Impact
Cumulative Impacts	Possible economic losses for wine and olive farmers. Possible negative health impacts on residents.
Mitigation measures	Limit the creation of additional access roads especially in the agricultural areas. In cases where access roads need to be created, these should not be close to dwellings, or other public gatherings/venues. Gravel roads on the construction site frequently used by construction vehicles should be sprayed with water (or an alternative appropriate dust suppressant) to limit dust generation. Clearance of vegetation along the centre line should be limited to removal of trees and shrubs, and cutting grass short, to minimise the creation of gravel roads and dusty areas. Areas where the vegetation has been removed (e.g. at foundation footings) should also be sprayed with water to suppress dust during periods of strong wind. Construction vehicles should be in good working order and should keep to the speed limits. The timing of the construction activities within the agricultural areas should be scheduled in consultation with the affected farmers and/or property owners to limit the negative impact of possible dust on their crop production.
Level of significance after mitigation	No Impact

o) Health

Health related impacts during the construction phase of the proposed project are associated with the influx of outsiders to the area, whether these are job seekers or construction workers. The spread of HIV/Aids, with long-term possible regional consequences, is always a source of concern, but especially with the high prevalence rate of HIV/Aids in the area and the large number of youths residing in the area. Additional infections (even limited) with long-term possible regional consequences, therefore remain a source of concern.

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Other cumulative health impacts associated with the construction activities refer to environmental pollution resulting in health impacts. Hence, if the construction sites and/or the construction camp (where workers are housed) are not properly managed, it could result in negative impacts on the environment with related health impacts on the surrounding communities such as pollution of water sources due to improper sanitation facilities, solid waste management or wastewater management. This is especially a concern in the areas where the water quality is already a concern and in the agricultural areas where boreholes are used for irrigation purposes, such as the vineyards found on the Vergenoegd Wine Estate.

Accidents during the construction phase of the proposed power line and substation are always a source of concern. Even with regard to the additional risk of accidents it is anticipated that the emergency services in the larger Cape Town area would be able to deal with emergencies, should these occur.

It is argued that should the proposed project be implemented, the reduction in air pollution as a result of less residents relying on pollution creating sources for heating and cooking purposes would assist in improving the overall air quality in the beneficiary areas. This would thus have positive health-related consequences for those in the Cape Peninsular who would benefit from the improved electricity supply and possibly those people residing within the study area.

Concerns are also usually present with regards to the impact of the electrical current of Transmission power lines on people. Drawing on the existing body of research, the World Health Organisation has stated that it is becoming increasingly unlikely that exposure to EMFs constitutes a serious health hazard, although it concedes that some uncertainty remains. However, electric and magnetic fields can be reduced (through shielding, engineering techniques or line designs) and decreased with an increase in distance from the Transmission power line (Empetus CC, 2006). The 55m servitude area limits the constant exposure to these EMFs, and according to the Eskom regulations no one is allowed to live within the servitude.

These health concerns should not be dismissed as irrelevant. Sections of Alternative FM-a, MS-C and MS-D would traverse densely populated areas where people live in poor socio-economic circumstances and where health care facilities are not always readily available. Concerns in this regard would thus possibly remain, especially if people would settle in the servitude area, as is currently happening in Khayelitsha.

THEME	**HEALTH**		
Impact focal point	Impact of Tranmission power line on health of residents and possible environmental pollution		
Phase	**Construction Phase**		**Operational Phase**
Alternative Alignment	**FM-A, MS-D**	**MS-C**	**FM-A, MS-C, MS-D**
Nature of impact	Construction of new pylon structures		Eskom Transmission maintenance of power lines and impact from EMF on human health
Extent of impact	Regional (3)		Regional (3)

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THEME	HEALTH			
Impact focal point	Impact of Tranmission power line on health of residents and possible environmental pollution			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**FM-A, MS-D**	**MS-C**	**FM-A, MS-C, MS-D**	
Duration of impact	Short-Medium term (2)		Long term (4)	
Intensity of impact	Low-Medium (4)		Medium (6)	
Probability	Possible (2)	Likely (3)	Likely (3) Negative	Likely (3) Positive
Confidence	Medium		Medium	
Status	Negative		Negative	Positive
Calculation	(3+2+4) × 2 = 18	(3+2+4) × 3 = 27	(3+4+6) × 3 = 39	(3+4+6) × 3 = 39
Level of significance	No Impact	No Impact	Low (Negative)	Medium (Positive)
Cumulative Impacts	Possible helath impact on dwellers settling within the servitude areas. Possible spread of sexually transmitted diseases and increased pressure on health services. Concerns were raised that should resettlement of people occur, it could lead to an increase in the prevalence of rodents in the area with subsequent health impacts.			
Mitigation measures	Eskom, in conjunction with the contractors, should continue and extend HIV/AIDS awareness and support programmes amongst the contractors and sub-contractors. Adequate water supply and sanitation related facilities should be provided to the workers at the construction sites. Local labour should be employed as far as possible to avoid additional pressure of outsiders on the existing services. Construction waste should be disposed of properly to prevent any surface and groundwater pollution. Construction sites should be fenced off to avoid unauthorised entry by individuals and animals. Eskom should take a strong stance with regards to the illegal squatting within the servitude areas. For safety reasons these dwellers should be moved out of the servitude areas on an ongoing basis.			
Level of significance after mitigation	No Impact	No Impact	Low (Negative)	Medium (Positive)

p) Impact on Hospitality Industry

Some select highly skilled workers are required during the construction phase. These outsiders would most probably obtain accommodation in the Cape Town area for the duration of their stay. This could again have some possible positive cumulative impacts on the local hospitality industry, but in light of the existing thriving tourism industry in the Western Cape and Cape Town, and the limited number of these workers, this impact would be minor or even insignificant.

THEME	IMPACT ON THE HOSPITALITY INDUSTRY
Impact focal point	Outsiders obtaining accommodation in the Cape Town area
Phase	**Construction Phase**

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Alternative Alignment	**PM-1, PM-2, PM-3, PM-4**
Nature of impact	Construction of Transmission power line
Extent of impact	Regional (3)
Duration of impact	Short-Medium term (2)
Intensity of impact	Low (2)
Probability	Possible (2)
Confidence	Medium
Status	Neutral
Calculation	(3+2+2) × 2 = 14
Level of significance	No Impact
Cumulative Impacts	None
Mitigation measures	None
Level of significance after mitigation	No Impact

q) Commercial Development

Future developments in the area could be impacted by the proposed Transmission power line, as the eventual servitude alignment may affect proposed future township development and densifications, and *vice versa*. Existing developments and possible future developments known will be discussed in this section.

- Mitchell's Plain District Hospital

The Mitchell's Plain District Hospital would be situated to the east of the Watergate Development and A.Z. Berman Drive (M36). It is just north of the existing Lentegeur Hospital flanked by the Mitchell's Plain and Khayelitsha areas. Construction is expected to be completed by the end of 2012. The hospital will cater for residents living in the Mitchell's Plain, Philippi and Khayelitsha areas.

Patients at hospitals can be characterised as "sensitive receptors" and the proposed Transmission power line (and substation) could be viewed by many as a source of concern due to the possible impact of Electromagnetic fields (EMFs) on the patients as well as the safety threat (e.g. possible explosions at substation). Even if explosions do not frequently occur it should still be noted.

The upgrading of the electricity grid would allow a safe and secure electricity supply to the Mitchell's Plain District Hospital where it is critically required. The impact of Alternative FM-A on the hospital is therefore deemed of low-medium intensity, as the impacts are expected to respond to the prescribed mitigation measures. However, placing FM-A on the hospital site is not recommended, if other options could be pursued.

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- Philippi Industrial area/Stock Road/Landsdowne Road

The area around Stock Road and Sheffield Road (Philippi Industrial area) is supported in the long term as an emerging commercial and industrial development opportunity (comments from the CoCT, see **Appendix F~~Appendix F~~**). Economic development in this area, however, would have to be supported by infrastructural development and urban upgrading. The CoCT indicated that in terms of the district plan, mixed use development is planned for the area along Stock Road and therefore the visual impacts should be considered in this area.

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For the rest of the Philippi Industrial area, new general industrial uses are proposed, including the area affected by the airport noise to the east of Stock Road. Alternative MS-C should take cognisance of this issue.

- Cape Town Film Studio

The Cape Town Film Studio is a film studio complex situated to the north of the N2, and west of Baden Powell Drive (R310) and the Vergenoegd Estate. The film studio officially opened in October 2010. This studio is planning on hosting various international film production teams. The buildings include four sound stages, multi-purpose workshops, art departments, make-up rooms, wardrobe rooms, star rooms, production offices, green rooms and storage space. The second phase of the development would include extensive office buildings that would host film and media companies (www.dreamworld.co.za).

Due to the size of the venture, it should be noted that Alternative FM-A should be aligned as such to avoid the existing studio buildings and the office buildings that would form part of the next phase of the development. An alignment as close to the N2 as possible would thus be preferable.

- Denel

The Denel site is a large open area between Khayelitsha and Mitchells Plain located south of the N2 between the M49 (Swartklip Road) and the M44 (extension of Mew Way). Swartklip Products, a division of Denel is operating from this site. The company specialises in the design and development of various products, which include small calibre ammunition, explosives and pyrotechnic products (www.epicos.co.za). An alignment should again be as close to the railway line as possible to have the least negative impact on this site.

- SA Infantry Base

The SA Infantry Base is located to the east of Spine Road, south of the N2. An alignment in this vicinity should take note of the infrastructure, activities undertaken on site and any possible future extensions or developments on site.

- AJ Brick Sales Commercial Development

This property is located on the south-western corner of the Stellenbosch Arterial and Range roads. Considering that there is an open area for the storage of this company's bricks close to this intersection, MS-D-25Bb has been placed here, as an alternative pylon position to link alternative pylons of MS-D-24 and MS-D-26, respectively.

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THEME	IMPACT ON COMMERCIAL DEVELOPMENTS	
Impact focal point	Impact of development plans and layout on the alignment of the proposed Transmission power line and *vice versa*	
Phase	**Operational Phase**	
Alternative Alignment	**FM-A**	**MS-C**
Nature of impact	Construction of Transmission power line	
Extent of impact	Site (2)	
Duration of impact	Long term (4)	
Intensity of impact	Low-Medium (4)	
Probability	Possible (2)	Highly Likely (4)
Confidence	Medium	
Status	Negative	
Calculation	(2+4+4) × 2 = 20	(2+4+4) × 3 = 30
Level of significance	No Impact	Low
Pylon Positions	• FM-A-4B • FM-A-5B • FM-A-8 • FM-A-9 • FM-A-10 • FM-A-11 • FM-A-12 • FM-A-27B • FM-A-28 • FM-A-29 • FM-A-30	• MS-C-3B • MS-C-4B • MS-C-5 • MS-C-6B • MS-C-9B • MS-C-10 • MS-C-11
Cumulative Impacts	Possible safety risks to proposed hospital due to proximity of alignment and substation. Possible health-related risks to patients at the hospital.	

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THEME	IMPACT ON COMMERCIAL DEVELOPMENTS	
Impact focal point	Impact of development plans and layout on the alignment of the proposed Transmission power line and *vice versa*	
Phase	**Operational Phase**	
Alternative Alignment	**FM-A**	**MS-C**
Mitigation measures	The Mitchells Plain District Hospital and Lentegeur Hospital, should, in conjunction with Eskom, prepare emergency plans to cater for any possible accidents and safety risks at the proposed Mitchells Plain Substation Alternative 1. Alternative FM-A should take cognisance of the layout plans of the new Mitchells Plain District Hospital. Eskom should enter into discussions with the representatives of the Mitchells Plain District Hospital and Department of Health regarding the possible alignment of a Transmission power line through the hospital site. The proposed Transmission power line should be placed on the border of the Mitchells Plain District Hospital site if possible so that it is as far from the hospital buildings as possible. The 55m servitude area would limit any possible constant exposure to EMFs and Eskom should thus ensure that this is implemented. Alternative FM-A should be aligned as close to the N2 as possible to avoid the existing and future developments planned at the Cape Town Film Studio west of Baden Powell Drive. Alternative MS-C should take note of the proposed industrial uses within the Stock Road precinct (Philippi Industrial area), as stated by the CoCT.	
Level of significance after mitigation	No Impact	Low

r) Residential Developments

Some residential developments in the study area are planned, or in the process of being implemented. Any servitude alignment should take cognisance of such future township development and densifications, and *vice versa*.

- Watergate Development

The proposed Watergate Development is located to the west of A.Z. Berman Drive (M36), east of the Woodlands area and the railway line, and south of the R300 in the Mitchell's Plain area on Erf 695 and Erf 694. This development is an R800-million project which is on 22ha of land. It will provide affordable, bondable housing for 4 500 families in the R5 000 to R10 000 income bracket. In total, it will include 2 200 apartments, 800 conventional separate title units, a mini shopping centre and open spaces with recreational facilities when it is complete. Phase 1 of the Watergate Development (Erf 695) will provide 2 200 affordable Gap housing units. Phase 2 (Erf 694) and Phase 3 will include 700 separate title units. The development will consist of one to three bedroom units (single and double storey). Construction would last three years (CoCT, 2007). Detailed planning for the entire development has thus been completed. Estimations are that this development would benefit 3 000 families. Other areas for development include Farm 693 Portion 10 and Erf 3482, with the latter reflecting opportunity for mixed-use development around the Stock Road Station.

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Alternative FM-A would traverse the Watergate Development only between FM-A-3B to FM-A-5B. The layout would have to be redone to accommodate the proposed Transmission power lines, which would be an expensive and long process, with subsequent severe financial losses to the developer (including number of erven that would be lost in the process). It is thus recommended that Eskom negotiate with the developer to allow space for some tower footprints across the site to enable them to reach the proposed Mitchells Plain Substation Alternative 1. This should be done as soon as possible to limit the possible negative financial implications for the developer.

- Macassar

The area just north of Macassar between Kramat Road and the Zandvliet High School on the farm Zandvliet 664 is proposed for future housing development. Concerns from the CoCT refer to the possibility that Alternative FM-A (between FM-A-466 to FM-A-49B) could divide the site, thereby negatively impacting on the future development. It was thus proposed by CoCT that the alignment should rather be not traverse this site (see IRR **Appendix F~~Appendix F~~**).

Boys Town, Macassar is also situated to the south of the N2 just west of Kramat Road. Again care should be taken to avoid this facility due to the youth attending these facilities being seen as sensitive receptors. However, the impact would be reduced, considering that the proposed route alignment would follow an existing 132kV power line.

- Residential Developments: Rouxville and Amandelrug

To the east of the Rouxville and Amandelrug suburbs, new erven have been established and new houses are being built on these properties in these suburbs. The use of Steel Mono Poles and/or the Single Lattice Masts could be required, if this section of Alternative MS-Dc be recommended.

- Densification north of N2

Possible infilling of vacant land in the Hagley, Wimbledon, Happy Valley, Mfuleni and Kalkfontein areas form part of the CoCT's housing developments. In areas where the proposed Transmission power line borders the existing settlements, cognisance should be taken with regard to the possible infilling and extensions that would take place in future. This would be applicable with regard to sections of Alternative MS-C (Mfuleni, Hagley, and Kalkfontein) and sections of Alternative MS-D (Mfuleni, Wimbledon, Happy Valley) where these alignments are proposed withiin 100m of these settlements.

The land currently occupied by the Ithemba Farmers Association is currently used for subsistence farming practices, but indications are that this land has been earmarked for future housing development. Pylons along Alternative FM-A should thus be placed as close to the N2 as possible.

- Rotterdam

The Rotterdam area refers to an area east of the R300 and north of Hindle Road within close proximity to Diepwater (Wesbank), Hagley, High Gate and Silversands. According to the

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CoCT, this site belongs to the Provincial Housing Board and residential developments are being planned on this site (comments from CoCT in **Appendix F**~~**Appendix F**~~). Pylons MS-D-14 to MS-D-19 of Alternative MS-D runs along the eastern boundary of this site.

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- SANRAL property

The SANRAL property is located to the east of the Zevenwacht Mall opposite Polkadraai Road. The SANRAL land consists of four smaller sections divided by Polkadraai Road and Skilpaddam Street. The CoCT indicated that this land has been considered for housing recently. However, pylons MS-D-31B and MS-D-32B have been placed south of Polkedraai Road, avoiding the impact on these properties.

- Stellendale Village and Park

The Stellendale Village is situated to the north of the Blackheath Industrial area, just north of the Stellenbosch Road (M12) and south of Highbury (south of Amethyst Street). A railway line runs to the east of the development with Van Riebeeck Road more to the east. Environmental authorisation had been obtained for the Stellendale village and park. This residential property development (security estate), which would include 1 500 houses to be developed over five phases, along the Stellenbosch Road, would be affected by Alternative FM-Db (MS-D-24Bb and MS-D-25Ba).

A part of the development has already been constructed and occupied by residents. The layout for the last phases situated closest to the Stellenbosch Road has been completed. From the layout plans, it is clear that due to the sizes of the erven, tower positioning within the estate would have severe negative intrusion and visual impacts on the properties. Sufficient space for the towers could be problematic.

The layout plan of the township would have to be redone to accommodate the proposed Transmission power lines, which would be an expensive and long process, with subsequent severe financial losses to the developer (number of erven that would be lost in the process). It should furthermore be noted that the developer, Visual International (Pty) Ltd Entities, were in negotiations with Eskom Distribution to move an existing 132kV Distribution power line from their property. They have received a quotation for the removal of this power line. Therefore, it is evident that the developer would not support another Transmission power line across their property and social mobilisation against the implementation of Alternative MS-D within this section of the study area should be expected.

- Sitari Fields Golf Estate Development

Plans for the proposed Sitari Fields Golf Estate Development north of the N2 and south of Old Main Road in close proximity to the existing Firgrove Substation, include an 18 hole golf course, 1 130 residential units with commercial area and hotel. The land came under auction in October 2010, but indications are that the proposed development would continue.

