FINAL ENVIRONMENTAL IMPACT REPORT

For

THE PROPOSED NARINA (BLANCO) 400/132KV MTS SUBSTATION AND DROERIVIER PROTEUS LOOP-IN LOOP-OUT POWERLINE PROJECT

Prepared for:

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For submission to:

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S · E · F
STRATEGIC ENVIRONMENTAL FOCUS

FEBRUARY 2016

DEA REF NO: 14/12/16/3/3/2/424
NEAS REF NO: DEA/EIA/0001519/2012
SEF Project Code: 504769

PURPOSE OF DOCUMENT

A period of 30 calendar days **(3 March 2016 – 5 April 2016)** is being provided to the State Departments and registered Interested and Affected Parties (I&APs) for the review and commenting phase of this Final Environmental Impact Report (EIR). All I&APs as well as State Departments have been notified of this review period.

The commenting period on this Final EIR will run concurrently with the Department of Environmental Affairs (DEA) review of the Final EIR towards an Environmental Authorisation (EA). Thus, all comments on this Final EIR must be submitted directly to the DEA and all communication must highlight DEA's Reference Number (i.e.: 14/12/16/3/3/2/424). Comments can be submitted to the following contact person.

Department of Environmental Affairs - Contact Person: Ms. Samkelisiwe Dlamini
Tel: 012 310 9379 ; E-mail: SDlamini@environment.gov.za ; Postal Address: Private Bag X447, Pretoria, 0001

Please copy SEF in all communication to the DEA.

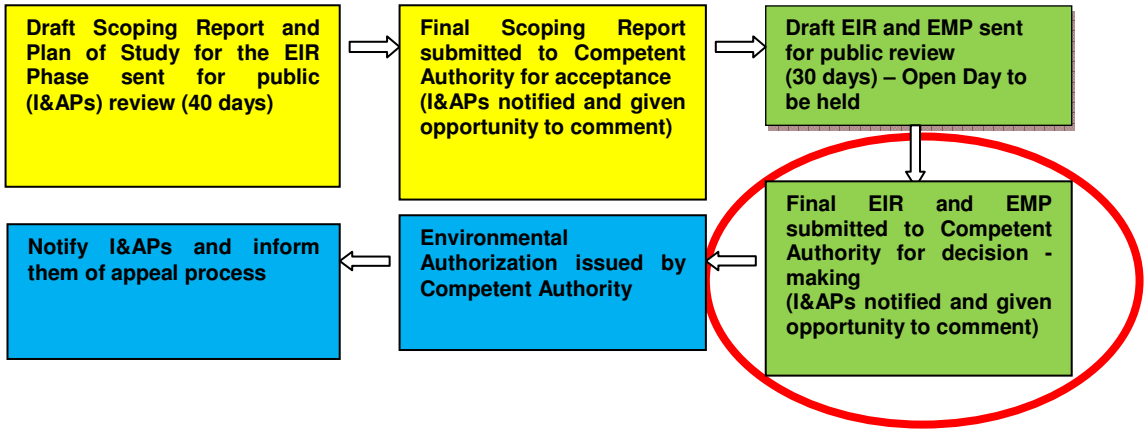
Strategic Environmental Focus - Contact Person: Ms. Natalie Ritsch
Tel: 021 469 9159 ; Fax: 012 424 5571 ; E-mail: natalie@sefsa.co.za ; Postal Address: P.O. Box 1330, Durbanville, 7551

The DEA will make a decision and grant or refuse authorisation (in terms of the National Environmental Management Act, Act No. 107 of 1998) - Regulations 35(1)(a) and 35(1)(b) respectively). All registered I&AP's will be notified of the decision (i.e. Environmental Authorisation). This notification will also detail the appeal procedure should I&APs disagree with the decision.

The Final EIR and EMPr will also be available on SEF's website: http://www.sefsa.co.za.

Should you wish to participate in the S&EIR process by contributing issues of concerns/comments, please register as an I&AP by completing the enclosed Registration and Comment Sheet or you can visit SEF's website at http://www.sefsa.co.za. Click on "Stakeholder Engagement" (seventh tab on the top of the home page). Click on the "register" button and complete the compulsory fields to register as an I&AP. On completion of these fields, you will be registered. Insert your username and password to log in. Click on Scoping and Environmental Impact Assessments, under categories on the right side of the stakeholder engagement page. Please click Final EIR for the Proposed Narina (Blanco) Substation and Power Line Project to view the report and associated appendices. Should you have any problems in obtaining the information from the Internet, please feel free to contact SEF for assistance.

The flow diagram below highlights the phases in the project where I&APs have the opportunity to participate within the process.



PROJECT SUMMARY	
Project Name	Narina (Blanco) 400/132kV MTS substation and the Droerivier Proteus Loop-in Loop-out powerline project.
Preferred Site / Routes	The five (5) site alternatives for the substation site which have been proposed are discussed in this report and presented in the Locality map attached as **Appendix 1.** The five (5) alternative routes proposed for the loop-in / loop-out power line routes are discussed in this report and presented in the Locality map attached as **Appendix 1.** Alternatives 1 to 4 are not supported as these sites affects productive agricultural practises and loss of established farm land as a result of the proposed substation and power lines. This will impact negatively on the landowners in terms of food production, loss of jobs, income and livelihoods. Alternative 5 is supported as the proposed development will have the least impact on production of agricultural crops, as the site consists mainly of unmanaged Eucalyptus and Black Wattle thickets (forestry). There was no evidence of farm infrastructure on the site. The Environmental Assessment Practitioner (EAP) recommends that the proposed power line be shifted as close as possible to the existing 132kV power line, as impacts exist already. The shifting of the proposed powerline to immediately south of the existing powerline would not place additional impacts on the Important Bird Area (IBA) to the north. Bird Flight Diverters on the earth wires must be installed as per specifications devised by the Endangered Wildlife Trust (EWT). Bird flappers and anti-collision devices must be installed on the power lines as there are various wetlands and watercourses in this area. The exact location of the pylons must be determined in consultation with the terrestrial and wetland ecologist by means of a walk-through of the site at the detailed design stage. i.e. post receipt of the Environmental Authorisation (EA). As far as possible, pylons must not be located in or within 32m of a wetland and watercourse. There is no natural vegetation remaining at the proposed substation site.
Surveyor-General 21 Digit Codes	**SG21 Codes of properties potentially affected by the proposed substation alternative sites:** C02700000000021700003 C02700000000021700037 C02700000000002170 045 C02700000000002170047 C02700000000002170048 C02700000000002170054 C02700000000021700062 C02700000000021800028 C02700000000021800043 C02700000000003180001 C02700000000003180002 C02700000000003180006 **SG21 Codes of properties potentially affected by the placement of loop-in / loop-out power line alternative routes:** C02700000000002170003 C02700000000002170037 C02700000000002170045 C02700000000002170046 C02700000000002170047 C02700000000002170048 C02700000000002170053 C02700000000002170054 C02700000000002170059 C02700000000002170061 C02700000000002170062 C02700000000002170063

	C02700000000002180028 C02700000000002180043 C02700000000003180001 C02700000000003180002 C02700000000003180005 C02700000000003180006 C02700000000003420000
Generation Capacity	Proposed Narina (Blanco) 400/132kV Main Transmission Substation and a Proteus - Droerivier 400kV line.
Development Footprint	The proposed surface area for the substation site is approximately 600 X 600 m in extent. The length of the loop-in / loop-out power line route is estimated in the region of 1.8 – 4 km (dependent on the alternative recommended). The 400kV powerlines each have servitudes of 55m, i.e. 110m for 2 lines. The 132kV powerlines have servitudes of 32m.
Development / Structure Height	The type of tower structure proposed for the 400kV Loop-in Loop-out power line will be from the 515 series ~~(Heavy)~~ Self - Supporting ~~Suspension~~ Tower (developed by Eskom in 1983) which will support quad (X4) wolf conductors in conjunction with 120KN glass insulators. The spacing between the sub-conductors is estimated at 380mm and the midspan ground clearance of this tower (in order to achieve optimal electrical performance) is approximately 9.1m.
Site Photographs	Refer to **Appendix 2**
Additional information requested in the Plan of Study for EIR and the acceptance of the Final Scoping Report	(a) Refer to the Table of listed activities in Section A of the FEIR. (b) Impacts on birds and bats (refer to the Ecological Assessment in **Appendix 6.3** and Section G.4.1.2 and G.4.1.3). (c) Refer to the Construction and Operational Phase Environmental Management Programme (EMPr) in **Appendix 7**. Refer to the Regional Locality Map and Locality Maps of the proposed alternative sites in Appendix 1. In a letter dated 26 March 2014, Heritage Western Cape (HWC) provided a response with regard to the Notification of Intent to Develop (NID) requesting that a Heritage Impact Assessment (HIA be undertaken in terms of Section 28 (3) of the NHRA (Act No. 25 of 1999) assessing the archaeological, visual and landscape heritage. An HIA has been undertaken, as in included in **Appendix 6.4** (including Archaeological and Visual Impact Assessments). The comments received from HWC will be provided to the DEA. An open and transparent Public Participation Process took place during the Scoping and Environmental Impact Reporting (S&EIR) Process. Full details of the process are provided in Section C-4 and Appendix 5.
Confirmation of Capacity to Supply Bulk Services:	
Water (Construction & Operational Phases)	Supplier: George Local Municipality Construction Phase = Estimated at 40 000 l litres/per month Operational Phase = 3200l litres/per month
Sewage (Construction & Operational Phases)	Supplier: George Local Municipality Construction Phase = 2 m^3 / per month Operational Phase = 0.2 m^3 /per month
Electricity (Construction & Operational Phases)	Supplier: Eskom (from existing substation and power line) Construction Phase = 100 kw / per month Operational Phase = 20 kw/ per month
Solid Waste (Construction & Operational Phases)	Receiver: Municipal waste disposal site within the Blanco (George) area Construction Phase = 7 m^3/ per month Operational Phase = 0.5 m^3/ per month

ENVIRONMENTAL ASSESSMENT PRACTITIONER

SEF is one of Africa's largest multi-disciplinary consultancies, offering sustainable development solutions to private and public sector clients. Our dynamic team of dedicated professionals delivers customised products and quality services, supporting the sustainable development and management of natural, built and social environments across all sectors.