Alternative FM-A, along the N2, would thus have to consider this development. Existing plans indicate the golf course to be situated within the southern section of the development which is closest to the N2. An alignment just north of the N2 would thus traverse the golf course which could result in the following negative social impacts:

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- Negative impact on the golfers' experience as well as the overall sense of place;
- Golf rules state a compulsory replay if balls hit power lines. Should power lines frequently be hit by the golfers it would result in delays of play and back-up of the entire field with subsequent negative financial losses to the club;
- A Transmission power line could negatively impact on the layout of the field which could hamper the potential development with severe loss of generating future revenue.

As the site has been resold in October last year, layout plans could be reviewed. This would provide Eskom with an opportunity to negotiate a servitude within this area and to limit the negative visual and intrusion impacts on the sense of place of such a golf development.

Pylon positions FM-A-49B to FM-A-57 are located on this proposed development's property.

- Croydon Olive Estate and Croydon Vineyard Estate

Croydon Olive Estate is situated to the north of the N2, east of Kramat Road and just south of the Croydon Suburb. The Croydon Vineyard Estate is also a recently built security estate situated west of Croydon Olive Estate, north of the N2 and south of Croydon. The farm Vergenoegd and the Croydon Vineyard Estate is to the west of this development. This security estate aims to consist of a working olive farm where all owners receive a monthly allocation of olives and olive oil from the farm as additional benefits. Alternative FM-A would traverse the property of the Croydon Olive Estate (the farm Toplands) with a negative impact on the sense of place and loss of land to be used for the development and/or for the olive production.

It should be noted that the Croydon Olive Estate Development Company (Pty) Ltd has undergone immense financial costs to relocate the Distribution power line which was situated on the property. It is evident that the developer would not support a Transmission power line across their property and social mobilisation against the implementation of a route alignment within this section of the study area should be expected. However, FM-A route alignment has placed FM-A-45B to FM-A-48B south of the N2, avoiding the Croydon Olive Estate completely.

THEME	**RESIDENTIAL DEVELOPMENTS**		
Impact focal point	Impact of development plans and layout on the route alignment of the proposed Transmission power line and *vice versa* Possible loss of land due to servitude acquisitions or tower placements		
Phase	**Construction and Operational Phases**		
Alternative Alignment	**FM-A**	**MS-C**	**MS-D**
Nature of impact	Construction and maintenance of Transmission power line		
Extent of impact	Regional (3)		
Duration of impact	Long term (4)		
Intensity of impact	Medium-High (8)	Low (2)	Medium-High (8)

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THEME	RESIDENTIAL DEVELOPMENTS		
Impact focal point	Impact of development plans and layout on the route alignment of the proposed Transmission power line and *vice versa* Possible loss of land due to servitude acquisitions or tower placements		
Phase	**Construction and Operational Phases**		
Alternative Alignment	**FM-A**	**MS-C**	**MS-D**
Probability	Highly Likely (4)	Likely (3)	Highly Likely (4)
Confidence	Medium		
Status	Negative		
Calculation	(3+4+8) × 4 = 60	(3+4+2) × 3 = 27	(3+4+8) × 4 = 60
Level of significance	Medium	No Impact	Medium
Pylon Positions	• FM-A-4 • FM-A-5 • FM-A-42 • FM-A-43 • FM-A-44 • FM-A-45B • FM-A-46B • FM-A-47 • FM-A-48B • FM-A-49B • FM-A-50 • FM-A-51 • FM-A-52 • FM-A-53B • FM-A-54B • FM-A-55Ba or b • FM-A-56B • FM-A-57	None	• MS-D-13b • MS-D-14Ba or b • MS-D-15a or b • MS-D-16Ba or b • MS-D-17B • MS-D-18Ba or b • MS-D-19Ba or b • MS-D-20 • MS-D-21a or b • MS-D-22 • MS-D-24Bb • MS-D-25Ba • MS-D-26Ba • MS-D-30B • MS-D-31B • MS-D-32B • MS-D-43 • MS-D-44 • MS-D-45B • MS-D-46B • MS-D-47
Cumulative Impacts	Re-planning of township layout. Possible financial cost and losses to developer. Possible devaluation of property value due negative visual impact. Social mobilisation against the proposed alignments as property owners/developers have already negotiated with Eskom Distribution to remove existing lines from the property. Without the proposed Transmission power line, the provision of electricity to these developments would be limited, resulting in cumulative losses to owners/developers in this region.		

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THEME	RESIDENTIAL DEVELOPMENTS		
Impact focal point	Impact of development plans and layout on the route alignment of the proposed Transmission power line and *vice versa* Possible loss of land due to servitude acquisitions or tower placements		
Phase	**Construction and Operational Phases**		
Alternative Alignment	**FM-A**	**MS-C**	**MS-D**
Mitigation measures	Eskom should liaise with the developers and representatives of the CoCT during the negotiation phase of the project to ensure a route alignment which would ensure the protection of the land value and resources and which would also be to the socio-economic benefit of the communities. Eskom should negotiate with the developer to allow space for some tower footprints across the Watergate Development site to enable them to reach the proposed Mitchell's Plain Substation.		
Level of significance after mitigation	Medium	No Impact	Medium

s) Wine Estates

- Vergenoegd Wine Estate

The Vergenoegd Wine Estate is situated to the north of the N2, just east of Baden Powell Drive. The farm is one of the oldest farms in the Cape with the manor house being a historical monument. Apart from the wine making activities and wine tasting, the farm has various activities which the visitors can enjoy such as the historical walk-about, a duck parade tour and playing of Jeu de Boulles, also known as Petanque.

The wine estate is situated on approximately 230ha of the Vergenoegd Farm. The major farming section of the farm is to the west of the Eerste River. The area to the east of the Eerste River is not cultivated due to poor soils, and is currently used for natural grazing purposes. Approximately 74ha of the farm contain established vineyards with permanent and supplementary irrigation areas.

Applications for future urban developments and land use changes on specific sections of the farm Vergenoegd (east of Baden Powell Drive) have been submitted. This would include some limited residential and tourism type of development. Developers and the property owners have been in negotiations regarding this with representatives of the CoCT, relevant officials and DEADP. Some applications are thus well advanced and approvals are eminent.

As environmental constraints have been taken into account when the above development plans were developed, one could thus assume that the land to be developed is also the most suitable for a Transmission power line due to the avoidance of sensitive environmental areas. While no approvals are currently in place these proposed development plans should be noted and the proposed alignment of the line should be adapted to have the least impact on these developments. The historical importance of the farm Vergenoegd should furthermore be considered and therefore any visual impacts on the entrance to the estate,

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the function of the homestead as a tourist attraction and associated tourism activities undertaken on the property should be avoided.

The initial alignment of Alternative FM-A (to the north of the N2) over the farm Vergenoegd was identified to negatively impact on the farm in terms of existing farming activities. Therefore the alignment was moved to the south of the N2, which would also traverse the farm Vergenoegd, but would have less impact on their core activities, the sense of place (due to the visual impact) and proposed future development. The model aeroplane aerodrome on the Vergenoegd site (south of the N2) is also noted.

- Zevenwacht Wine Estate

The Zevenwacht Wine Estate is located to the north of the Stellenbosch Road (M12) just east of the Jagtershof suburb and north of the Saxenburg Industrial Park. The Zevenwacht Wine Estate consists of expansive vineyards, the historical homestead, other historical buildings, accommodation facilities, conference facilities, wine tasting facilities, a restaurant, spa and cheesery. It is a declared heritage site and a part of the Cape Winelands Cultural Landscape. The estate focuses on tourists and a Transmission power line (Alternative MS-Dc) would negatively impact on the overall experience of the visitors and the aesthetic quality of the area, as the estate is known for its views towards Table Mountain.

No pylons are proposed within the wine estate, but some pylons may be visible on the southern side of the wine estate.

- Langverwacht Wine Estate

The Langverwacht Wine Estate is situated to the north of Polkadraai Road (M12) (Stellenbosch Road) and east of the Zevenwacht Wine Estate. Various historical buildings form part of the property of which some even date back to 1720 when the original farm was laid out. The estate has various vineyards, a wine making facility, wine tasting facility and serves as a wedding venue. Alternative MS-Dc would negatively impact on the visual character and overall experience of the visitor.

No pylons are proposed within the wine estate, but some pylons may be visible from the wine estate.

THEME	**IMPACT ON WINE ESTATES**	
Impact focal point	Impact of the Transmission power line on the aesthetic value, historical importance (sense of place), visual impact and possible future developments of these properties	
Phase	**Construction and Operational Phases**	
Alternative Alignment	**FM-A**	**MS-D**
Nature of impact	Construction and operation of Transmission power line	
Extent of impact	Regional (3)	
Duration of impact	Long term (4)	
Intensity of impact	Medium (6)	

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THEME	IMPACT ON WINE ESTATES	
Impact focal point	Impact of the Transmission power line on the aesthetic value, historical importance (sense of place), visual impact and possible future developments of these properties	
Phase	**Construction and Operational Phases**	
Alternative Alignment	**FM-A**	**MS-D**
Probability	Highly Likely (4)	Likely (3)
Confidence	Medium	
Status	Negative	
Calculation	(3+4+6) × 4 = 52	(3+4+6) × 3 = 39
Level of significance	Medium	Low
Pylon Positions	• FM-A-37B • FM-A-38B • FM-A-39 • FM-A-40 • FM-A-41 • FM-A-42 • FM-A-43 • FM-A-44	• MS-D-34B • MS-D-35 • MS-D-36 • MS-D-37 • MS-D-38 • MS-D-39 • MS-D-40 • MS-D-41
Cumulative Impacts	Possible negative economic implications for the estates due to the negative impact on the resource use (vineyards) and sense of place resulting in less visitors to the estates. Possible devaluation of property value due negative visual impact.	
Mitigation measures	Alternative FM-A should take cognisance of the model aeroplane aerodrome. Alternative MS-D should preferably be aligned as far west within the corridor as possible to avoid any negative impact on the visual quality of the Zevenwacht Wine Estate and the Langverwacht Wine Estate.	
Level of significance after mitigation	Medium	Low

t) Driftsands Nature Reserve

The DNR is a provincial nature reserve managed by CapeNature. It is situated to the east of Delft South, north of Khayelitsha and the N2, and west of the Mfuleni settlement. CapeNature aims to transform the area into a "safe, multi-purpose urban reserve and a treasured community resource" (Open Africa, 2011). The DNR's plans for a multi-functional park would also address biodiversity and socio-economic issues to make sure the benefits accrue to the communities around the DNR.

Even no formal developments are planned with the DNR; a formal hiking trail for environmental education purposes is under construction. A hiking trail is situated south of the Medical Research Complex (MRC) running eastwards to and around the open wetland (dam). The trail further runs back to the complex. There is also an existing traditional Xhosa

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initiation site situated to the north east of the MRC within the reserve. CapeNature is currently working in partnership with the Department of Cultural Affairs, Arts and Sport to formalise the initiation site. Xhosa communities living in close proximity to the reserve such as Sikhumbule, Mfuleni, Khayelitsha, Los Angeles, Green Park make use of the initiation site at least twice a year during school holidays (Koali, 2010). The DNR, even in a degraded state, also plays an important role in the environmental education of the surrounding communities.

The DNR, however, is severely affected by unauthorised entry to the nature reserve and illegal dumping of waste, as well as socio-economic pressure from development and informal settlements situated on its boundary. The need for building sand also resulted in various sand mining applications. These factors relentlessly impact on the reserve's character and *status quo*. The DNR's small extent has thus been reduced by various pressures such as land-use, and socio-economic challenges. With regard to the proposed residential development situated within the south-western section of the DNR, the Provincial Cabinet's resolution stipulated that negotiations should be facilitated to enable the inclusion of the conservation worthy habitats along the Kuils River floodplain to the north and south of DNR to off-set the loss of conservation land to the proposed residential development (Koali, 2010).

Alternative MS-C traverses to the north of the border of the DNR along an existing corridor of Eskom Distribution power lines, whereas Alternative MS-D runs near the eastern border of, but outside, the DNR. The intensity of the impact of MS-C is lower than MS-D. The former would require an expansion of the existing servitude (to a maximum of 55m) as opposed to a new servitude of maximum 55m required for the latter.

At this stage it seems as if a power line would not severely impact on the character and *status quo* of the nature reserve, but even if the nature reserve is in a degraded state it cannot afford to allow such infrastructure in the reserve as it would further negatively impact on the sense of place of the reserve.

The proposed Mitchell's Plain Substation Alternative 3 that is proposed within the reserve, would reduce the size of the DNR even further. From the authorities' point of view, this cannot be allowed. Furthermore, CapeNature's policy statement does not support any new power lines (Transmission or Distribution) in nature reserves, especially in small reserves such as Driftsands. The CoCT Biodiversity Management also indicated that the DNR is of even greater importance today, than previously, due to the vegetation sub-type that is becoming more endangered due to all the development pressure.

Should the above-mentioned objectives be achieved, to restore the reserve to its full potential, a Transmission power line and substation would have definite negative impacts on the sense of place. The construction of the Transmission power line would disturb the initiation activities resulting in increased risk related to personal health and safety.

An alignment should preferably not be considered through the DNR to mitigate against any impacts on the sense of place of the DNR, its ecological importance, and its potential function as a safe, multi-purpose urban reserve and a treasured community resource.

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THEME	IMPACT ON DRIFTSANDS NATURE RESERVE	
Impact focal point	Impact of the Transmission power line on the ecological importance, historical importance (sense of place), visual impact and community resource of the DNR	
Phase	**Construction Phase**	
Alternative Alignment	**MS-C**	**MS-D**
Nature of impact	Construction of Transmission power line within the Driftsands Nature Reserve	
Extent of impact	Regional (3)	Regional (3)
Duration of impact	Long term (4)	Long term (4)
Intensity of impact	Medium (6)	Medium-High (8)
Probability	Likely (3)	Highly Likely (4)
Confidence	Medium	
Status	Negative	
Calculation	(3+4+6) × 3 = 39	(3+4+8) × 4 = 60
Level of significance	Low	Medium
Pylon Positions	• MS-C-31 • MS-C-32 • MS-C-33 • MS-C-34 • MS-C-35B	• MS-D-2Ba • MS-D-3 • MS-D-4 • MS-D-5 • MS-D-6B • MS-D-7 • MS-D-8 • MS-D-9B • MS-D-10
Cumulative Impacts	Loss of resource use	
Mitigation measures	Preferably, no Transmission power line should go through the DNR. But, if such an option cannot be avoided, the Transmission power line should be placed as close to the DNR's boundaries as possible. Should an alignment be constructed through the DNR, Eskom could assist in fencing off the reserve, and assist in enhancing the community partnership between CapeNature and the various settlements bordering the reserve.	
Level of significance after mitigation	Low	Medium

u) Road Development

Future road developments should be considered when investigating possible corridors for Transmission power lines. Within the Khayelitsha area, indications are that Mew Way and

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Landsdowne Road would in future be upgraded (widened) (comments from CoCT in Appendix F~~Appendix F~~). In some areas the Mew Way upgrading would require approximately 66m and Landsdowne Road approximately 45m. The Mew Way and Landsdowne Road area is already problematic with regards to possible resettlement of households and any widening of the roads would complicate the difficulties in putting a Transmission power line through this section of the study area.

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Widening of the roads would possibly also result in resettlement. The cumulative social impacts in this regard, should the Transmission power line follow Alternative FM-A, would thus be intense and would require critical mitigation measures. Due to the complexity and social disruptions associated with a resettlement process, Alternative FM-A in this section of the study area is thus not supported from a social perspective.

THEME	**ROAD DEVELOPMENTS**	
Impact focal point	Impact of road development plans on the alternative route alignments and *vice versa*	
Phase	**Construction Phase**	
Alternative Alignment	**FM-A**	**MS-C, MS-D**
Nature of impact	Construction of power lines	
Extent of impact	Regional (3)	
Duration of impact	Long term (4)	
Intensity of impact	Medium-High (8)	Low-Medium (4)
Probability	Highly Likely (4)	Possible (2)
Confidence	Medium	
Status	Negative	
Calculation	(3+4+8) × 4 = 60	(3+4+4) × 2 = 22
Level of significance	Medium	No Impact
Pylon Positions	• FM-A-15B • FM-A-16B • FM-A-17B	None
Cumulative Impacts	A snowballing effect with regards to resettlement due to the road and power line developments.	
Mitigation measures	If Alternative FM-A through this area is the recommended option, Eskom should liaise with the CoCT and relevant Transport Departments about the timeframes and planning processes with regards to this road construction and implementation so that the road development and power line construction and implementation could coincide to concentrate the intrusion impacts during the construction phase and to limit the negative impacts expected during the implementation.	
Level of significance after mitigation	Medium	No Impact

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v) Agricultural Activities

The proposed Transmission power line could impact on the vineyards found in the south-eastern section of the study area, such as those on the farm Vergenoegd in close proximity to the Firgrove Substation. The majority of agricultural activities on the farm Vergenoegd are undertaken to the west of the Eerste River. The area to the west of the Eerste River is used for grazing purposes, whilst approximately 74ha are used for vineyards. Other agricultural activities of the farms Zevenwacht and Langverwacht could possibly be affected, but as sections of these farms are situated on the border of the study area, the impact is expected to be low.

Tower positions could limit the resource use and productivity of these vineyards and clearing of areas for the towers could have a short term impact on the economic capability of the land.

The agricultural activities undertaken would also be negatively affected by the possible dust pollution. However, the intensity and significance of the impact during the construction phase would be influenced by the exact location of the line, the size of the property, the need for access roads to the construction areas, the duration of the construction activities on the property, the timing of the construction activities and the extent of the vineyards. At this stage it is perceived that the impact of the proposed power line could be limited if the main activities on the western side of the Eerste River on the farm Vergenoegd are avoided.