Vision:

SEF is a national sustainability consultancy that provides integrated social, biophysical & economic solutions by forging strategic stakeholder relationships, underpinned by SEF's core values.

Mission: SEF offers holistic sustainable solutions in response to global change.

SEF has significant in-house teams of specialist scientists and professionals that provide innovative, industry-specific solutions and resource management which talks to Environmental Impact Assessments and related services. Our Built Environment specialists provide integrated solutions in the context of architectural and landscape design whilst our GIS team provides spatial analysis models. SEF manages all aspects of social services projects and is dedicated to the transformation of the mining and production industries. Other areas of expertise include Integrated Waste Management as well as energy-related impact assessments and planning studies. The water quality and bio-monitoring team assists in implementing water quality and quantity monitoring programmes and audits.

SEF staff are members of various professional associations, including the International Association for Impact Assessment (IAIA), Professional Landscape Architect with the South African Council for the Landscape Architectural Profession (SACLAP), South African Council for the Architectural Profession (SACAP), GISSA Gauteng & Kwa-Zulu Natal, The Association of Southern African Professional Archaeologist (ASAPA), South African Council for Natural Scientific Professions (SACNASP), Zoological Society of Southern Africa and South African Institute for Architects (SAIA).

SEF commits itself to comply with the requirements and the implementation of a Quality Management System. The Quality Management System will be reviewed and implemented to continually improve efficiency and effectiveness of the organisation.

SEF uses a "green" approach to anything we embark on. We believe in using technology to our and the environment's best advantage. We encourage the use of green alternatives such as telephone and video conferencing instead of travelling for workshops and meetings and Compact Discs (CDs) instead of printed material, where possible.

The following project team members are involved in this S&EIR application process (Refer to **Appendix 6** for relevant CV's).

Table 1: SEF Project Team Members

Name	Organization	Project Role
Natalie Ritsch	SEF	Project Manager
Ryan Jonas	SEF	Environmental Manager
Leighdre Koopman	SEF	Environmental Assistant
Robyn Phillips	SEF	Fauna Specialist
Karin van der Walt	SEF	Ecological Specialist
Willem Lubbe	SEF	Wetland Specialist

Natalie Ritsch	**Project Manager** **Natalie Ritsch** has been an EAP for 11 years, and has been involved in the environmental science field for 15 years. She has been exposed to the government, parastatal and private sectors in her career thus far, which involved the supervision of junior staff, reviewing of documentation and compilation of various reports from small-scale BA's to large-scale EIA's. Natalie is currently a Project Manager at SEF and is the Regional Manager for the Cape Town Regional Office, where she provides support and oversight to staff, project leadership and quality assurance on all projects. Natalie is currently registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (Reg. No. 400130/05), and is a member of the International Association for Impact Assessment – south African affiliate (IAIAsa).
Ryan Jonas	**Environmental Manager** **Ryan Jonas** has obtained a B.Sc (Natural Sciences) and Master's degree in Environmental Science from a local university and acquired 8 years full time working experience in the environmental science and management field with regard to projects within the major infrastructure development field and mining sector. Ryan has obtained a good working knowledge of environmental legislation in terms of the NEMA, 1998; MPRDA, 2002; NEM:WA, 2008 and NEWA, 1998 and is an Environmental Manager at SEF**.**
Leighdre Koopman	**Environmental Assistant** **Leighdré Koopman** has obtained her National Diploma and BTech in Environmental Management from Cape Peninsula University of Technology, together with a certificate in Health and Safety Management from the same institution. She has acquired experience in Health and Safety working as an onsite safety officer and first aider with a level 1 first aid certificate for Frontline Health Safety and Environmental Consultants for 7 months in 2013, she left to continue her studies in February of 2014. Leighdré is currently working as an Environmental Assistant at Strategic Environmental Focus. Where she has gained experience in Public Participation, Basic Assessments, Environmental Control Officer (ECO) duties, Tenders and Proposals and the day to day office administration and management.