Agricultural activities within the study area are limited to small-scale labour-intensive farming such as the small-scale subsistence agriculture adjacent to the N2, and some wine estates (see agricultural impact assessment in **Section 9.1.5~~9.1.5~~**).

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In addition, livestock have been seen within the DNR. It is doubtful that grazing rights have been awarded to the cattle owners. Alternative MS-D that traverses the DNR, however, is not anticipated to severely impact on these activities as cattle can continue grazing underneath the Transmission power lines.

The Ithemba Farmers Association manages a section of land which is situated north of the N2, west of Spine Road and south of Old Faure Road. This land is under the jurisdiction of the CoCT, but the area is mostly inhabited by small-scale farmers actively farming with chickens, pigs, goats and some vegetables for the past 15 years. It is also referred to as "Blikkiesdorp" by the local communities. The farmers are occupying the land illegally and it seems as if the land is actually earmarked for low cost housing. Therefore, the pylons in this section of the FM-A route alignment should be placed as close as possible to the N2. Note is taken that the land might in future be used for residential development. Any negative impacts on the existing farming activities by the pylon placement should however still be avoided, even though farming activities would be able to continue underneath the Transmission power lines.

It is not anticipated that any specific agricultural activities along Alternative MS-C would be affected.

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THEME	AGRICULTURAL ACTIVITIES	
Impact focal point	Impact of agricultural activities in the study area	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A**	
Nature of impact	Construction of power lines	Maintenance of power lines
Extent of impact	Site (2)	Site (2)
Duration of impact	Medium term (3)	Long term (4)
Intensity of impact	Medium (6)	Medium (6)
Probability	Likely (3)	Possible (2)
Confidence	Medium	
Status	Negative	
Calculation	(2+3+6) × 3 = 33	(2+4+6) × 2 = 24
Level of significance	Low	No Impact
Pylon Positions	• FM-A-27 • FM-A-28 • FM-A-29 • FM-A-30 • FM-A-31 • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-36b • FM-A-47 • FM-A-48B • FM-A-49B • FM-A-50 • FM-A-51 • FM-A-52 • FM-A-53B • FM-A-54B • FM-A-55Ba or b • FM-A-56B • FM-A-57	
Cumulative Impacts	Possible economic losses due to loss of resources use.	

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THEME	AGRICULTURAL ACTIVITIES	
Impact focal point	Impact of agricultural activities in the study area	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A**	
Mitigation measures	Line alignments should take the position of sprinkler irrigation systems into consideration to ensure that these areas are avoided. The tower types and construction approaches should be selected based on the minimum impact on agricultural practices. Noise and dust should be kept to a minimum. Eskom should keep the construction of access roads to a minimum and rather use the existing infrastructure, as the construction and maintenance of these roads is very costly, impact on the residents' daily living and movement patterns, and create a potential for erosion. Rehabilitation of new access roads for construction vehicles should be undertaken as soon as the construction process allows. Placement of the towers should be carefully planned to limit any possible negative impacts on the wine farming activities as well as on the subsistence farming practices. If any of the towers negatively impact on the agricultural production capacity of a specific property, it should be calculated and taken into consideration when compensation is negotiated. Tower positions should, where possible, be placed on the borders of properties.	
Level of significance after mitigation	Low	No Impact

w) Tourism-related Impacts

A Transmission power line could impact on the tourism potential of facilities as it could impact on the visual character and sense of place of the area and tourism facility itself.

Possible negative impacts of Alternative FM-A and Alternative MS-Dc on the tourist attractions and facilities at the Vergenoegd, Zevenwacht and Langverwacht Wine Estates (also due to their historical interest and the possible impact on the sense of place) remain a concern. The alignment of the proposed Transmission power line and its location in relation to these estates and their tourist-related activities should thus be noted.

Alternative FM-A could also negatively impact on the proposed Sitari Golf Fields Estate and visitors to the golf course. A disturbance of a Transmission power line on the golf course could influence the golfers' experience and possibly influence the potential of the golf course to host international and national golf events.

Alternative MS-C and Alternative MS-D runs outside the northern and eastern border of the DNR. Due to the degraded state of the DNR the number of visitors to this nature reserve could be limited. Even though the DNR plays an important role with regards to environmental education for the neighbouring communities, it is anticipated that the proposed Transmission power line alignments would only slightly affect the tourism potential of the reserve.

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THEME	TOURISM-RELATED IMPACTS	
Impact focal point	Impact on tourism facilities and attractions	
Phase	**Operational Phase**	
Alternative Alignment	**FM-A, MS-D**	**MS-C**
Nature of impact	Visual sensitivity of Transmission power line on tourism industry	
Extent of impact	Regional (3)	
Duration of impact	Long term (4)	
Intensity of impact	Medium (6)	Low-Medium (4)
Probability	Highly Likely (4)	Possible (2)
Confidence	Medium	
Status	Neutral	
Calculation	(3+4+6) × 4 = 52	(3+4+4) × 2 = 22
Level of significance	Medium	No Impact
Cumulative Impacts	Possible negative financial implications due to negative impact on the tourist attractions and activities.	
Mitigation measures	Alternative FM-A and MS-D should preferably be as west as possible within the corridor assessed to limit any negative impacts on the Zevenwacht and Langverwacht Wine Estate. Alternative FM-A should preferably not be pursued within the area where the Sitari Golf Fields Estate is proposed. Should this not be possible, the proposed Transmission power line should be as close to the N2 and the border of the golf course as possible to avoid traversing the golf course.	
Level of significance after mitigation	Medium	No Impact

x) Local Economic Benefits

Local economic benefits during the construction phase would include the temporary employment of local labourers and short term socio-economic spin offs such as increased buying power around the construction sites, and small-scale economic advancement of entrepreneurs (e.g. those selling food and goods to the construction workers). Although the benefits of temporary employment is short lived, it should still be seen as a positive impact due to the high unemployment rates and levels of poverty found in the study area.

At this stage no information is available with regards to the material and quantity of material required, as well as for consumables (e.g. fuel for construction vehicles) for the construction of the Transmission power line.

The impact of the project on the procurement of local businesses and previously Historically Disadvantaged South Africans (HDSAs) can therefore not be determined at this stage. It is, however recommended that Eskom commits itself to involving locals (HDSAs and SMMEs) in the procurement of capital goods, consumables and services, if these are locally available.

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Due to the specialised material and equipment used, the intensity of this impact is considered to be of a low intensity, although possible.

It is not expected that there would be any direct economic benefits to the local communities as a result of the proposed project. Some local, but limited, indirect economic benefits, however, could come about because of the proposed project. This could include local economic spin-offs in the area as a result of increased investor confidence in the Cape Town region due to an overall improvement in the electricity supply in the Cape Region.

The proposed project would thus have a positive impact on economic development in the region.

THEME	**LOCAL ECONOMIC BENEFITS**	
Impact focal point	Local economic benefits and local procurements	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**PM-1, PM-2, PM-3, PM-4**	**PM-1, PM-2, PM-3, PM-4**
Nature of impact	Construction of Transmission power line	Maintenance of power lines.
Extent of impact	Regional (3)	
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low (2)	Medium (6)
Probability	Possible (2)	Likely (3)
Confidence	Medium	Medium
Status	Neutral	Positive
Calculation	(3+2+2) × 2 = 14	(3+4+6) × 3 = 39
Level of significance	No Impact	Low
Cumulative Impacts	Contribution to additional positive economic spin-offs and economic wellbeing of the area and its residents, with the potential for further economic development. Positive impact on economic development in the region.	
Mitigation measures	Local procurement should be aimed at local businesses as far as possible. Local sourcing of materials would assist in providing more economic and employment opportunities for the local people. Local procurement could result in indirect economic spin-offs and benefits such as increased income, and expansion of other local economic sectors. Maximise the use of local labour even if the number of locals that would be employed would be limited. Accommodate, but regulate the activities of vendors in the vicinity of the construction areas and at the construction camps.	
Level of significance after mitigation	No Impact	Low (Positive)

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y) Resettlement

The establishment of the proposed power line servitude could result in the resettlement of individuals because of the densely populated settlement patterns found in the study area such as the Khayelitsha area. Moreover, encroachment into the servitude areas is already an existing problem throughout the study area, especially in the more informal settlements found in the Khayelitsha area.

With regards to the various alignments investigated as part of the Firgrove-Mitchell's Plain project, the following problem areas should be noted:

- Alternative FM-Aa:
  - Alternative FM-A traverses the Bongani informal settlement of Khayelitsha situated to the south of the railway line and Lansdowne Road (M9) as well as the settlements of Victoria Merge and Village 3 North which have extended to the north of the railway line up to Lansdowne Road (M9). Should this option be pursued, resettlement would be a definite even if Eskom would be able to recycle and multi-circuit CoCT Distribution pylons. Not only would those residents within the tower footprint area be affected, but also those that would be within the servitude width. At this stage, the number of residents (dwellings) that could be affected cannot be determined as this would depend on the final alignment, final tower positions and technology to be used. Such studies would form part of a Resettlement Action Plan (RAP). It can however, be concluded that a large number of dwellings and thus households would be severely negatively affected as the affected area would span approximately 800 metres (pylon positions FM-A-13B up to FM-A-16B).
  - Alternative FM-A should furthermore take note of the possibility that Mew Way and Landsdowne Road would in future be upgraded (widened). In some areas the Mew Way upgrading would require up to 66m and Landsdowne Road approximately 45m. The Mew Way and Landsdowne Road area is already problematic with regards to possible resettlement of households (as discussed above) and any widening of the roads would complicate the difficulties in putting a Transmission power line through this section of the study area.
  - The possible impact of this alignment on the Oliver Tambo Sports Centre and the Mew Way Information Centre situated in Khayelitsha to the east of Mew Way (M44) and south of the N2 should also be noted.
- Alternative MS-C:
  - With regards to Alternative C, an area within Philippi East, between Landsdowne Road/M9 and the N2, east of Sheffield Road could result in resettlement. The tower placements proposed are on the southern and northern edges of the dwellings, although the line would span approximately 200m above these dwellings (pylon positions MS-C-16Ba, MS-C-16 Bb and MS-C-17A). As no dwellings are allowed within a servitude these affected dwellings within the servitude in close proximity to Sheffield Road would have to be resettled.
  - Delft South is located to the south of the Cape Town International Airport, west of the R300 and to the north of the N2 and Khayelitsha. Even though Eskom has indicated that the consolidation of the existing lines within the existing servitude is

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possible, resettlement is still likely at specific places in this section of the study area as the maximum servitude width required is 55m. For some sections of the route there is sufficient spacing for the consolidation of the existing power lines and the construction of the new Transmission power line, but the areas of concern are located east of Mango Street, east of the Masibambisane High School (pylon positions MS-C-21 up to MS-C-23). This are spans approximately 460m although only select properties along this length would have to be resettled. Another location of concern relates to a dwelling just west of the R300, in close proximity to Essenhout Street which is situated illegaly within the servitude (between pylon position MS-C-26 and MS-C-27).

- Alternative MS-D:
  - An alternative tower position within the Blackheath Industrial area (corner of Range Road and Stellenbosch Road/M12) could possibly result in a partial use of one property (north-western corner of the Blackheath Industrial area) (pylon position MS-D-25Bb). Alternative tower placements, however, could avoid this impact and have been pursued (MS-D-24Be and MS-D-25Bc).

It should, however be noted that resettlement and the process to be followed such as the compilation of a RAP and the actual resettlement of residents do not form part of the EIA process. Resettlement falls within the mandate of the Department of Housing, and as such the DEA cannot make a decision.

With regards to resettlement, the following possible impacts and cumulative issues should be noted:

- Resettlement is a lengthy process associated with various levels of conflict arising between residents due to the perceived benefits that could accrue to those being resettled. Most groups in a settlement usually struggle to obtain as much benefit from the process as possible.
- The socio-economic status of the different residents (e.g. poor households/possible children headed households as a result of the impact of HIV/Aids) in the affected area could worsen the intricacy of the process. Resettlement of such households would severely affect their social cohesion and increase the insecurity experienced by these households.
- Political influences could exacerbate the complexity of the process.
- Settling of individuals and/or jobseekers from outside of the study area could occur as these individuals could aim to take advantage of the relocation process by posing as residents that should be resettled.
- Suitable land for the resettlement of individuals is usually not readily available. It is assumed that if appropriate serviced land would have been vacant, a process would have been initiated to relocate residents who are currently staying in extremely underprivileged living conditions. It is thus fair to state that acquiring suitable land could furthermore delay the relocation process and therefore the implementation process of the Transmission power lines. As a residual effect, if the relocation process does not transpire, further power would not be made available to existing and future

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developments within this study area. Therefore, the IDP would need to take congnisance of the lack of a sustainable power supply in this region.

- Negotiations with the owners of so-called "informal shacks", where no title deeds have been registered could be problematic. This situation could become even more complex if one would be dealing with heads of households who are underage (as discussed under the second bullet above).
- Resettlement is a complex and lengthy process with dire consequences for those involved in the resettlement (those that need to be resettled and those communities to where these households would be moved to).
- Tension between the host community and the resettled communities, usually arising out of poor resettlement implementation, could result in violence between the different groupings forced to cohabit.

From a social perspective it is thus highly recommended that alternatives be found before resettling any individuals. Such alternatives would include the use of different types of pylon towers which can be considered for the proposed development that could have different impacts on the land use and subsequently on resettlement. At this stage it is anticipated that the tower positions proposed and the use of Steel Mono Pole and/or the Single Mast would have the least impact in the densely populated areas due to the smaller tower footprint sizes and the reduced servitude width required (i.e. 40m) of these two types of towers.

Based on the above, resettlement is likely for each route alignment, implying that resettlement cannot be avoided. Therefore, in order to mitigate the impact of resettlement, the amount and specific location of resettlement must be considered and assessed. The linking of the Mitchell's Plain Substation to the Firgrove or Stikland substations or the switching station must be undertaken in order to ensure that sufficient electricity is provided for the future (see **Section 3.23.2**).

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THEME	**RESETTLEMENT**	
Impact focal point	Possible resettlement of individual properties	
Phase	**Construction Phase**	
Alternative Alignment	**FM-Aa, MS-C, MS-Db, MS-Dc**	**FM-Ab, MS-Da**
Nature of impact	Construction of Transmission power line	
Extent of impact	Site (2)	
Duration of impact	Long term (4)	
Intensity of impact	High (10)	Medium-High (8)
Probability	Highly Likely (4)	
Confidence	Medium	
Status	Negative	

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THEME	**RESETTLEMENT**	
Impact focal point	Possible resettlement of individual properties	
Phase	**Construction Phase**	
Alternative Alignment	**FM-Aa, MS-C, MS-Db, MS-Dc**	**FM-Ab, MS-Da**
Calculation	(2+4+10) × 4 = 64	(2+4+8) × 4 = 56
Level of significance	Medium	Medium
Pylon Positions	• FM-A-13B • FM-A-14B • FM-A-15B • FM-A-16B • FM-A-17B • FM-A-18B • MS-C-16Ba & b • MS-C-17a & b • MS-C-20 • MS-C-21 • MS-C-24 • MS-C-25B • MS-C-26 • MS-C-27 • MS-D-1Ba • MS-D-25Bb	None
Cumulative Impacts	Negative economic implications for those residents that would be resettled due to e.g. further distance from work and other amenities. Negative economic implications due to the resettlement. Disruption in social networks, and social relationships with possible negative psychological consequences. Loss of community cohesion and loss of "sense of place" by residents. Periods of uncertainty due to negotiations with property owners and finalisation of resettlement process.	

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THEME	RESETTLEMENT			
Impact focal point	Possible resettlement of individual properties			
Phase	**Construction Phase**			
Alternative Alignment	**FM-Aa, MS-C, MS-Db, MS-Dc**		**FM-Ab, MS-Da**	
Mitigation measures	Care should be taken in the final route alignment to have the least possible impact in terms of resettlement. The section of Alternative FM-Aa through Bongani should rather not be pursued due to the high likelihood of resettlement in this high density settlement. Specific attention should be given to the tower type to be used as this could minimise the impact and possibly avoid resettlement along all route alignments. Consolidation of the existing power lines (Transmission and Distribution) within the servitude area through Delft South should be implemented. A temporary bypass would be necessary to ensure that the supply of the existing power lines is not switched off. If there is any power outages while the temporary bypass is created this should be clearly communicated to the areas affected. The tower placements along Alternative MS-D in the Blackheath Industrial area where the alignment should cross the Stellenbosch Road should be carefully considered to avoid the partial use of one of the properties situated in the industrial area. Eskom should provide affected residents and property owners with as much information as possible to enable them to anticipate the potential resettlement. It would be desirable to address issues relating to resettlement as a matter of urgency and also to provide definitive timeframes linked to any possible resettlement. Should resettlement be required a detailed RAP should be prepared, which would include detailed discussions between Eskom and the CoCT with regards to the number of dwellings and individuals to be affected, timeframes and the availability of a site where resettlement could occur			
Level of significance after mitigation	Medium	No Impact	Medium	No Impact

9.1.10 Impact on Heritage Resources

The Transmission power lines will consist of overhead cables suspended from towers that are 400-500m apart (or as needed). Each steel tower will need to be mounted on concrete footings set into the ground surface. Hence each point of land surface disturbance is confined to the few square meters of the tower bases. The actual servitude will require a service road (normally an unpaved track), while the corridor will have to be cleared of tree cover and structures. During construction, the landscape will be subject to a period of temporary disturbance when construction equipment is brought onto site for building the towers and lifting the cables.

Heritage sites can be negatively affected by disturbance of the land surface, destruction of significant structures and places, as well as any action that will alter the feel and appearance of a historical place or building.

Archaeological and palaeontological impacts are not a major concern in either study area as few are known to exist on the Cape Flats, and as they are not visually sensitive.

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a) Zeekoeivlei Historic Site

This early 19th century dwelling was destroyed by fire in early 2011 after the holding company (golf course development) was liquidated and the building abandoned. The location of Transmission power line a short distance to the east of the dwelling house would have constituted an impact. However, a recent site inspection revealed that the house had been so completely destroyed that its status a significant heritage indicator is massively reduced. The land is destined to become a golf course development, while the area directly affected by the proposed Transmission power line is no longer farmed and overrun with alien vegetation. The proposed Transmission power line across the property to Firgrove Substation follows an existing servitude and Transmission power lines.

The yellow arrow marks the view point (Figure 9-2~~Figure 9-1~~) showing the servitude and existing transmission lines that mark the proposed route. The remains of the farm house are obscured by recent vegetation growth.

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Figure 9-2: Location of Zeekoeivlei Farm House in Relation to Proposed Pylon Positions

b) Vergenoegd Wine Estate

During the scoping process this heritage site was judged to be a potential recipient of negative visual impacts that could affect the surrounds of the property, particularly if the route alignment FM-A was to be constructed on the estate land to the north side of the N2. Although, some distance away from the Vergenoegd historic buildings, it is possible that the proposed Transmission power line could have been perceived as intrusive from a number of vantage points close to the historic farm *werf*. Fortunately it has proved feasible to re-align alternative FM-A to the south side of the N2 off Vergenoegd property. The N2 at this point, which is raised on an embankment above the surrounding landscape, will have a screening

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effect on the Transmission power line. The resulting impact is therefore of no impact – neutral significance.

THEME	**HERITAGE**	
Impact focal point	Impact of heritage areas in the study area from Mitchell's Plain to Firgrove	
Phase	**Construction Phase**	**Operational Phase**
Alternative Alignment	**FM-A**	
Nature of impact	Construction of Transmission power line may affect visual/aesthetic qualities from Vergenoegd Wine Estate and Zeekeovlei historic farm	Presence of Transmission power line may affect visual/aesthetic qualities from Vergenoegd Wine Estate and Zeekeovlei historic farm
Extent of impact	Footprint (1)	Footprint (1)
Duration of impact	Short-Medium term (2)	Long term (4)
Intensity of impact	Low (2)	Low (2)
Probability	Highly Likely (4)	Highly Likely (4)
Confidence	High	
Status	Negative	
Calculation	(1+2+2) × 4 = 20	(1+4+2) × 4 = 28
Level of significance	No Impact	No Impact
Pylon Positions	• FM-A-37B • FM-A-38B • FM-A-39 • FM-A-40 • FM-A-41 • FM-A-42 • FM-A-43 • FM-A-44	• FM-A-37B • FM-A-38B • FM-A-39 • FM-A-40 • FM-A-41 • FM-A-42 • FM-A-43 • FM-A-44
Cumulative Impacts	Possible negative economic implications for the estates due to the negative impact on the resource use (vineyards) and sense of place resulting in less visitors to the estates.	
Mitigation measures	An independent, suitably qualified person with at least a B.Sc (Hons) in the natural sciences, to act as the ECO. Changes to alignments and pylon positions should be checked by heritage specialist. Any finds in foundation trenches should be reported by the ECO to an archaeologist/heritage specialist and to HWC for further action, if need be. Any finds of human remains, whether archaeological or crime-related should not be disturbed, and reported to the SAPS.	
Level of significance after mitigation	Low	No Impact

c) Driftsands Nature Reserve

This is a declared nature reserve that represents that last elements of the Cape Flats landscape that have survived into the 21st century. In these terms it is considered a heritage resource although human made heritage on the site is limited to the late 20th century.

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Initially it was proposed that route alignment MS-D be routed through the nature reserve (which is in a very poor condition). However, revision of the proposal had led to the re-use of existing corridors around the edge of the site. This will effectively limit impacts to areas that have already been disturbed. There is an existing servitude along the east of the R300 (MS-C-25B to MS-C-29) to where the proposed route alignment crosses the northern edge of the DNR via an existing corridor of disturbance (MS-C-30 to MS-C-35). Alternatively, route MS-D passes up the eastern edge of the DNR, through an existing corridor of disturbance. This has also negated the need for the Mitchell's Plain Substation Alternative 3 due to the sensitivities associated with the DNR.

The DNR is surrounded by suburbia, roads, electrical services, low cost housing and informal settlements. While all route alignments will be visible from inside the reserve, none of them impact the core areas. In the context of the surrounding urban clutter, Transmission power lines do not constitute an unexpected presence. Given that the opportunities for routing Transmissions power lines in urban areas are extremely limited, all alternatives presented represent a reasonable compromise. Alignments MS-C and MS-D are equally acceptable, constituting a medium-low negative impact to the visual qualities of the place. No mitigation is applicable.

d) Cape Winelands along the Urban Edge

The proposed MS-D route alignment passes through existing servitudes through the recent suburbs around Kuils River, Brentwood and Brakenfell before terminating at the Stikland Substation. During the scoping phase of the study, there was some doubt as to whether the existing servitudes could accommodate a further Transmission power line, which would have meant that alternative corridors would have been required. This was potentially a source of negative visual impacts that might have been experienced from the notable Cape wine farms such as Zevenwacht and Langverwacht that lie on the edge of the Cape Winelands Cultural Landscape.

Confirmation by Eskom that it is technically possible to re-utilise existing servitudes that run through corridors in existing recent suburbs has alleviated this threat. The wine lands edge will therefore be buffered by recent development areas and the existing milieu of existing Transmission power lines (which would need to be re-rationalised to accommodate new services). Hence all activities will occur in areas that have been subject to previous electrical-related activity. If this route alignment had to be routed to the urban edge, the likely impacts would have been considerably greater.

THEME	**HERITAGE**			
Impact focal point	Impact of heritage areas in the study area from Mitchell's Plain to Stikland			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**MS-C, MS-D**	**Alternative 3**	**MS-C, MS-D**	**Alternative 3**
Nature of impact	Construction of Transmission power line may affect visual/aesthetic qualities as perceived from Cape Winelands (MS-D) and the DNR (MS-C and Mitchell's Plain Substation Alternative 3)		Presence of Transmission power line may affect visual/aesthetic qualities as perceived from Cape Winelands (MS-D) and the DNR (MS-C and Mitchell's Plain Substation Alternative 3)	

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THEME	**HERITAGE**			
Impact focal point	Impact of heritage areas in the study area from Mitchell's Plain to Stikland			
Phase	**Construction Phase**		**Operational Phase**	
Alternative Alignment	**MS-C, MS-D**	**Alternative 3**	**MS-C, MS-D**	**Alternative 3**
Extent of impact	Regional (3)		Footprint (1)	Site (2)
Duration of impact	Short-Medium term (2)		Long term (4)	
Intensity of impact	Low (2)	High (10)	Low (2)	High (10)
Probability	Highly Likely (4)		Highly Likely (4)	
Confidence	High			
Status	Negative			
Calculation	(3+2+2) × 4 = 28	(3+2+10) × 4 = 60	(1+4+2) × 4 = 28	(2+4+10) × 4 = 64
Level of significance	No Impact	Medium	No Impact	Medium
Pylon Positions	• MS-C-30 • MS-C-31 • MS-C-32 • MS-C-33 • MS-C-34 • MS-C-35B • MS-D-2Ba • MS-D-3 • MS-D-4 • MS-D-5 • MS-D-6B • MS-D-7 • MS-D-8 • MS-D-9B • MS-D-10	Mitchell's Plain Substation Alternative 3	• MS-D-34B • MS-D-35 • MS-D-36 • MS-D-37 • MS-D-38 • MS-D-39 • MS-D-40 • MS-D-41	Mitchell's Plain Substation Alternative 3
Cumulative Impacts	Possible negative economic implications for the estates due to the negative impact on the resource use (vineyards) and sense of place resulting in fewer visitors to the estates.			
Mitigation measures	An independent, suitably qualified person with at least a B.Sc (Hons) in the natural sciences, to act as the ECO. Changes to alignments and pylon positions should be checked by heritage specialist. Any finds in foundation trenches should be reported by the ECO to an archaeologist/heritage specialist and to HWC for further action, if need be. Any finds of human remains, whether archaeological or crime-related should not be disturbed, and reported to the SAPS.			
Level of significance after mitigation	No Impact	Medium	No Impact	Medium

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e) Archaeology and Palaeontology

The site inspection revealed that there are very few areas throughout the 30 km study area that have not been subject to landscape modification or prior disturbance.

The likelihood of impacts to archaeological and palaeontological material is extremely low. There is a possibility that material will be impacted during excavations for tower footings, however the depth and size of the impact would be limited by the fact that the footprint of the pylons are usually limited to 1-2m^2.

Comment [BG3]: Kentridge, please confirm that this footprint is correct.

No particular recommendations or mitigation is required, other than to report any finds (including human remains) to Heritage Western Cape for their advice on further action.

9.1.11 Impact on Visual Integrity

Visual impacts are subjective and usually considered most significant when the development is dissimilar to other developments in the area, is readily viewed from areas of public access, such as paths, roads and viewpoints, or is placed in areas which are characterised by significant natural features.

The following areas have been identified as having potential visual impacts:

- Middle ground views of the vineyards from the Vergenoegd Wine Estate and the Zevenwacht Wine Estate, amongst others.
- Distant vistas of the Helderberg and Hottentots Holland mountains (according to the CoCT Scenic Route Study (MCA Urban & Environmental Planners, 2002)).

The extent of the potential visual impact was determined in the Viewshed Analysis. The Viewshed Analysis identified that the proposed Transmission power line and pylons will be visible from much of the surrounding land, for a distance up to 1km. The impact will applicable through to the decommissioning phase of the Transmission power line and pylons. Due to the considerable heights of the pylons (40-60m, depending on the type of pylon, the visibility is often 10km and beyond. However, due to the flimsy nature of the structure at these distances the structures appear ephemeral and tend to blend in with the landscape.

Any change in a local view through the introduction of new power line infrastructure in a viewer's line of sight can be considered a visual impact.

Overhead 400kV Transmission power lines are visually intrusive. However, the type of pylons envisaged for this proposed development would limit the visual intrusive nature of power lines within the area. Therefore, the visual impact created by the power lines connected to the substation would only be significant in terms of the cumulative effect of positioning power lines adjacent to one another.

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THEME	**VISUAL IMPACT**		
Impact focal point	Impact of visual integrity in the study area		
Phase	**Operational Phase**		
Alternative Alignment	**FM-A**	**MS-C**	**MS-D**
Nature of impact	Construction of Transmission power line may affect visual/aesthetic qualities as perceived from Cape Winelands (MS-D) and the Driftsands Nature Reserve (MS-C)		
Extent of impact	Regional (3)		
Duration of impact	Long term (4)		
Intensity of impact	Low-Medium (4)	Low (2)	Medium (6)
Probability	Definite (5)		
Confidence	High		
Status	Negative		
Calculation	(3+4+4) × 5 = 55	(3+4+2) × 5 = 45	(3+4+6) × 5 = 65
Level of significance	Medium	Low	Medium

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THEME	VISUAL IMPACT		
Impact focal point	Impact of visual integrity in the study area		
Phase	**Operational Phase**		
Alternative Alignment	**FM-A**	**MS-C**	**MS-D**
Pylon Positions	• FM-A-1B • FM-A-2B • FM-A-3B • FM-A-4B • FM-A-8 • FM-A-9 • FM-A-10 • FM-A-11 • FM-A-12 • FM-A-13B • FM-A-14B • FM-A-15B • FM-A-16B • FM-A-17B • FM-A-32 • FM-A-33 • FM-A-34 • FM-A-35 • FM-A-36B • FM-A-37B • FM-A-38B • FM-A-39 • FM-A-47 • FM-A-48B • FM-A-49B • FM-A-50 • FM-A-51 • FM-A-52 • FM-A-53B • FM-A-54B	• MS-C-2B • MS-C-3B • MS-C-4B • MS-C-5 • MS-C-6B • MS-C-7B • MS-C-8B • MS-C-9B • MS-C-10 • MS-C-11 • MS-C-12B • MS-C-13B • MS-C-14 • MS-C-15 • MS-C-16Ba • MS-C-16b • MS-C-17a • MS-C-17b	• MS-D-1Ba & b • MS-D-2Ba & b • MS-D-3 • MS-D-4 • MS-D-5 • MS-D-6B • MS-D-7 • MS-D-8 • MS-D-9B • MS-D-10 • MS-D-12Ba & b • MS-D-13a & b • MS-D-14Ba & b • MS-D-15a & b • MS-D-16Ba & b • MS-D-17B • MS-D-18Ba & b • MS-D-22 • MS-D-23a & b & c • MS-D-24a & b c & d & e • MS-D-25a & b & c • MS-D-26Ba & b • MS-D-27a & b & c
Mitigation measures	Mitigation for electrical infrastructure is limited to design options for pylons. As described in the project overview, various pylon types are available, and where possible the least intrusive structure will be used, but in reality these options only mitigate the possible extent of the impact rather than the significance of the visual impact.		
Level of significance after mitigation	Medium	Low	Medium

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9.1.12 Waste-Related Impacts

The construction of the Transmission power line may result in the demolition or relocation of existing structures. In the event that structures are demolished, such demolition shall result in large volumes of waste (beyond the threshold prescribed in the NEM:WA). Therefore, the on-site storage of waste (including temporary storage of up to 90 days) and subsequent disposal at a registered landfill site may require a Waste Management Licence (see **Section 5.3~~5.3~~**). The Waste Management Licence will only be required if the building rubble amounts to more than 100m^3 and if it is stored in one area for more than 90 days.

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Based on the number of properties that may require resettlement (in terms of the recommended route alignment), the amount of rubble may exceed these capacities. However, it will be recommended that the rubble may not be stored in one area for more than 90days. Therefore, this activity will not be applicable to the proposed development, and an application for a Waste Management Licence will not be submitted to the DEA.

Construction rubble generated during the construction of the Transmission power lines would be accepted at existing landfill disposal sites, which have sufficient capacity, according to the CoCT: Solid Waste Department (see **Appendix F~~Appendix F~~**).

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THEME	**WASTE-RELATED IMPACTS**	
Impact focal point	Disposal of waste due to possible resettlement and demolition of buildings	
Phase	**Construction Phase**	
Alternative Alignment	**FM-A, MS-Da, MS-Dc**	**MS-C, MS-Db**
Nature of impact	Construction of Transmission power line may result in the demolition of existing structures. The temporary storage and disposal of the waste would result in a construction-related impact.	
Extent of impact	Regional (3)	
Duration of impact	Short term (1)	
Intensity of impact	Medium (6)	Low-Medium (4)
Probability	Highly Likely (4)	
Confidence	Medium	
Status	Negative	
Calculation	(3+1+6) × 4 = 40	(3+1+4) × 4 = 32
Level of significance	Low	Low
Pylon Positions	• FM-A-13B • FM-A-14B • FM-A-15B • FM-A-16B	• MS-C-12B • MS-C-13B • MS-C-16Ba or b • MS-C-17a or b • MS-D-14Ba or b • MS-D-25Bb

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THEME	WASTE-RELATED IMPACTS	
Impact focal point	Disposal of waste due to possible resettlement and demolition of buildings	
Phase	**Construction Phase**	
Alternative Alignment	**FM-A, MS-Da, MS-Dc**	**MS-C, MS-Db**
Mitigation measures	All waste created by the demolition of buildings must not be stored at one point for more than 90 days. All waste created by the demolition of buildings must be taken to the nearest registered waste disposal facility.	
Level of significance after mitigation	Low	No Impact

9.2 POTENTIAL SOCIAL CONFLICT

Areas of concern with regard to potential social conflict in the study area have been identified based on the various route alignments and are listed below:

- Alternative FM-A:
  - Future Mitchell's Plain District Hospital situated east of A.Z. Berman Drive, south of the R300 and north of Lentegeur and the Lentegeur Hospital.
  - Bongani (informal settlement of Khayelitsha), situated to the south of the railway line and Lansdowne Road (M9), as well as the area just to the north of Lansdowne Road (M9) and west of Mew Way (M44) and south of the N2.
  - The Vergenoegd Wine Estate, situated to the north of the N2, east of Baden Powell Drive (R310) and south of Eersterivier Suid.
  - The proposed Sitari Fields Golf Estate Development alongside the N2 (north of N2) close to the Firgrove Substation.
- Alternative MS-C:
  - Delft South, located to the south of the Cape Town International Airport, west of the R300 and to the north of the N2 and Khayelitsha.
- Alternative MS-D:
  - Proposed new residential development to the east of Amandelrug and Rouxville, south of Bottelary Road.
  - Possible spacing problems near the Zevenwacht shopping mall area and Saxenburg Industrial Park, located near the corner of Van Riebeeck Road (R102) and Stellenbosch Road (M12).
  - Extensions of the Mfuleni area to the north. The Mfuleni area is located to the north of the Swartklip-Old Faure Road and directly east of the DNR.
  - Bongani (informal settlement of Khayelitsha), situated to the south of the railway line as well as the area north of Lansdowne Road (M9) and west of Mew Way (M44) and south of N2. This is where Alternative C and D join.

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9.3 ECONOMIC IMPACTS

The cost of each pylon differs, depending on the type of pylon used. The biggest denominator in the calculation of the cost of each pylon type is the cost of steel. Steel was estimated at R28,000.00 per ton (based on 2009 values) in the cost estimate.

A bend in the route alignment of a 400kV Transmission power line requires a pylon structure that will be able to withstand the tension created in-between. Whereas, if the route alignment of the pylon structures are in a straight line, there will be less steel required in the latter to support the power line. Therefore, the type of pylon used along the specific section of the route alignment affects the overall cost of the proposed project. These calculations exclude the cost of the contractor, stringing of the power line and ancillary equipment required for construction purposes.

Therefore, a cost of each pylon tower was estimated as follows, with each section of the route alignment presented in **Table 9-1**~~**Table 9-1**~~:

- R850,000.00 for a pylon that requires a bend in the route alignment; and
- R300,000.00 for a pylon that ensures a straight route alignment.