Robyn Phillips	**Faunal Specialist** **Robyn Phillips** holds an MSc degree in Zoology from the University of KwaZulu-Natal, Pietermaritzburg. The majority of her professional career has been spent working in ecological research at the University, having specialised in avifaunal ecology. She has been involved in a number of projects requiring biodiversity surveys and ecological assessments. She has 13 years working experience and joined SEF in 2011 as Faunal Specialist. Robyn is currently registered as a Professional Natural Scientist with the South African Council for Natural Scientific Professions (Reg. No. 400401/12). As Faunal Specialist, her duties include biodiversity and ecological assessments for reports such as Environmental Impact Assessments (EIA), Basic Assessments (BA), Strategic Environmental Assessments (SEA), Environmental Management Programmes (EMPr), and Biodiversity Action Plans (BAP). As a Senior Specialist at SEF, her duties are to manage and coordinate specialist studies for projects managed out of the KwaZulu-Natal Regional Office.
Karin van der Walt	**Ecological Specialist** **Karin van der Walt** has more than 10 years' experience in the field of Nature Conservation. After working as a wilderness trails ranger in the Kruger National Park for five years, she was employed to manage a project on threatened and medicinal plants in South Africa. Through this she was exposed to extensive fieldwork, plant population assessments, threat assessments and biodiversity management plans. She has presented nationally and internationally on ecological and conservation issues. Currently, as a specialist ecologist for SEF, she is doing faunal and floral assessments, ecological management plans, impact assessments and mitigations.
Willem Lubbe	**Wetland Specialist** **Willem Lubbe** has been an ecologist for more than 5 years with experience within the environmental sciences for more than 8 years. Currently, as a senior natural scientist for SEF, the majority of his work consists of wetland delineations and functional assessments ranging from micro catchment to regional level. As a terrestrial ecologist he has extensive experience carrying out ecological studies for Environmental Impact Assessments and Scoping studies which include flora and faunal assessments, sensitivity mapping; Red Data floral and faunal searches, strategic assessments as well as advice on ecosystem processes and landscape ecology.

Table 2: Contact Details of Environmental Assessment Practitioner

Name	Contact Details	Approval for Release
Natalie Ritsch	Strategic Environmental Focus (Pty) Ltd Postal Address: PO Box 1330, Durbanville, 7551 Tel: +27 21 469 9159 Fax: +27 21 424 5571 Email: Natalie@sefsa.co.za	

The EAP and her team are supported by SEF personnel (**Table 1** above), as well as a range of specialists. Refer to **Table 3** below. Eskom transmission also provides important input in order to ensure accuracy of project information.

Table 3: Eskom project team and external specialists

NAME	ROLE ON TEAM	COMPANY
John Phipson	Agricultural Economic Assessment	Mzanzi Agriculture
Bennie Schloms and Freddie Ellis	Agricultural Potential Assessment	Independent
Dave Halkett	Archaeology	ACO & Associates
Quahnita Samie	Heritage Impact Assessment	Vidamemoria
Tony Barbour	Social Impact Assessment	Tony Barbour
Candice Maasdorp	Town Planning Assessment	Sustainable Planning Solutions
Pieter Arangie	Traffic Impact Statement	ITS Engineers
Mandy van der Westhuizen	Visual Impact Assessment	NuLeaf SA
ESKOM TRANSMISSION		
Rudzani Ranwedzi	Eskom Senior Environmental Advisor	Eskom Transmission
Michiel Goosen	Eskom Project Manager	Eskom Transmission
Ndangi Muthadi	Eskom ~~Planning~~ Engineer	Eskom Transmission
Sipho Shabalala	Eskom Senior Surveyor	Eskom Transmission
Cass Naidoo	Eskom Substation Engineer	Eskom Transmission

EXECUTIVE SUMMARY

1 INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Eskom Holdings SOC Limited to undertake an environmental application process for the proposed Narina (Blanco) 400/132kV Main Transmission Substation (MTS) and the Droerivier Proteus Loop in – Loop out line project (*here after referred to as the Narina (Blanco) substation and line project*).

A Scoping and Environmental Impact Reporting (S&EIR) process is being conducted for this project based on triggered listed activities within the Environmental Impact Assessment (EIA) Regulations of 2010 (Government Notice (GN) No's 543; 544; 545 and 546), as well as the EIA Regulations of 2014 (Government Notice No's 982, 983, 984 and 985, promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA).

The Scoping Phase for the proposed project has been completed and the Final Scoping Report (FSR) including the Plan of Study for the EIR, was submitted to the Department of Environmental Affairs (DEA) on 21 August 2013. The FSR was accepted by the DEA on 9 October 2013 (**Appendix 3**).

The purpose of the Environmental Impact Reporting (EIR) phase is to describe the proposed activity and reasonable alternatives, evaluate the impact of each of the proposed alternatives (informed by specialist input) and propose suitable management measures (also informed by specialist input) to mitigate negative impacts on the receiving environment potentially affected by the proposed project. This report also describes the public participation process followed during the EIR phase, detailing the degree of stakeholder engagement to date.

The Draft EIR was available for public review and comment from **19 August 2015** to **18 September 2015**. The comments during public review of the Draft EIR are incorporated into the Final Environmental Impact Report (FEIR).
The purpose of this Final Environmental Impact Report is to provide all Interested and Affected Parties (I&APs) and relevant State Departments with an opportunity to comment on the report. The Final EIR will be submitted concurrently to the DEA for review and decision-making. State Departments and registered I&APs are requested to submit their comments directly to the DEA with copies of the submissions made to SEF.

2 BRIEF PROJECT DESCRIPTION

The proposed Narina (Blanco) substation and line project will be situated within the Blanco area under the jurisdiction of the George Local Municipality, Western Cape Province (Refer to **Appendix 1** for Locality Map).

Eskom proposes the establishment of a new 400/132kV MTS with an expected development footprint of approximately 600 X 600m and loop in – loop out power lines with a length in the region of 1.8 – 4km (*dependent on the alternative chosen*).

3. KEY IMPACTS

The following key impacts were identified and assessed in this Final EIR:

Biophysical Impacts:

- Loss/displacement of cultivated land (with high agricultural potential);
- Impact of construction traffic movement on the surrounding farm lands;
- Destruction of indigenous plant species through construction of the power pylons;
- Destruction and fragmentation of faunal habitat;
- Disturbance to avifaunal habitat within an IBA;
- Sedimentation of wetlands;

- Destruction of wetland habitat and associated loss of wetland functionality;
- Changes to the surface and sub-surface flow regimes;
- Potential impacts on ground and surface water quality due to hydrocarbon spillages from vehicles during the construction phase of the development; and
- Contamination of soil.

Socio-Economic Impacts:

- Creation of employment opportunities;
- Presence of construction workers in the area;
- Impacts on farming practices during construction;
- Increased dust and noise generation (and impact on the surrounding farmlands) during the construction phase of the project;
- Change in the visual character of the local area in which the project is located;
- Potential impacts on heritage resources affected by the construction of the substation or erection of the proposed power line;
- Potential loss of viable and high potential agricultural/ grazing land affected by the construction of the substation or erection of the proposed power line.

Cumulative Impacts:

- Increased loss of viable and high potential agricultural/ grazing land in the region;
- Increased visual impacts associated with additional power lines in the region;
- Increased loss of indigenous vegetation in the region; and
- Increase in demand for additional electrical infrastructure to serve the regional area.

4. PROJECT ALTERNATIVES

To give effect to the principles of NEMA and Integrated Environmental Management (IEM), an EIA should assess a number of reasonable and feasible alternatives that may achieve the same end result as that of the preferred project alternative. Eskom has investigated seven (7) possible alternative sites for the proposed 400/132kV Blanco substation.

The original scope of the project entailed four (4) alternative substation locations, with the associated powerlines (**Appendix 4.1**). These alternatives were published for comment in January 2013, in the Draft Scoping Report (DSR). Based on feedback from landowners at the Open House Meeting held in February 2013, further alternatives were suggested, which were considered by Eskom (**Appendix 4.2**). This resulted in the addition of Alternatives 5 and 6. These were presented in the Final Scoping report made available for public comment. The number of alternatives therefore increased to seven (7) alternatives. Due to the increase in substation size (due to civil requirements), from 350 X 350m to the current 600 X 600m, the number of alternatives has been reduced to five (5) alternatives. The alternatives considered during the process, are included in **Appendix 4.**

In so far as the criteria for the development of alternatives are concerned, the main criteria that were considered were related to environmental, social and economic considerations, as well as eskom's technical considerations. The methodology applied to the consideration of alternatives used the following approach:

- Alternative recommended or suggested by Eskom or I&AP;
- Eskom to consider the proposal from a technical point of view before any consideration;
- If go ahead provided by Eskom, specialists to consider in terms of the specific studies and provide detailed assessments; and
- Alternatives then to be presented for consideration.

The above methodology was implemented during the environmental process, specifically the end of the Scoping process, as well as the EIA phase. Due consideration was given to all the alternatives recommended, and the final 5 alternatives have been considered by all the appointed specialists, and their findings have been outlined in the FEIR.

These alternatives include the following:

SUBSTATION (SITE/LOCATION ALTERNATIVES)

Alternative substation site 1

This substation site is proposed on the north eastern side of the existing 132kV Blanco substation, across the existing gravel road – Geelhoutboom road. The site is located on agricultural land and will impact on a centre pivot.

Alternative substation site 2

This alternative is located immediately North West of the existing 132kV Blanco substation, and South West of Alternative 1. This site also impacts on irrigated agricultural land, a number of residential dwellings, and there is an existing 132kV powerline coming into the existing substation.

Alternative substation site 3

This alternative is located north of alternative 1 and Geelhoutboom Road, and approximately 1.5km north east of the existing Blanco substation. It is quite close to the existing Droerivier – Proteus 400kV powerline, with the shortest proposed powerline route. The existing 132kV powerline passes through the site.

Alternative substation site 4

This alternative is located approximately 1.2km south west of the existing Blanco substation. The site lies beyond an existing gravel road, on an established horse stud farm, and will affect a perennial river and associated vegetation.