Table 9-1: Cost Estimate of Pylon Towers in Sections of Route Alignments

Alignment Split	Bend Towers (R850,000)		Straight Towers (R300,000)		Total	
	Number	Cost	Number	Cost	Number	Cost
Alternative FM-Aa	9	R 7,650,000.00	7	R 2,100,000.00	16	R 9,750,000.00
Alternative FM-Ab	15	R 12,750,000.00	27	R 8,100,000.00	42	R 20,850,000.00
Alternative MS-Ca	16	R 13,600,000.00	20	R6,000,000.00	36	R 19,600,000.00
Alternative MS-Da	5	R 4,250,000.00	7	R 2,100,000.00	12	R6,350,000.00
Alternative MS-Db	14	R 11,900,000.00	11	R 3,300,000.00	25	R 15,200,000.00
Alternative MS-Dc	7	R 5,950,000.00	12	R 3,600,000.00	19	R 9,550,000.00

According to CoCT (2002), the economic function of the N2 is considered very high as it is one of the major access routes to and from Cape Town via the Strand area. This route is also an important link between Cape Town, the Grabouw/Elgin area and the Overberg wheat lands further afield. On a more local level, this route is used on a daily basis for commuters from Somerset West and Stellenbosch, who live in these towns, but who travel daily into the city to work.

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10 SUMMARY OF FINDINGS OF SPECIALIST STUDIES

The EIA Phase includes the following specialist studies (Appendix I~~Appendix I~~):

- Geotechnical Investigation;
- Soil and Agricultural Potential Assessment;
- Agricultural Economic Potential Assessment;
- Ecological Assessment (including flora and fauna);
- Wetland Assessment;
- Avifauna (Birds) Assessment;
- Heritage/Archaeological Impact Assessment;
- Social Impact Assessment; and
- Visual Impact Assessment.

Specialist studies were undertaken in compliance with Section 33(2) of GNR No. 543, which includes the following:

(a) details of –
  (i) the person who prepared the report; and
  ~~(i)~~(ii) the expertise of that person to carry out the specialist study or specialised process;
(b) a declaration that the person is independent in a form as may be specified by the competent authority;
~~(b)~~(c) an indication of the scope of, and the purpose for which, the report was prepared;
~~(b)~~(d) a description of the methodology adopted in preparing the report or carrying out the specialised process;
~~(b)~~(e) a description of any assumptions made and any uncertainties or gaps in knowledge;
~~(b)~~(f) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;
~~(b)~~(g) recommendations for any mitigation measures that should be considered by the applicant and the competent authority;
~~(b)~~(h) a description of any consultation process that was undertaken while carrying out the study;
~~(b)~~(i) a summary and copies of any comments that were received during any consultation process; and
~~(b)~~(j) any other information requested by the competent authority.

10.1 GEOTECHNICAL INVESTIGATION

The Quaternary Deposits generally comprise sandy soils and are located in approximately 93% of the study area for route alignments FM-A and the entire study area for route alignments MS-C and MS-D.

Much of the expected settlement in these soils will be elastic/immediate settlement, which will occur during construction. However, these soils are prone to collapse settlement and are termed collapsible soils. A collapsible soil is a partially saturated material, which exhibits additional settlement upon wetting up. This generally occurs without any increase in applied

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pressure. Structures founded on collapsible material may exhibit no signs of distress for many years until an inundation of some sort occurs and produces sudden, unexpected settlement. This sudden settlement is associated with a change in soil structure. Essentially, the soil structure collapses in on itself thereby inducing the potential impact of the settlement of sandy soils. In addition, these Quaternary sands are generally unconsolidated and thus have a relatively low *in situ* bearing capacity (see **Figure 7-9~~Figure 7-9~~**).

Occasionally, peaty soils are evident in the Springfontyn Formation. Should these peaty soils be encountered, it is likely that they will be highly compressible and that there will be a shallow water table associated with their occurrence. It is possible for peat to compress to as little as 10% of its original volume under load. Water from peat deposits is usually highly acidic and aggressive to concrete. When the water table is lowered and the peat is allowed to dry out, spontaneous combustion may occur. Hence, the potential impact that can occur is spontaneous combustion of peaty soils.

The Malmesbury Group is characterised by variations in rock type. These variations often occur within a very short distance such that there may be a variation under individual foundations. In addition, the rocks are often very steeply dipping and this can lead to problems when excavating for foundations as there may be a potential impact of instability within the sidewalls, should the excavation intercept unfavourably dipping rock.

The residual soils formed by the *in situ* weathering of the Malmesbury Group are variable in composition. However, the soils generally comprise stiff silts and clays which are generally not expansive. Furthermore, the transported soils derived from the residual Malmesbury soils have been found to be expansive. Therefore, the expansive nature and the instability in excavations of residual Malmesbury soils are identified as potential impacts.

Instability in excavations through the residual Malmesbury soils has been noted. This is probably due to the silt/clay composition, which may be affected by the relict bedding, which may form steep surfaces along which release surfaces may form. This is aggravated by the presence of a shallow water table or seepage.

The granite and granitic rocks of the Cape Granite Suite weather to silts and clays along the coastal region as the weathering has been mainly chemical. Occasionally, small pockets of expansive soils are found, but this is not a common feature of the soil. Refer to **Appendix I~~Appendix I~~-1**.

10.2 SOIL AND AGRICULTURAL POTENTIAL ASSESSMENT

The soils are generally sandy, freely-drained, but lacking somewhat in fertility (**Figure 7-10~~Figure 7-10~~**). Where subsoil clay horizons occur, they may well be prone to water logging. However, as long as care is taken in crossing wetlands or rivers, there were no fatal flaws identified. The impact of a Transmission power line is comparatively small, with small, isolated footprints for each separate pylon, as long as irrigated areas are not impacted upon.

The Western Cape Department of Agriculture requested that "unique" soils are addressed as a possibility of occurring in the study area (see **Appendix F~~Appendix F~~: IRR**). Due to the prevailing sandy nature of the soils, and associated fertility depletion, it is extremely unlikely that "unique" soils occur in the area. In addition, there are no projects that have mapped

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such soils, especially at a detailed scale. The soil investigation has identified the areas of varying potential in order that comparisons may be made.

There are no impacts on Alignment MS-C. The only impacts that are rated as medium along Alignment MS-Dc are on pylon MS-D-33 and MS-D-34, with all other pylon positions rated as no or low impacts. In addition, no areas with agriculture and good soils are traversed in Alignment FM-A, resulting in all site being rated as no or low impacts. Refer to **Appendix I~~Appendix I~~-2**.

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10.3 AGRICULTURAL ECONOMIC POTENTIAL ASSESSMENT

It is noted that a range of values are used for the purpose of this report as the land values in the Western Cape Province have much disparity based on the following factors:

- On-farm infrastructure
- Soil quality
- Water availability for irrigation
- Quality of water
- Location

The market price for vineyards may vary from R400 000 to R1 million per hectare. However, the gross income, according to industry standards for vineyards, is approximately R30 000 per hectare. However, wine estates such as the Vergenoegd Wine Estate, calculates their land value by vertically integration of the total operation. This results in a higher income per hectare calculation, and is only known to the respective landowner.

The value of land currently used for vegetable production may vary between R250 000 to R500 000 per hectare. However, the gross income per hectare for vegetable production is substantially higher (e.g. Gross income for cabbage could be approximately R60 000 per hectare).

Based on the ratings of each pylon, the following conclusions were drawn:

- Alignment FM-A:
  - FM-A-58a and FM-A-58b are rated as medium impact.
  - The other 59 pylons positions are rated as low to no impact.
- Alignment MS-C:
  - All 39 pylon positions are rated as no impact.
- Alignment MS-D:
  - MS-D-33B and MS-D-34B are rated as medium impact.
  - MS-D-35, MS-D-36 and MS-D-37 are rated as low impact.
  - The other 75 pylon positions are rated as no impact.

Therefore, the recommended alignment from the lowest impacted agricultural economic perspective is from the the Mitchell's Plain Substation Alternative 1, along MS-C and MS-Db to the Switching Station. This ensures that the pylons rated as medium will be avoided. Refer to **Appendix I~~Appendix I~~-3**.

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10.4 ECOLOGICAL AND WETLAND ASSESSMENT

The ecological sensitivity of the site for the Mitchell's Plain Substation Alternative 1 is Low as it has been previously disturbed by heavy machinery, and is now dominated by various alien invasive species. The northern half of the Mitchell's Plain Substation Alternative 2 site (north of Hindle road) is also of Low sensitivity, but the southern section incorporates important wetlands which are of Intermediate sensitivity. The Mitchell's Plain Substation Alternative 3 site is partly within the DNR, and fully within the floodplain of the Kuils River. Although the area has been quite heavily disturbed and supports low indigenous plant diversity, the site is of at least an Intermediate sensitivity.

The ecological sensitivity status of the site proposed for the switching station is Low, as the site is degraded by previous agricultural activities, and over-utilised by livestock, with significant illegal dumping.

Lampranths explanatus (Endangered) has been recorded from sandy soils in the existing servitude south of the Stikland substation, west of the Zevenwacht wine estate.

Along route alignment FM-A, a number of SCC may occur within the proposed servitude on seasonally wet clay soils, especially in the vicinity of the Cape Town Film Studio. *Cliffortia ericifolia* (Endangered) has been recorded in this area, and *Lachenalia corymbosa* (Vulnerable) may also occur here.

Because the surveys were done outside the optimal season, the presence of potential SCC along the alternative routes could not be confirmed. It is therefore proposed that a detailed site survey is undertaken in the likely habitats (**Table 10-1**~~**Table 10-1**~~) during the optimum season (August 2011) to check for the presence of plant SCC.

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Alternatives FM-A and MS-D have 26 and 10 proposed pylon positions, respectively, which were found to be in ecologically sensitive areas. These areas are sensitive as they support wetlands, or remnants of threatened vegetation types that are still in good condition. Important areas of sensitivity are associated with seasonal and permanent wetland along the Kuils River, some sections of the Driftsands Nature Reserve, and the existing servitude west of Zevenwacht wine estate and south of Stikland. Mitigation measures are required for all pylon positions in these areas.

Substation Alternative 1, the northern section of Alternative 2, and the Switching Station site are all of low ecological sensitivity.

Three alternatives powerline routes were assessed for this project. No Fatal Flaws or Red Flags were identified in any of the alternatives, although FM-A will require significant mitigation inputs if selected. Refer to **Appendix I**~~**Appendix I**~~ **4**.

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Table 10-1: Pylon Positions in Ecologically Sensitive Areas

PYLON NUMBER	REASON	RECOMMENDATION
FM-A-4B	Wetland	Botanical input during August
FM-A-5B	Wetland; Vegetation	Botanical input during August
FM-A-9	Vegetation	Botanical input during August
FM-A-10	Vegetation	Botanical input during August
FM-A-12	Vegetation	Botanical input during August
FM-A-13	Wetland; Vegetation	Move 40m E; botanical input at walkdown stage

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PYLON NUMBER	REASON	RECOMMENDATION
FM-A-19B	Vegetation	Botanical input at walkdown stage
FM-A-21	Vegetation	Move 50m E
FM-A-22	Wetland; Vegetation	Move 30m W
FM-A-24	Vegetation	Botanical input during August
FM-A-25	Vegetation	Botanical input during August
FM-A-26a	Wetland; Vegetation	Botanical input during August
FM-A-26b	Wetland; Vegetation	Botanical input during August
FM-A-27B	Vegetation	Move 60m E
FM-A-29	Vegetation	Botanical input during August
FM-A-30	Wetland; Vegetation	Botanical input during August
FM-A-31	Wetland; Vegetation	Botanical input during August
FM-A-32	Wetland; Vegetation	Botanical input during August
FM-A-33	Wetland; Vegetation	Botanical input during August
FM-A-34	Wetland; Vegetation	Botanical input during August
FM-A-35	Wetland; Vegetation	Botanical input during August
FM-A-36B	Wetland	Botanical input during August
FM-A-37B	Vegetation	Move as far SE as possible; Botanical input during August
FM-A-41	Wetland	
FM-A-42		
FM-A-43		
FM-A-53B	Spans a wetland; Vegetation	Move line north of wetland : move both 53B and 54B 60m north
FM-A-54B		
FM-A-56B	Wetland	Move 50m NW
MS-C		
MS-D-1Ba	Wetland	Move 20m SE
MS-D-1Bb	Vegetation	Move 15m SE
MS-D-3	Vegetation	Move 15m E
MS-D-12Ba	Vegetation; Wetland	Move 30m E
MS-D-37	Vegetation	Botanical input during August
MS-D-38	Vegetation	Botanical input during August
MS-D-39	Vegetation	Botanical input during August
MS-D-40	Vegetation	Botanical input during August
MS-D-41B	Vegetation	Botanical input during August
MS-D-47	Spans a wetland	
MS-D-48		

Table 10-2: Ecological and Wetland Summary of Route Alignments

ROUTE ALIGNMENT	SUMMARY
FM-A	FM-A has 26 identified areas of ecological sensitivity, and is thus by far the most sensitive of the alternative routes assessed. The FM-A alternative is thus not recommended. Provided that all proposed mitigation is feasible the overall negative ecological impacts could be Low after mitigation. If all mitigating measures are not feasible, the negative impacts will then be Medium. The section south of the Cape Town Film Studios (and on their property) is particularly sensitive from an ecological point of view.
MS-C	MS-C is the strongly recommended alternative from an ecological point of view, with no sensitive areas identified en route.
MS-D	MS-Da and MS-Dc have together 10 identified areas of ecological sensitivity. Provided that all proposed mitigation is feasible, the overall negative ecological impacts could be Low after mitigation. If mitigation is not feasible negative impacts will be Low to Medium.

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10.5 AVIFAUNA (BIRDS) ASSESSMENT

Anderson (2001) summarises collisions as a source of avian mortality as follows:

> *"The collision of large terrestrial birds with the wires of utility structures, and especially power lines, has been determined to be one of the most important mortality factors for this group of birds in South Africa (Herholdt 1988; Johnsgard 1991; Allan 1997). It is possible that the populations of two (2) Southern African endemic bird species, the Ludwig's Bustard (Neotis ludwigii) and Blue Crane (Anthropoides paradiseus), may be in decline because of this single mortality factor (Anderson, 2000; McCann, 2000). The Ludwig's Bustard (Anderson, 2000) and Blue Crane (McCann, 2000) are both listed as "vulnerable" in The Eskom Red Data Book of Birds of South Africa, Lesotho & Swaziland (Barnes, 2000) and it has been suggested that power line collisions is one of the factors which is responsible for these birds' present precarious conservation status.*
>
> *Collisions with power lines and especially overhead earth-wires have been documented as a source of mortality for a large number of avian species (e.g. Beaulaurier et al., 1982; Bevanger 1994, 1998). In Southern Africa, this problem has until recently received only limited attention. Several studies however have identified bird collisions with power lines as a potentially important mortality factor (e.g. Brown & Lawson 1989; Longridge 1989). Ledger et al., (1993), Ledger (1994) and Van Rooyen & Ledger (1999) have provided overviews of bird interactions with power lines in South Africa. Bird collisions in this country have been mainly limited to Greater and Lesser Flamingos, various species of water birds (ducks, geese, and waders), Stanley's Neotis denhami and Ludwig's Bustards, White Storks (Ciconia ciconia), and Wattled (Grus carunculatus), Grey Crowned (Balearica regulorum) and Blue Cranes (e.g. Jarvis, 1974; Johnson, 1984; Hobbs, 1987; Longridge, 1989; Van Rooyen & Ledger, 1999). Certain groups of birds are more susceptible to collisions, namely the species which are slow fliers and which have limited manoeuvrability (as a result of high wing loading) (Bevanger, 1994). Birds which regularly fly between roosting and feeding grounds, undertake regular migratory or nomadic movements, fly in flocks, or fly during low-light conditions are also vulnerable. Other factors which can influence collision frequency include the following from Anderson (1978) and APLIC (1994):*
>
> - *the age of the bird (younger birds are less experienced fliers);*
> - *weather factors (decreased visibility, strong winds etc.);*
> - *terrain characteristics and power line placement (power lines that cross the flight paths of birds);*
> - *power line configuration (the larger structures are more hazardous for collisions, with electrocutions the opposite is the case]);*
> - *human activity (which may cause birds to panic and fly into the overhead*

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power lines); and

- *familiarity of the birds with the area (therefore nomadic Ludwig's Bustards would be more susceptible).*

Although collision mortality rarely affects healthy populations with good reproductive success, collisions can be biologically significant to local populations (Beer & Ogilvie, 1972) and endangered species (Thompson, 1978; Faanes, 1987). The loss of hundreds of Northern Black Korhaans (Eupodotis afraoides) due to power line collisions would probably not affect the success of the total population of this species and would probably not be biologically significant, but if one Black Harrier was killed due to a collision, that event could have an effect on the population that would be considered biologically significant. Biological significance is an important factor that should be considered when prioritising mitigation measures. Biological significance is the effect of collision mortality upon a bird population's ability to sustain or increase its numbers locally and throughout the range of the species."

The collision threat that will be posed by the proposed power lines is limited. From a biological significance perspective, the biggest threat will be in the wetland and arable lands of FM-A (particularly old lands that have reverted to grassy areas), as those areas could attract any of the remaining power-line-sensitive RDL species. Cultivated lands (part of MS-Dc) might attract Lanner Falcon, Peregrine Falcon, Black Harrier and (possibly) Blue Crane and Secretarybird, but the latter two species are likely to be vagrants. Collisions at wetlands and water bodies (such as the Kuils River and the DNR wetland systems) are also possible, and may affect Flamingos, Pelicans, Black Stork, African Marsh-Harrier and various non-Red Data species.

10.5.1 Habitat Destruction

During the construction phase of power lines, habitat destruction and alteration inevitably takes place on the site. This happens with the construction of access roads, the clearing of the site itself and any associated infrastructure. The power line servitude will be cleared of trees and shrubs, but the grass will be cut short to minimise the risk of fire, among other risks. These activities have an impact on birds using the servitude and substation site for breeding, foraging and roosting.