Alternative substation site 5

This alternative is located in the foothills of the Outeniqua Mountains, approximately 4.5km north east of the existing Blanco substation. A small forestry station, including a number of dwellings is located north of the proposed site.

POWERLINE ROUTE (LAYOUT/DESIGN ALTERNATIVES)

Power line route alternative 1:

This powerline route is approximately 1.5km long, and runs in a north-westerly direction, before turning and heading north to link up with the existing Droerivier – Proteus 400kV powerline. The line crosses two non-perennial rivers / drainage lines.

Power line route alternative 2:

This powerline route is approximately 1.8km long, and heads in a north easterly direction before it joins the powerline route for Alternative 1. The route runs across agricultural land and crosses the Geelhoutboom Road.

Power line route alternative 3:

This is the shortest powerline route, approximately 1.2km, and is the closest to the existing Droerivier – Proteus 400kV powerline. The proposed route crosses agricultural land, and also occurs in close proximity of a few dwellings.it also cuts across the access road linking Farm Uitsig to the Geelhoutboom Road.

Power line route alternative 4

This alternative is approximately 3.5km in length, and runs in a northerly direction before turning north east, and then north before linking with the existing Droerivier – Proteus 400kV powerline. The route crosses agricultural land, and crosses the Geelhoutboom Road.

Power line route alternative 5

This alternative is approximately 4km and runs in an easterly direction from the proposed substation location to the existing Droerivier – Proteus 400kV powerline.

PREFERRED ALTERNATIVE SITE

Alternatives 1 to 4 are not supported as these sites affects productive agricultural practises and loss of established farm land as a result of the proposed substation and power lines. This will impact negatively on the landowners in terms of food production, loss of jobs, income and livelihoods.

Based on the Narina integration report compiled by Eskom in September 2015, alternative 1 is preferred due to the ease of integration, followed by Alternative 3. Alternative 5 is however supported as the proposed development will have the least impact on production of agricultural crops, as the site consists mainly of unmanaged Eucalyptus and Black Wattle thickets (forestry). There was no evidence of farm infrastructure on the site. The Environmental Assessment Practitioner (EAP) recommends that the proposed power line be shifted as close as possible to the existing 132kV power line, as impacts exist already. The shifting of the proposed powerline to immediately south of the existing powerline would not place additional impacts on the Important Bird Area (IBA) to the north.

Bird Flight Diverters on the earth wires must be installed as per specifications devised by the Endangered Wildlife Trust (EWT). Bird flappers and anti-collision devices must be installed on the power lines as there are various wetlands and watercourses in this area. The exact location of the pylons must be determined in consultation with the terrestrial and wetland ecologist by means of a walk-through of the site at the detailed design stage. i.e. post receipt of the Environmental Authorisation (EA). As far as possible, pylons must not be located in or within 32m of a wetland and watercourse. There is no natural vegetation remaining at the proposed substation site. The EAP recommends that the DEA approve Alternative 5 as the preferred site alternative.

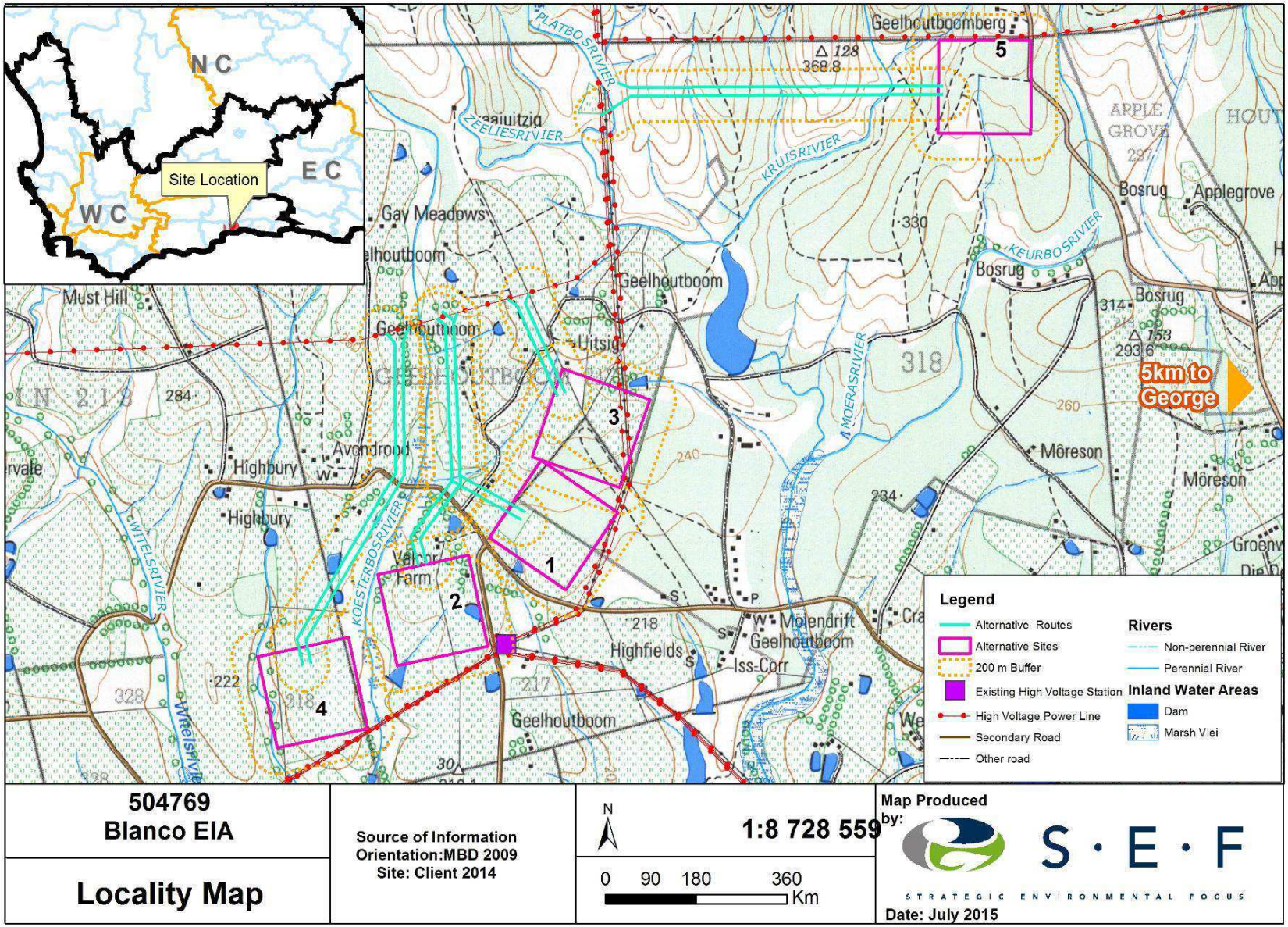


Figure 1: Proposed Blanco project with substation & powerline alternatives indicated

5. CONCLUSIONS AND RECOMMENDATIONS

In accordance with GN No. 543 and GN. No. 982, the Environmental Impact Phase is aimed at identifying and assessing potential impacts caused by the proposed development. The ability to mitigate any of the identified impacts are also addressed and summarised into a working / dynamic Environmental Management Programme (EMPr) for consideration by I&APs and ultimately by the DEA.

Comments and/or concerns identified by Interested and Affected Parties (I&APs) during the review period of the Draft Environmental Impact Report was incorporated into the Final Environmental Impact Report. The FEIR has been simultaneously to the public for review and comment and to the DEA for review and decision-making.

Table 4: Impact significance ratings before and after mitigation

Impact	Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Biophysical Environment		
Loss/displacement of land with agricultural potential	Medium-High	N/A
Destruction of indigenous plant species	Medium	Low
Destruction and fragmentation of habitat	Medium	Low
Disturbance to avifaunal habitat	Medium	Low
Sedimentation of wetlands	Medium	Low-Medium
Destruction of wetland habitat	Medium	Low
Changes to the surface and sub-surface flow regimes	Medium	Low
Surface and ground water contamination	Low to Medium	Low
Soil contamination	Low to Medium	Low
Socio Economic Environment		
Creation of employment opportunities	Medium	Medium
Presence of construction workers in the area	Medium-High	Medium-high
Impacts on farming practices (Alt 1-4)	High	Low
Impact of construction traffic on surrounding farm lands	Medium	Medium - Low
Increase in ambient dust levels	Medium	Medium - Low
Increase in ambient noise levels	Low to Medium	Low
Visual impact disturbance	Medium	Medium - Low
Impacts on heritage resources	Low to Medium	N/A
Operational Phase		
Destruction of wetland habitat and associated loss of wetland functionality	Low Medium	Low
Electrocution of birds and large bat species	Medium	Low
Collision by birds and bats with structures	Medium	Low-Medium
Loss and fragmentation of habitat	Medium	Low
Cumulative Impacts		
Increased loss of land with agri-potential in the local area	High	Low - Medium
Increased visual impacts associated with additional electrical infrastructure in the local area.	Medium-High	N/A
Increased loss of indigenous vegetation	Medium-High	Medium-Low
Increased demand for additional electrical infrastructure to serve the local area	Medium-High Positive	

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LIST OF ABBREVIATIONS AND ACRONYMS

ASAPA	Association of South African Professional Archaeologists
BA	Basic Assessment
BAP	Biodiversity Action Plan
BBBEE	Broad-Based Black Economic Empowerment
CLN	Customer Load Network
CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
DEA	Department of Environmental Affairs
DWS	Department of Water and Sanitation
DTM	Digital Terrain Model
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Reporting
EMPr	Environmental Management Programme
EWT	Endangered Wildlife Trust
FSR	Final Scoping Report
FEIR	Final Environmental Impact Report
GA	General Authorisation in terms of Section 39 of the NWA
GN	Government Notice
ha	Hectares
HV	High Voltgage
HIA	Heritage Impact Assessment