Due to the heavy existing impacts identified in the study area (even in officially protected areas such as the DNR), namely urbanisation (formal and informal), industrialisation, agriculture, alien infestation and illegal dumping in open spaces, the clearing of shrubs and trees is likely to have a limited effect on bird habitats (see ~~Figure 10-1~~~~Figure 10-1~~, ~~Figure 10-2~~~~Figure 10-2~~, ~~Figure 10-3~~~~Figure 10-3~~, ~~Figure 10-4~~~~Figure 10-4~~, ~~Figure 10-5~~~~Figure 10-5~~, ~~Figure 10-6~~~~Figure 10-6~~, ~~Figure 10-7~~~~Figure 10-7~~, Figure 10-8, ~~Figure 10-9~~~~Figure 10-9~~ and ~~Figure 10-10~~~~Figure 10-10~~).

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Figure 10-1: Typical Stands of Dense Alien Vegetation in Study Area

Figure 10-2: Dense Urbanisation in Study Area

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Figure 10-3: Few Remaining Open Areas in Study Area

Figure 10-4: Most Habitat in Study Area Bears Evidence of Heavy Impacts

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Figure 10-5: Limited Agricultural Activity in Study Area (Mostly South of Philippi)

Figure 10-6: Man-made Wetlands Attract a Number of Bird Species in Study Area

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Figure 10-7: Arable Lands Reverted to Grassy Areas are an Important Bird Habitat

Figure 10-8: The Kuils River and Associated Wetlands is Most Prominent Drainage Line in Study Area

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Figure 10-9: Driftsands Nature Reserve, a Degraded Island of Natural Vegetation in Study Area

Figure 10-10: Artificial Water Bodies, an Important Habitat for Water Birds

10.5.2 Disturbance

Construction and maintenance activities impact on birds through disturbance, particularly during breeding times. There is potential for the impact of disturbance to influence a greater

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area than the site itself in that it could result in breeding failure of birds close to the construction activities.

It is, however, foreseen that disturbance will be a temporary impact, as it will be mostly associated with the construction activities. During the course of the site visit, it became obvious that the existing impacts in the area are significant due to the dense human population. Disturbance is thus already a factor in the few remaining areas of natural vegetation, even in nominally protected areas such as the Driftsands Nature Reserve.

10.5.3 Electrocutions of Birds on Pylon Towers

This refers to the scenario whereby a bird bridges the gap between two phases or a phase and an earthed component thereby causing an electrical short circuit. The larger bird species such as vultures and eagles are particularly vulnerable to this impact, as the larger the wingspan and other dimensions of a bird, the greater the likelihood of it being able to bridge the gap between hardware.

Since the proposed power line towers will be higher than the average vegetation, the towers may be the most preferred perching substrate in the area for a number of bird species. However, in this instance, electrocutions are not an envisaged impact because the clearances on 400kV Transmission power lines are too big for any bird to bridge. Electrocutions are therefore ruled out as a potential impact.

10.5.4 Recommendations

The recommended route alignment from an avifaunal perspective is:

- MS-C (MS-C-1 to MS-C-35).
- MS-Db (MS-D-12 to switching station).

Refer to **Appendix I~~Appendix I~~-5**.

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10.6 Heritage/Archaeological Impact Assessment

The construction of the Firgrove-Mitchell's Plain project will result in low impacts in terms of heritage. This outcome is mainly due to the comprehensive planning and consultative process implemented during this EIA process, which has avoided areas of known sensitivity. Potential impacts to the edge of the Winelands with respect to the MS-D route alignment have been largely eliminated as it will be possible to re-utilise existing servitudes. Hence this option is equally acceptable. Refer to **Appendix I~~Appendix I~~-6**.

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Unless the proposed alignments undergo substantial change during the design phase, it is recommended that the HWC provides comment that will allow the project to proceed. No mitigation or further work is required. However, further alterations to the alignments (if these take place) should be reviewed by a heritage specialist.

10.7 Social Impact Assessment

From a social perspective the following general conclusions can be made (refer to **Appendix I~~Appendix I~~-7**):

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- No fatal flaws with regard to the Firgrove-Mitchells Plain project were found from a social perspective. Although resettlement will occur, this will have severe social consequences.
- Impacts associated with the construction phase mainly relate to intrusion impacts such as the inflow of temporary workers, inflow of job seekers, dust and noise pollution, and impacts on daily living and movement patterns. These impacts are largely similar for all the route alignments and it is expected that the negative impacts in this regard could respond well to mitigation measures.
- The critical negative social impact is the possible resettlement of individual dwellings, which has been rated as high. It is considered that even if mitigation measures were implemented, resettlement would still result in severe negative impacts on the resettled community as well as on the host community.
- The recommended route alignment should limit the number of individuals that would be negatively affected by the proposed Firgrove-Mitchell's Plain project.
- The resettlement of individuals in the study area could be limited depending on the tower placements, tower types, footprint of tower, servitude width required, and detailed alignment. It is anticipated that the alignments proposed should limit the negative impacts associated with resettlement.
- For both projects, future developments in the area could be influenced by the proposed power line and substation, as the eventual servitude alignment and substation site may sterilise some sections of land where these future residential and commercial developments and densifications are proposed, and *vice versa*.
- Even with the likelihood of resettlement, this project is necessary for the continued supply of electricity to the greater Mitchell's Plain area, and for economic development in the CoCT.
- No significant negative impacts are foreseen with the construction of the proposed Switching Station.

The following areas of concern are noted with regard to Alternative FM-A:

- Alternative FM-Aa traverses the Bongani informal settlement of Khayelitsha situated next to the south of the railway line and Lansdowne Road (M9) as well as the settlements of Victoria Merge and Village 3 North, which have extended to the north of the railway line up to Lansdowne Road (M9). Should this option be implemented, resettlement of a number of dwellings would be required. The affected area would span approximately 800 metres and would include pylon positions FM-A-13B up to FM-A-16B.
- The possible widening of Mew Way and Landsdowne Road would complicate the placement of a Transmission power line through the Khayelitsha area and ensure that resettlement would be required.
- Alternative FM-Aa traverses the future Mitchells Plain District Hospital site situated east of A.Z. Berman Drive, south of the R300 and north of Lentegeur and the Lentegeur Hospital. Even though it is anticipated that a Transmission power line could be allowed on this site, it is not recommended as the hospital patients are viewed as sensitive receptors. Thus, route alignments in close proximity to such receptors should be avoided, where possible.

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- Alternative FM-A would furthermore result in various negative impacts with regard to the sterilisation of land proposed for housing developments along the N2 (e.g. Croydon Olive Estate, Croydon Vineyard Estate, the Vergenoegd Wine Estate and the Sitari Fields Golf Estate). Commercial developments, such as the Cape Town Films Studio west of Baden Powell Drive could be negatively affected by Alternative FM-A.
- Alternative FM-A traverses the area north of Macassar, between Kramat Road and the Zandvliet High School, on the farm Zandvliet 664. This area is proposed for future housing development and concerns refer to the possibility that Alternative B could divide the site, thereby negatively impacting on the future development. This issue should thus be considered with the final alignment should Alternative B be implemented.
- Tower positioning should acknowledge the sensitive receptors of the Boys Town situated west of Kramat Road. Tower placements should preferably not be near any buildings of where activities are undertaken.
- Alternative FM-A would furthermore have to take cognisance of the proposed Sitari Golf Fields Estate.
- Due to the impact of resettlement and the number of dwellings possibly affected in the Bongani area, Alternative FM-Aa should thus at all costs be avoided from a social perspective.

The following areas of concern are noted with regard to Alternative MS-C:

- Alternative MS-C should consider possible future commercial and industrial developments in the Philippi East area (industrial area) especially along Stock Road.
- An area within Philippi East, between Landsdowne Road/M9 and the N2, east of Sheffield Road could most probably result in resettlement. The tower placements proposed are on the southern and northern edges of the dwellings, although the line would span above these dwellings. As no dwellings are allowed within a servitude these affected dwellings within the servitude in close proximity to Sheffield Road would have to be resettled. The affected pylon positions include MS-C-16Ba, MS-C-16 Bb and MS-C-17A which span an area of approximately 200m.
- Delft South along Alternative MS-C remains problematic as resettlement could occur along specific sections of the existing servitude area (with existing lines) even though Eskom has indicated that the consolidation of the existing lines within the existing servitude is possible. Resettlement is still likely at specific locations east of Mango Street, east of the Masibambisane High School (pylon positions MS-C-21 up to MS-C-23). This area spans approximately 460m although only select properties along this length would have to be resettled. Another location of concern relates to a dwelling just west of the R300, in close proximity to Essenhout Street which would be situated within the servitude (between pylon position MS-C-26 and MS-C-27).
- Sections of Alternative MS-C could impact on densely populated settlements (eg Mfuleni and Hagley areas) and infilling of vacant land within close proximity to these settlements. The proposed Rotterdam Development in close proximity to Hindle Road is especially a source of concern, but this route alignment runs along the eastern border of the proposed future housing development.

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- This route alignment limits any possible negative impacts on the DNR.

The following areas of concern are noted with regard to Alternative MS-D:

- Alternative MS-D could impact on densely populated settlements (e.g. Mfuleni, Wimbledon, Happy Valley) and infilling of vacant land within close proximity to these settlements.
- Alternative MS-D should take cognisance of proposed new residential development to the east of Amandelrug and Rouxville, south of Bottelary Road.
- Alternative MS-D should avoid sterilising SANRAL land in close proximity to the Zevenwacht Mall as this area has been identified as ideal for residential development.
- Possible spacing problems near the Zevenwacht shopping mall area and Saxenburg Industrial Park located near the corner of Van Riebeeck Road (R102) and Stellenbosch Road (M12) with regards to Alternative MS-D are expected.
- A possible tower placement (pylon position MS-D-25Bb) within the Blackheath Industrial area (corner of Range Road and Stellenbosch Road/M12) could possibly result in resettlement of one property (north western corner of the Blackheath Industrial area). Alternative tower placements, however, could avoid this impact and should thus be pursued.

10.8 VISUAL IMPACT ASSESSMENT

Various risk sources for the visual impact have been identified for the construction and operation phasea and can be classified as both negative and positive. Refer to **Appendix ~~Appendix I~~ 8**.

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10.8.1 Construction Phase

It is anticipated that the major risk source during the construction phase would be:

- Negative Risk Sources
  - Excessive cleaning for site offices, servitudes and temporary access road.
  - The relatively random and disorganised laydown of building materials and vehicles.
  - The extent and intensity of the security at night.
  - Dust from construction activities.
  - Uncontrolled exploitation of borrow pits and quarries without compliance to environmental controls related to aesthetic rehabilitation.
  - High seed bank of alien species such as *A. saligna* in the topsoil can lead to the uncontrolled spread of this exotic invader plant species along the edges of the Transmission power line servitude. This could create a treed edge that is visually contrary to the low grasslands.
  - Location and layout of construction camp if located in proximity of works area.
- Positive Risk Sources
  - Image of construction activity could lead to a perceived view of progress and benefit to the community.

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10.8.2 Operational Phase

It is anticipated that the major risk source during the operational phase would be:

- Negative Risk Sources
  - Site engineering such as fills, could remain aesthetically incompatible with surrounding landscape. Edges may not blend in with the landscape.
  - Areas and/or specific sites of high aesthetic value may be disfigured by the introduction of project components such as pylons and power lines within the viewshed resulting in a permanent change to the existing visual quality of visually sensitive areas.

10.8.3 Viewing Distance

The visual impact of an object in the landscape diminishes at an exponential rate as the distance between the observer and the object increases (Hull and Bishop, 1988).

Thus, the visual impact at 1 000m would be approximately a quarter of the impact as viewed from 500m. Consequently, at 2 000m, it would be one sixteenth of the impact at 500m. The view of the project components would appear so small from a distance of 5 000m or more that the visual impact at this distance is insignificant. On the other hand the visual impact of the project components from a distance of 500 metres or less would be at its maximum.

It is important to qualify the above statement by adding that due to the considerable height of the pylons (40-60m, depending on type of structure), the visibility is often 10km and beyond. However, due to the nature of the structure at these distances the structures appear ephemeral and tend to blend in with the landscape.

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11 COMPARATIVE ASSESSMENT OF ALTERNATIVES

11.1 INTRODUCTION

The following alternatives are assessed:

- Design Alternatives
  - Recycling of Existing Servitudes
  - Substation Designs
- Technical Alternatives
  - Location Alternatives
  - Route Alternatives

11.2 DESIGN ALTERNATIVES

11.2.1 Recycling of Existing Servitude

The pylons that are recommended for the recycling of existing servitudes within the recommended route alignment are as follows:

- MS-C-19B
- MS-C-20
- MS-C-21
- MS-C-22
- MS-C-23
- MS-C-24
- MS-C-25b
- MS-C-26
- MS-C-27
- MS-C-28
- MS-C-29a
- MS-C-29b
- MS-C-30Ba
- MS-C-30Bb
- MS-C-31
- MS-C-32
- MS-C-33
- MS-C-34
- MS-C-35B

11.2.2 Substation Designs

c) Air Insulated Substation

The advantages of an Air Insulated Substation are that:

- The cost of an Air Insulated Substation is low.
- It eliminates reliance on original suppliers or manufacturers as the layout allows the use of equipment from a variety of suppliers or manufacturers.

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The disadvantages of an Air Insulated Substation are that:

- Air Insulated Substation has a larger footprint than a Gas Insulated Substation.
- The construction time for an Air Insulated Substation is considerably longer than for a Gas Insulated Substation.
- All the insulators are exposed to external environmental pollutants, as is the case along coastal areas or where there are heavy-pollution industries in the vicinity, resulting in air/saline contamination and possibly resultant corrosion.
- Isolators require frequent maintenance.

a) Gas Insulated Substation

The advantages of a Gas Insulated Substation are that:

- The installation is not subject to external environmental pollutants (as is the case along coastal areas or where there are heavy-pollution industries in the vicinity) because the entire equipment is enclosed and filled with pressurised SF_6 gas.
- A Gas Insulated Substation is recommended in cosmopolitan cities, industrial townships and the like, where the cost of land is considerably higher. The higher cost of SF_6 insulated switchgear is justified by savings derived from the reduction in the floor area required.
- A Gas Insulated Substation requires less maintenance, has a long service life and is seen as more reliable.
- The construction time for a Gas Insulation Substation is considerably less than it is for other types.

The disadvantages of a Gas Insulated Substation are that:

- SF_6 is a greenhouse gas, which contributes to global warming. Should there be a leak, this hazard would be intensified.
- The cost of a Gas Insulated Substation is more than three times the cost of an electrically comparable Air Insulated Substation.
- Only the original supplier or manufacturer can be relied on for any modification or extensions of a Gas Insulated Substation.

Thus, it is recommended that the Mitchell's Plain Subsation be designed and constructed as a Gas Insulated Substation as it minimises the footprint disturbance.

11.3 TECHNICAL ALTERNATIVES

11.3.1 Location Alternatives

The ratings of each site for the Mitchell's Plain Substation are presented in Table 11-1. It is clear that Alternative 1 is the recommended location of the Mitchell's Plain substation. The only specialist study that is rated medium is Wetland. However, mitigation measures for this are provided (see EMP in Appendix H).

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Table 11-1: Specialists Ratings of Mitchell's Plain Substation

Alternative	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
1	1	2	1	0	1	0	0	0	1	6	1.11
2	2	3	3	1	1	1	0	1	2	14	2.67
3	3	3	3	2	1	2	0	1	3	18	3.44

11.3.2 Alternative Route Alignment Analysis

This section analyses the alternative route alignments proposed for the Firgrove-Mitchell's Plain project. The significance ratings used in the tables below are based on the significance rating as per Table 8-2~~Table 8-2~~.

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a) Alternative FM-Aa

The ratings of the pylons of FM-Aa are presented in Table 11-2~~Table 11-2~~. The pylon that is rated as medium is FM-A-13B due to its proximity to the informal settlements in Khayelitsha, high visual impact and the wetland. This alignment has concerns with regards to resettlement in the Khayelitsha area, especially with regards to people currently staying within power line servitudes.

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Table 11-2: Specialists Ratings of FM-Aa

SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Aa	1B	1	1	1	0	1	0	0	0	2	6	1.00
Aa	2B	2	0	0	0	1	0	0	0	2	5	0.78
Aa	3B	2	0	0	0	1	0	0	0	2	5	0.78
Aa	4B	2	1	0	0	1	0	0	0	2	6	1.00
Aa	5B	2	0	0	0	1	0	0	0	1	4	0.67
Aa	6	2	0	0	0	1	0	0	0	1	4	0.67
Aa	7	2	0	0	0	1	0	0	0	1	4	0.67
Aa	8	1	0	1	0	1	0	0	0	2	5	0.78
Aa	9	1	0	1	0	1	0	0	0	2	5	0.78
Aa	10	1	0	1	0	1	0	0	0	2	5	0.78
Aa	11	1	0	0	0	1	0	0	0	2	4	0.56
Aa	12	1	1	1	0	1	0	0	0	2	6	1.00
Aa	13B	1	3	1	0	1	0	0	0	3	9	1.56
Aa	14B	3	0	0	0	1	0	0	0	3	7	1.11
Aa	15B	3	0	0	0	1	0	0	0	2	6	1.00
Aa	16B	3	0	0	0	1	0	0	0	2	6	1.00

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b) Alternative FM-Ab

The ratings of the pylon positions (including alternatives of specific pylon positions) of FM-Ab are presented in Table 11-3~~Table 11-3~~. The concerns in this alignment are:

- the CBAs,
- the Kuils River floodplain,
- proposed and existing developments on either side of the N2, and
- agricultural, heritage and visual perspectives on Vergenoegd Wine Estate,

resulting in 22 pylon positions rated as medium.

Table 11-3: Specialists Ratings of FM-Ab

SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Ab	17B	3	0	0	0	1	0	0	0	2	6	1.00
Ab	18B	3	0	0	0	1	0	0	0	1	5	0.89
Ab	19B	0	0	2	1	1	0	0	0	1	5	0.89
Ab	20	0	0	0	1	1	0	0	0	1	3	0.44
Ab	21	0	1	3	1	1	0	0	0	1	7	1.33
Ab	22	0	1	3	1	1	0	0	0	1	7	1.33
Ab	23	0	0	2	1	1	0	0	0	1	5	0.89
Ab	24	0	0	2	1	1	0	0	0	1	5	0.89
Ab	25	0	1	3	1	1	0	0	0	1	7	1.33
Ab	26a	0	2	3	1	1	0	0	0	1	8	1.56
Ab	26b	0	2	3	1	1	0	0	0	1	8	1.56
Ab	27B	0	1	3	1	1	0	0	0	1	7	1.33
Ab	28	1	1	1	1	1	1	0	0	1	7	1.33
Ab	29	1	2	2	1	1	1	0	0	1	9	1.78
Ab	30	1	2	2	1	1	1	0	0	1	9	1.78
Ab	31	1	1	3	1	1	1	0	0	1	9	1.78
Ab	32	1	2	3	1	1	1	0	0	2	11	2.11
Ab	33	1	3	2	1	1	1	0	0	2	11	2.11
Ab	34	1	3	2	1	1	1	0	0	2	11	2.11
Ab	35	1	3	2	1	1	1	0	0	2	11	2.11
Ab	36B	1	3	1	1	1	1	0	0	2	10	1.89
Ab	37B	1	2	3	1	1	1	0	0	2	11	2.11
Ab	38B	1	1	1	1	1	1	1	0	2	9	1.56
Ab	39	1	1	1	0	1	1	1	0	2	8	1.33
Ab	40	1	1	1	0	1	1	1	0	1	7	1.22
Ab	41	1	1	1	1	1	1	0	0	1	7	1.33
Ab	42	1	3	1	1	1	1	1	0	1	10	1.89

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SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Ab	43	1	1	0	1	1	0	0	0	1	5	0.89
Ab	44	1	0	0	1	1	0	0	0	1	4	0.67
Ab	45B	1	1	0	0	1	0	0	0	1	4	0.67
Ab	46B	1	1	0	0	1	0	0	0	1	4	0.67
Ab	47	2	0	0	0	1	0	0	0	2	5	0.78
Ab	48B	2	0	1	0	1	0	0	0	2	6	1.00
Ab	49B	2	2	1	0	1	0	0	0	2	8	1.44
Ab	50	2	1	1	1	1	1	1	1	2	11	1.89
Ab	51	2	1	0	1	1	1	1	1	2	10	1.67
Ab	52	2	1	0	1	1	1	1	1	2	10	1.67
Ab	53B	2	1	0	1	1	1	1	1	2	10	1.67
Ab	54B	2	0	1	1	1	1	1	1	2	10	1.67
Ab	55Ba	2	0	1	1	1	1	1	1	1	9	1.56
Ab	55Bb	2	0	1	1	1	1	1	1	1	9	1.56
Ab	56B	2	2	1	1	1	1	1	1	1	11	2.00
Ab	57	2	0	1	1	1	1	1	1	1	9	1.56
Ab	58a	1	0	0	1	1	1	2	0	0	6	1.00
Ab	58b	1	0	0	1	1	1	2	0	0	6	1.00

c) Alternative MS-C

The ratings of the pylon positions of MS-C are presented in

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Table 11-4~~**Table 11-4**~~. There are no pylon positions in this alignment with a rating of medium. There are 34 pylons rated low and 5 as no impact. However, attention is drawn to 7 pylons with a high social rating due to possible resettlement or proposed residential development.

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Table 11-4: Specialists Ratings of MS-C

SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Ca	1	1	2	1	0	1	0	0	0	1	6	1.11
Ca	2B	1	0	0	0	1	0	0	0	2	4	0.56
Ca	3B	1	0	0	0	1	0	0	0	2	4	0.56
Ca	4B	2	0	0	0	1	0	0	0	2	5	0.78
Ca	5	2	0	0	0	1	0	0	0	2	5	0.78
Ca	6B	2	0	0	0	1	0	0	0	2	5	0.78
Ca	7B	0	1	0	0	1	0	0	0	2	4	0.56
Ca	8B	0	1	1	0	1	0	0	0	2	5	0.78
Ca	9B	1	0	0	0	1	0	0	0	2	4	0.56
Ca	10	1	0	0	0	1	0	0	0	2	4	0.56
Ca	11	1	0	0	0	1	0	0	0	2	4	0.56
Ca	12B	2	0	0	0	1	0	0	0	2	5	0.78
Ca	13B	2	0	0	0	1	0	0	0	2	5	0.78
Ca	14	1	0	1	0	1	0	0	0	2	5	0.78
Ca	15	1	0	1	0	1	0	0	0	2	5	0.78
Ca	16Ba	3	0	0	0	1	0	0	0	2	6	1.00
Ca	16Bb	3	0	0	0	1	0	0	0	2	6	1.00
Ca	17a	3	0	0	0	1	0	0	0	2	6	1.00
Ca	17b	2	0	0	0	1	0	0	0	2	5	0.78
Ca	18B	2	1	0	0	1	0	0	0	1	5	0.89
Ca	19B	2	0	0	0	1	0	0	0	1	4	0.67
Ca	20	3	0	0	0	1	0	0	0	1	5	0.89
Ca	21	3	0	0	0	1	0	0	0	1	5	0.89
Ca	22	2	0	0	0	1	0	0	0	1	4	0.67
Ca	23	2	0	0	0	1	0	0	0	1	4	0.67
Ca	24	3	0	0	0	1	0	0	0	1	5	0.89
Ca	25B	3	0	0	0	1	0	0	0	1	5	0.89
Ca	26	1	0	0	0	1	0	0	0	1	3	0.44
Ca	27	1	0	0	0	1	0	0	0	1	3	0.44
Ca	28	1	0	0	0	1	0	0	0	1	3	0.44
Ca	29a	1	0	0	0	1	0	0	0	1	3	0.44
Ca	29Bb	1	0	0	0	1	0	0	0	1	3	0.44
Ca	30Ba	1	0	2	0	1	0	0	0	1	5	0.89
Ca	30Bb	1	0	2	0	1	0	0	0	1	5	0.89
Ca	31	1	1	2	1	1	0	0	0	1	7	1.33
Ca	32	1	0	0	1	1	0	0	0	1	4	0.67

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SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Ca	33	1	1	1	1	1	0	0	1	1	7	1.22
Ca	34	1	0	0	1	1	0	0	1	1	5	0.78
Ca	35B	2	2	1	0	1	0	0	1	1	8	1.44

d) Alternative MS-Da

The ratings of the pylon positions of MS-Da are presented in Table 11-5~~Table 11-5~~. Pylons MS-D-1,

MS-D-2, MS-D-3 and MS-D-4 are rated as medium as this alignment follows the eastern boundary of the ecologically-sensitive DNR.

Table 11-5: Specialists Ratings of MS-Da

SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Da	1Ba	3	3	1	0	1	0	0	0	2	10	1.89
Da	1Bb	2	2	3	1	1	0	0	2	2	13	2.33
Da	2Ba	2	1	0	0	1	0	0	2	2	8	1.22
Da	2Bb	2	0	1	0	1	0	0	2	2	8	1.22
Da	3	2	0	3	0	1	0	0	2	3	11	1.78
Da	4	2	1	1	0	1	0	0	2	3	10	1.56
Da	5	2	0	0	0	1	0	0	2	3	8	1.11
Da	6B	2	0	0	0	1	0	0	2	3	8	1.11
Da	7	2	0	0	0	1	0	0	1	3	7	1.00
Da	8	2	0	0	0	1	0	0	1	3	7	1.00
Da	9B	2	0	0	0	1	0	0	1	3	7	1.00
Da	10	2	0	0	0	1	0	0	1	3	7	1.00
Da	11a	2	0	0	0	1	0	0	1	1	5	0.78
Da	11Bb	2	0	0	0	1	0	0	1	1	5	0.78

a) Alternative MS-Db

The ratings of the pylon positions for MS-Db are presented in Table 11-6~~Table 11-6~~. Pylons MS-D-12, MS-D-13 and MS-D-14 are rated as medium due to the wetland areas and their proximity to existing and proposed residential areas. The alternative pylons from MS-D-23 to MS-D-26 are located where this alignment crosses the Stellenbosch Arterial Road. Issues in this area relate to proposed and existing developments, wetlands and visual impact. Attention is also drawn to pylon MS-D-25Bb as a result of the possible partial acquisition of this land for the placement of this pylon. There are alternative positions, which should be considered by the DEA in the approval of the final alignment.

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Table 11-6: Specialists Ratings of MS-Db

SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Db	12Ba	2	2	1	0	1	1	0	1	2	10	1.67
Db	12Bb	2	2	1	0	1	1	0	1	2	10	1.67
Db	13a	2	2	1	0	1	1	0	1	2	10	1.67
Db	13b	2	0	0	0	1	1	0	1	2	7	1.00
Db	14ba	1	2	1	0	1	1	0	1	3	10	1.56
Db	14Bb	1	1	1	0	1	1	0	1	3	9	1.33
Db	15a	1	1	1	0	1	1	0	1	3	9	1.33
Db	15b	1	1	1	0	1	1	0	1	3	9	1.33
Db	16Ba	1	0	0	0	1	1	0	1	3	7	0.89
Db	16Bb	1	0	0	0	1	1	0	1	3	7	0.89
Db	17B	1	0	0	0	1	1	0	1	3	7	0.89
Db	18Ba	1	1	0	0	1	1	0	1	3	8	1.11
Db	18Bb	1	0	0	0	1	1	0	1	3	7	0.89
Db	19Ba	1	0	0	0	1	0	0	1	1	4	0.56
Db	19Bb	1	0	0	0	1	0	0	1	1	4	0.56
Db	20	1	0	0	0	1	0	0	0	1	3	0.44
Db	21a	1	0	1	0	1	0	0	0	1	4	0.67
Db	21b	1	0	1	0	1	0	0	0	1	4	0.67
Db	22	1	0	1	0	1	0	0	0	2	5	0.78
Db	23a	1	1	0	0	1	0	0	0	3	6	0.89
Db	23b	1	0	1	0	1	0	0	0	3	6	0.89
Db	23Bc	1	0	1	0	1	0	0	0	3	6	0.89
Db	24a	1	3	0	0	1	0	0	0	2	7	1.22
Db	24Bb	3	2	0	0	1	0	0	0	2	8	1.44
Db	24Bc	1	3	0	0	1	0	0	0	2	7	1.22
Db	24d	1	1	0	0	1	0	0	0	2	5	0.78
Db	24Be	1	0	0	0	1	0	0	0	2	4	0.56
Db	25Ba	3	0	0	0	1	0	0	0	2	6	1.00
Db	25Bb	3	0	0	0	1	0	0	0	2	6	1.00
Db	25Bc	2	1	0	0	1	0	0	0	2	6	1.00
Db	26Ba	3	0	0	0	1	0	0	0	2	6	1.00
Db	26Bb	3	2	0	0	1	0	0	0	2	8	1.44
Db	27a	3	2	0	0	1	0	0	0	2	8	1.44
Db	27b	3	2	0	0	1	0	0	0	2	8	1.44
Db	27c	2	2	0	0	1	0	0	0	2	7	1.22
Db	28a	2	0	0	0	1	0	0	0	1	4	0.67
Db	28Bb	2	0	0	0	1	0	0	0	1	4	0.67

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SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Db	29	2	0	0	0	1	0	0	0	1	4	0.67
Db	30B	2	0	0	0	1	0	0	0	1	4	0.67
Db	31B	2	0	0	0	1	0	0	0	1	4	0.67
Db	32B	2	0	0	0	1	0	0	0	1	4	0.67
Db	Gantry 1	2	0	0	0	1	1	0	0	1	5	0.78
Db	Gantry 2	2	0	0	0	1	1	0	0	1	5	0.78
Db	Gantry 3	2	0	0	0	1	1	0	0	1	5	0.78
Db	Gantry 1a	2	0	0	0	1	1	0	0	1	5	0.78
Db	Gantry 2a	2	0	0	0	1	1	0	0	1	5	0.78
Db	Gantry 3a	2	0	1	0	1	1	0	0	1	6	1.00

e) Alternative MS-Dc

The ratings of the pylon positions of MS-Dc are presented in ~~Table 11-7~~Table 11-7. There are no pylon structures within this alignment that are rated medium. However, attention is drawn to ecologically-sensitive areas from MS-D-39 to MS-D-43. A concern for this alignment is the number of existing pylons within this alignment. The construction of the Firgrove-Mitchell's Plain project along this alignment would result in technical complications during the construction phase. The recycling of the servitude within this area would require that these power lines be switched off during construction, which may not prove feasible over the duration of the construction period and would result in very large areas being without electricity for prolonged periods of time.

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Table 11-7: Specialists Ratings of MS-Dc

SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Dc	33B	1	0	0	0	1	2	2	0	1	7	0.89
Dc	34B	1	0	0	0	1	2	2	0	1	7	0.89
Dc	35	1	0	2	0	1	0	1	0	1	6	1.00
Dc	36	1	0	2	0	1	0	1	0	1	6	1.00
Dc	37	1	0	2	0	1	1	1	0	1	7	1.11
Dc	38	1	0	1	0	1	1	0	0	1	5	0.78
Dc	39	1	0	3	0	1	1	0	0	1	7	1.22
Dc	40	1	0	3	0	1	1	0	0	1	7	1.22
Dc	41B	1	0	3	0	1	1	0	0	1	7	1.22
Dc	42B	1	0	3	0	1	1	0	0	1	7	1.22
Dc	43	1	0	3	0	1	1	0	0	1	7	1.22
Dc	44	1	0	2	0	1	0	0	0	1	5	0.89

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SPLIT	PYLON	Social	Wetland	Ecology	Avifauna	Geotech	Soil & Agri	Agri-Economic	Heritage	Visual	Total	Average
Dc	45B	1	0	0	0	1	0	0	0	1	3	0.44
Dc	46B	3	0	1	0	1	0	0	0	1	6	1.11
Dc	47	3	0	1	0	1	0	0	0	1	6	1.11
Dc	48	1	0	1	0	1	0	0	0	1	4	0.67
Dc	49	1	0	1	0	1	0	0	0	1	4	0.67
Dc	50B	1	0	1	0	1	0	0	0	1	4	0.67
Dc	51	1	0	0	0	1	0	0	0	1	3	0.44

f) Economic Analysis

As discussed in **Section** ~~9.3~~9.3, the economic impacts of each pylon position can't be excluded from this analysis. Therefore, Table 11-8~~Table 11-8~~ indicates the cost estimate of the recommended alignment, based on the cost of each pylon position. These calculations must not be taken as the total cost of this section of the alignment, but rather used as an indication of the type of pylon towers to be utilised. Costs of the contractor, stringing of the power line and ancillary equipment required for construction purposes are not included.

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Table 11-8: Economic Analysis of Each Alternative Alignment Section

Alignment Split	Bend Towers (R850,000)		Straight Towers (R300,000)		Total	
	Number	Cost	Number	Cost	Number	Cost
Alternative FM-Aa	9	R 7,650,000.00	7	R 2,100,000.00	16	R 9,750,000.00
Alternative FM-Ab	15	R 12,750,000.00	27	R 8,100,000.00	42	R 20,850,000.00
Alternative MS-Ca	16	R 13,600,000.00	20	R6,000,000.00	36	R 19,600,000.00
Alternative MS-Da	5	R 4,250,000.00	7	R 2,100,000.00	12	R6,350,000.00
Alternative MS-Db	14	R 11,900,000.00	11	R 3,300,000.00	25	R 15,200,000.00
Alternative MS-Dc	7	R 5,950,000.00	12	R 3,600,000.00	19	R 9,550,000.00

g) Alternative Analysis Conclusion

From the above analysis, the recommended route alignment would be Mitchell's Plain Substation **Alternative 1** to **MS-C** to **MS-Db** to the **Switching Station** (Figure 11-1~~Figure 11-1~~). The issues related to resettlements of informal settlements in Khayelitsha, the vineyards and proposed developments along the N2 for FM-A, and the technical difficulties of MS-Dc will be avoided.

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11.4 Proposed Strategy for Satisfying the Need

The need to provide CoCT with a second 400kV injection into its supply network at Mitchell's Plain would be satisfied through the establishment of a Mitchell's Plain Substation at Alternative Site 1 to supply the existing Philippi Substation with sufficient capacity. The same Mitchell's Plain Substation must be connected to the switching station close to the existing 400kV Transmission power line from Palmiet Substation to Stikland Substation to load from the latter into this project.

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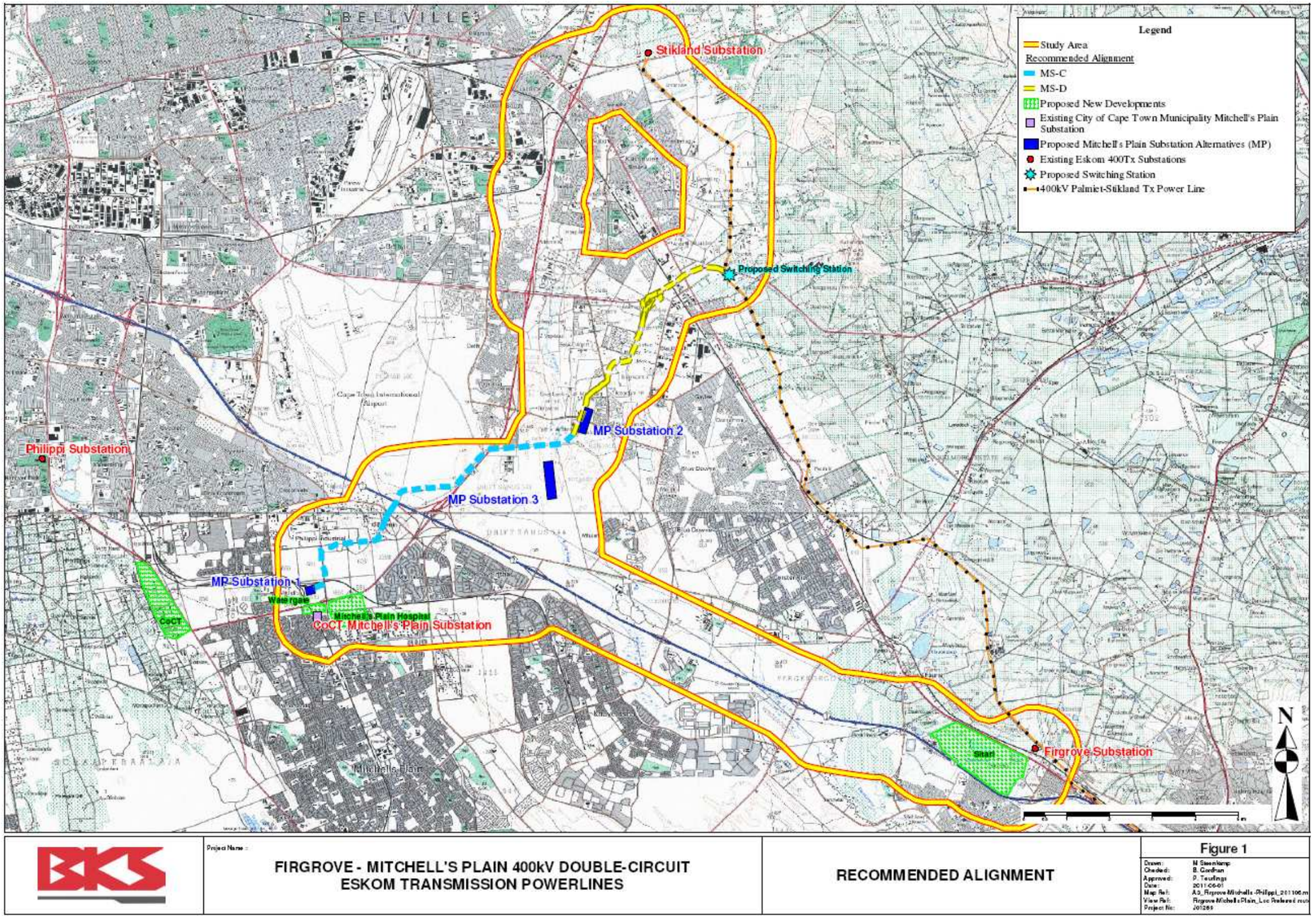

Figure 11-1: Recommended Route Alignment

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12 SITE-SPECIFIC ENVIRONMENTAL MANAGEMENT PLAN

A Draft Site-Specific Environmental Management Plan (EMP) details conditions for the implementation of the environmental management component for all personnel executing the project. As such, an EMP outlines how the project will be managed through its lifecycle and is designed to mitigate negative environmental impacts assessed in the EIA.

The Draft Site-Specific EMP as presented in **Appendix H~~Appendix H~~** is based on the construction phase and serves as a guide for best practice construction methods, within particular specifications of Eskom. In addition, this Draft Site-Specific EMP is compiled with the intention of promoting best practice construction methods and as a precautionary measure to comply with Section 28 of the NEMA.

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The Draft Site-Specific EMP will be submitted with the Draft EIA Report as mentioned in **Section 6.3.5~~6.3.5~~**. It must be noted that the Draft Site-Specific EMP is an unprecendented for an Eskom Transmission project at this stage of the EIA process as it is usually submitted after a corridor for the recommended route alignment is approved by the DEA. However, due the limited area available in this project's study area, the EAP recommends that the DEA approve the recommended pylon positions during the EIA process. The impacts of moving a pylon tower within an approved corridor of this project would be too great a difference, in most instances. Therefore, it is recommended that the pylon positions are fixed at this EIA stage and submitted to the DEA for their approval.

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The Draft Site-Specific EMP outlines the impacts and mitigation measures for the planning, design, construction, operational, rehabilitation and eventual decommissioning phases. The roles, responsibilities and reporting procedures have also been identified in the Draft Site-Specific EMP. The following details are covered in the Draft Site-Specific EMP:

- **Description of the Recommended Route Alignment:** from the proposed Mitchell's Plain Substation Alternative 1 along **MS-C** to **MS-Db** to the proposed Switching Station.
- **Summary of Impacts:** A summary of the predicted negative environmental impacts for which mitigation is required for the recommended route alignment. Positive impacts requiring enhancement will also be listed.
- **Description of Mitigation Measures:** The Draft Site-Specific EMP identifies feasible and cost-effective mitigation measures to reduce significant negative environmental impacts to acceptable and legal levels. Mitigation measures are described in detail and accompanied by designs, equipment descriptions, and operating procedures, where appropriate. The technical aspects of implementing the mitigation measures are also described.
- **Description of a Monitoring Programme:** Environmental performance monitoring was designed to ensure that mitigation measures are implemented. The monitoring programme clearly indicates the links between impacts, indicators to be measured, measurement methods and definition of thresholds that will signal the need for corrective actions.
- The **Emergency Action Plan:** The identification of accidents that could occur during construction and operational phases of the project, with measures on how these could be prevented and/or managed.

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- **Incorporation** of Eskom's Environmental Guidelines for vegetation management.
- **Institutional Arrangements** depict and define the responsibilities for mitigation and monitoring actions.
- **Legal Enforceability:** The key legal considerations with respect to the Draft Site-Specific EMP are:
  - Legal framework for environmental protection; and
  - Legal basis for mitigation.
- The **Implementation Schedule and Reporting Procedures** that specify the timing, frequency, and duration of the mitigation measures.
- A **Description of Requirements** for record keeping, reporting, review, auditing and updating of the Draft Site-Specific EMP will be provided.

The Draft Site-Specific EMP for the proposed power line deviations is presented in Appendix H.

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13 ENVIRONMENTAL IMPACTS SPECIFIC TO NEMA LISTED ACTIVITIES

The key environmental impacts associated with the listed activities as legislated by the NEMA and associated EIA Legislation are in this section. According to NEMA, development must be socially, environmentally and economically sustainable. This section assesses the impacts of the proposed development with respect to the NEMA Principles on Sustainable Development, which must be adhered to (Table 13-1~~Table 13-1~~).

Table 13-1: Environmental Impacts Specific to NEMA Principles – Sustainable Development

NO.	DESCRIPTION	EIA APPLICABILITY TO ACTIVITY
NEMA Principles on Sustainable Development		
(i)	Disturbance of ecosystems and loss of biological diversity are avoided, or, where they cannot be altogether avoided, are minimised and remedied.	Ciritical Biodiversity Areas, wetlands and other ecological parameters of high conservation value have been identified as part of the Ecological and Wetland Assessment (Appendix I~~Appendix I~~-4). Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~) for the management of the impacts associated with the recommended pylon positions. Overall, the recommended route alignment and proposed pylon positions would have the least impact on the ecosystems and loss of biological diversity.
(ii)	Pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied.	Degradation of the environment cannot be avoided as the proposed development entails the construction of power lines. However, site-specific pylon positions have been identified in areas that will limit the degradation of the environment and mitigation measures are prescribed. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~).
(iii)	Disturbance of landscapes and sites that constitute the nation's cultural heritage is avoided, or, where it cannot be altogether avoided, is minimised and remedied.	The HIA undertaken does not identify any known cultural/visual heritage resources that will be affected by the recommended route alignment. However, should there be any heritage resources unearthed during the Construction Phase, mitigation measures are prescribed. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~).
(iv)	Waste is avoided, or, where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner.	Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~) for the management of waste.
(v)	Use and exploitation of non-renewable natural resources is responsible, equitable and considers the consequences of the depletion of the resource.	No non-renewable resources will be used for the proposed Firgrove-Mitchell's Plain Transmission power line project.
(vi)	Development, use and exploitation of renewable resources and the ecosystems, of which they are part, do not exceed the level or 'critical limits' beyond which their integrity is jeopardised.	No renewable resources will be used for the proposed Firgrove-Mitchell's Plain Transmission power line project. Development, use and exploitation of the ecosystems have been limited by recommending pylon positions that would limit these activities.

Table 13-2~~Table 13-2~~ assesses the impacts of the proposed development with respect to the EIA Regulations (2006) as promulgated in terms of the NEMA.

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Table 13-2: Environmental Impacts Specific to Legislated Listed Activities

NO.	DESCRIPTION	EIA APPLICABILITY TO ACTIVITY
GNR No. 386 (Basic Assessment)		
1(m)	The construction of facilities or infrastructure, including associated structures or infrastructure for any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank of a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including canals; channels; bridges; dams; and weirs.	The wetland areas within the study area have been identified. Where the pylon positions are located within 32m of any wetland, mitigation measures are prescribed. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~).
4	The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland.	The wetland areas within the study area have been identified. Where the pylon positions are located within 32m of any wetland, mitigation measures are prescribed. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~).
7	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1 000 cubic metres at any one location or site.	Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~) for the management of above ground storage of hazardous material.
12	The transformation or removal of indigenous vegetation of 3 hectares or more, or of any size where the transformation or removal would occur within a critically endangered or an endangered ecosystem listed in terms of Section 52 of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	The recommended route alignment does not go through indigenous vegetation for the entire route (approximately 55ha). The footprint of each pylon position ranges from 100m^2 to 225m^2. Therefore, with approximately 61 pylons required as part of the recommended route alignment, the total area to be cleared for the entire route alignment (including any areas of indigenous vegetation) is maximum 13 725m^2 (i.e. less than 3ha). Therefore, this listed activity does not apply to the proposed development any more.
14	The construction of masts of any material or type and of any height, including those used for telecommunication broadcasting and radio transmission, but excluding - (d) masts of 15 metres and lower exclusively used: (iii) by radio amateurs; or ~~(iii)~~(iv) for lighting purposes (e) flag poles; and ~~(e)~~(f) lightning conductor poles.	The visual impacts created by the pylon towers and any masts at the Mitchell's Plain Substation have been assessed. The mitigation measures were prescribed to reduce the impact. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~).
15	The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity (e.g. national roads) or which are access roads of less than 30 metres long.	As the recommended route alignment follows existing roads, no additional access roads will be constructed. Therefore, existing access roads will be used for the construction and maintenance phase of the Transmission power lines. New tracks may be created by construction vehicles, but these would be of a temporary nature and would not need to be constructed according to Standards for Road Construction. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~) for the management of clearing of vegetation.

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NO.	DESCRIPTION	EIA APPLICABILITY TO ACTIVITY
16	The transformation of undeveloped, vacant or derelict land to – (c) establish infill development covering an area of 5 hectares or more, but less than 20 hectares; or (d) residential, mixed, retail, commercial, industrial or institutional use where such development does not constitute infill and where the total area to be transformed is bigger than 1 hectare	The servitude width for the 400kV Transmission power line ranges 40-55m. The recommended route alignment is approximately 30km. Therefore, the total developed area is approximately 165 ha. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~) for the mitigation measures prescribed for the proposed project.
25	The expansion of or changes to existing facilities for any process or activity, which requires an amendment of an existing permit or license or a new permit or license in terms of legislation governing the release of emissions, pollution, effluent.	No pollution, effluent or emissions that require a permit will be required as part of this project. Therefore, this listed activity does not apply any more.
GNR No. 387 (Scoping & EIA)		
1(e)	The construction of facilities or infrastructure, including associated structures or infrastructure, for any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in Government Notice No. R. 386 of 2006.	No pollution, effluent or emissions that require a permit will be required as part of this project. Therefore, this listed activity does not apply any more.
1(l)	The construction of facilities or infrastructure, including associated structures or infrastructure, for the transmission and distribution of above ground electricity with a capacity of 120 kilovolts or more.	The proposed project is the construction of a double-circuit 400kV Transmission power line. The impacts of the power line have been assessed and mitigation measures prescribed in this report. Also, refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~).
2	Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.	The size of the Mitchell's Plain Substation is less than 20 hectares. Refer to the Draft Site-Specific EMP (Appendix H~~Appendix H~~) for the mitigation measures prescribed for the proposed project.

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14 ENVIRONMENTAL IMPACT STATEMENT

The key issues identified during the EIA process were:

- Biophysical Impacts:
  - Impact of air quality on Transmission power lines
  - Geotechnical impacts
  - Impact on soil and agriculture
  - Impact on wetlands and ecology
  - Impact on avifauna
- Social Impacts:
  - Employment
  - Inflow of workers
  - Inflow of temporary workers
  - Impact of construction camp and equipment
  - Safety and security
  - Daily living and movement patterns
  - Visual impacts
  - Impact on the hospitality industry
  - Commercial development
  - Residential developments
  - Road developments
  - Agricultural Activities
  - Tourism-related Impacts
  - Local Economic Benefits
  - Resettlement
- Waste-related impacts
- Impact on traffic
- Impact on heritage resources
- Impact on visual integrity
- Economic Impacts:
  - Impact on economic value of agricultural lands
  - Economic impact of the cost of construction

The study area entails the following areas of importance:

- In areas where resettlement would occur or where it cannot be avoided, a detailed RAP would have to be developed and detailed discussions with all stakeholders involved (authorities, individuals and host communities). The following pylon positions on the recommended route alignment may require resettlement of residents and/or businesses:
  - MS-C-16B a or b
  - MS-C-17 a or b
  - MS-D-24Be
  - MS-D-25Bb

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- MS-D-25Bc

The recommended route alignment for the Firgrove-Mitchell's Plain project should be:

- MS-C
  - MS-C-1
  - MS-C-2B
  - MS-C-3B
  - MS-C-4B
  - MS-C-5
  - MS-C-6B
  - MS-C-7B
  - MS-C-8B
  - MS-C-9B
  - MS-C-10
  - MS-C-11
  - MS-C-12B
  - MS-C-13B
  - MS-C-14
  - MS-C-15
  - MS-C-16Ba
  - MS-C-17a
  - MS-C-18B
  - MS-C-19B
  - MS-C-20
  - MS-C-21
  - MS-C-22
  - MS-C-23
  - MS-C-24
  - MS-C-25B
  - MS-C-26
  - MS-C-27
  - MS-C-28
  - MS-C-29Bb
  - MS-C-30Bb
  - MS-C-31
  - MS-C-32
  - MS-C-33
  - MS-C-34
  - MS-C-35B
- MS-Db
  - MS-D-12Ba
  - MS-D-12Bb
  - MS-D-13a
  - MS-D-13b

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- MS-D-14Ba
- MS-D-14Bb
- MS-D-15a
- MS-D-15b
- MS-D-16Ba
- MS-D-16Bb
- MS-D-17B
- MS-D-18Ba
- MS-D-18Bb
- MS-D-19Ba
- MS-D-19Bb
- MS-D-20
- MS-D-21a
- MS-D-21b
- MS-D-22
- MS-D-23Bc
- MS-D-24Be
- MS-D-25Bc
- MS-D-26Bb
- MS-D-27b
- MS-D-27c
- MS-D-28a
- MS-D-28b
- MS-D-29
- MS-D-30B
- MS-D-31B
- MS-D-32B
- MS-D-Gantry 1
- MS-D-Gantry 2
- MS-D-Gantry 3

- Switching Station

The following pylon positions may require multi-circuiting in order to share the servitude with Eskom Distribution:

- MS-C-19B
- MS-C-20
- MS-C-21
- MS-C-22
- MS-C-23
- MS-C-24
- MS-C-25B
- MS-C-26
- MS-C-27
- MS-C-28

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15 CONCLUSION

The EAP believes that Eskom Holdings Limited has followed due environmental process during the undertaking of this EIA process and associated PPP. The identification of key issues during the EIA process has not shown any negative impacts that may be considered as fatal flaws.

It must be noted that this EIA process undertook an unprecedented approach to establish the pylon positions of the route alignment. Through Eskom's technical input and the inputs of the various specialists, proposed pylon have been optimally positioned with the result that all avoidable impacts were avoided, and practical mitigation measures are prescribed to reduce the impacts of that cannot be avoided.

Following the review period of the Draft EIA Report, the issues raised by I&APs and regulatory authorities are highlighted in yellow and presented in the Final EIA Report, which will be submitted to the competent approving authority, the DEA, for consideration and decision-making on the environmental authorisation.

It is, therefore, recommended that the DEA accept this EIA Report and issue environmental authorisation for the proposed construction of the Double-Circuit 400kV Transmission power line from the new Mitchell's Plain Substation Alternative 1 via MS-C and MS-Db to the Switching Station located at the intersection of Polkedraai Road and Zewenwacht Link Road. Furthermore, the DEA should approve the list of pylon positions recommended above.

In addition, the Draft Site-Specific EMP must be made legally binding on the developer, owners and their contractors. An independent Environmental Control Officer should be contracted to oversee and undertake monthly audits based on the EMP during the construction phase of the project.

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GLOSSARY OF TECHNICAL TERMS

Conductor:	A wire, cable, or other body that is capable of carrying electric current.
Feeder Bay:	The area where a power line is connected to the substation.
Kilovolt:	A unit of potential differences equal to 1000 volts.
No-go area:	An area in which the Transmission power line cannot be routed due to resulting significant environmental, technical and social impacts.
Pylon:	a large vertical steel tower-like structure supporting high-tension electrical cables.
Route:	The exact servitude in which the Transmission power line could be built.
Servitude Right:	A real right in favour of the servitude holder allowing the erection and maintenance of structures and cables to transmit electricity over portions of land and restricting any activities that could pose a hazard to the transmission of electricity, the environment and/or the safety of human and other living beings.
Study area:	The area that will be covered by the EIA process within which possible location alternatives will be investigated.
Substation:	A collection of equipment for the purpose of raising, lowering and regulating the voltage of electricity.

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