HWC	Heritage Western Cape
I&APs	Interested and Affected Parties
IBA	Important Bird Area
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IAIA	International Association of Impact Assessment
IRP	Integrated Resource Plan
MTS	Main Transmission Substation
MW	Mega Watt
MF	Monitoring Forum
ME	Mitigation Efficiency
mm	Millimetres
NDP	Network Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
NID	Notification of Intent to Develop
NSBA	National Spatial Biodiversity Assessment
PoS for EIR	Plan of Study for EIR
PPA	Power Purchase Agreement
PSDF	Provincial Spatial Development Framework
PV	Photo Voltaic

QDGC	Quarter Degree Grid Cell
SARCA	South African Reptile Conservation Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SACLAP	South African Council of Landscape Architect Professions
SACNASP	South African Council for Natural and Scientific Professions
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SEF	Strategic Environmental Focus (Pty) Ltd
SIA	Social Impact Assessment
SFM	Significance Following Mitigation
S&EIR	Scoping and Environmental Impact Reporting
SDF	Spatial Development Framework
SIP	Strategic Infrastructure Project
TDP	Transmission Development Plan
VIA	Visual Impact Assessment
WOM	Without Mitigation Measures
WM	With Mitigation Measures
WML	Waste Management License
WF	Weighting Factor
WULA	Water Use License Application

GLOSSARY OF TERMS

Applicant	Any person who applies for an authorisation to undertake an activity or to cause such activity to be undertaken as contemplated in sections 24(5), 24M and 44 of the National Environmental Management Act, 19998 (Act No. 107 of 1998).
Ecology	The study of the interrelationships between organisms and their environments.
Environment	The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment	Systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR.
Environmental Management Programme	A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.
Interested and Affected Party	Any person or groups of persons who may express interest in a project or be affected by the project, positively or negatively.
Key Stakeholder	Any person who acts as a spokesperson for his/her constituency and/or community/organization, has specialized knowledge about the project and/or area, is directly or indirectly affected by the project or who considers himself/herself a key stakeholder.
Stakeholder	Any person or group of persons whose live(s) may be affected by a project.
Study Area	Refers to the entire study area encompassing all the alternatives as indicated on the study area or locality map.
Succession	The natural restoration process of vegetation after disturbance.
State Department	Any department or administration in the national or provincial sphere of government exercising functions that involve the management of the environment.

SECTION A: INTRODUCTION

Strategic Environmental Focus (Pty) Ltd (SEF) has been appointed by Eskom Holdings SOC Limited (Eskom) to undertake an environmental application process (in the form of a Scoping and Environmental Impact Reporting process (S&EIR)) for the proposed Narina (Blanco) 400/132 kilovolt (kV) Main Transmission Substation (MTS) and the Droerivier Proteus Loop in – Loop out line project.

A-1 DESCRIPTION OF PROPOSED ACTIVITY

A-1.1 Locality

The proposed Narina (Blanco) substation and line project will be located within the Blanco area under the jurisdiction of the George Local Municipality in the Western Cape Province (Refer to **Appendix 1** for Locality Map).

A-1.2 Surrounding Land Use

The predominant land use within the project area can be described as Agriculture/ Farming / pasture land.

A-1.3 Details of the Project

Eskom Transmission Grid Planning initiated a study to investigate possible solutions to address transformation constraints at Proteus MTS as well as the sub-transmission constraints experienced on the network supplying the Blanco area. In response to this, Eskom proposes the establishment of a new 400/132kV MTS with an expected development footprint of approximately 600m X 600m and loop in – loop out power lines with a length in the region of 1.8km – 4km (dependent on the alternative chosen).

The scope of work for this proposed project will therefore include the following:

- Establishment of a 2x500 MVA, 400/132kV MTS near Blanco Substation.
- 2 X Loop-in loop-out line of the Proteus - Droerivier 400kV lines to the Blanco proposed MTS.
- 2 X Loop-in loop-out lines linking the proposed new MTS to the existing Blanco substation.
- The new MTS 400/132kV will supply the existing Blanco Substation 132kV busbars.

A-2 LEGAL REQUIREMENTS APPLICABLE TO THIS APPLICATION

A-2.1 NEMA and the Environmental Impact Assessment Regulations

The EIA Regulations, promulgated under NEMA, focus primarily on creating a framework for co-operative environmental governance. NEMA provides for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by State Departments and to provide for matters connected therewith.

In terms of the EIA Regulations of 2010 and activities listed in GN No. 544, 546 and GN No. 545, the listed activities as outlined in **Table 5** are deemed by the EAP to be applicable to the proposed Narina (Blanco) project based on the information provided by the project proponent and specialists.

South Africa's new environmental impact assessment (EIA) regulations came into effect on Monday, 8 December 2014. In terms of the GN R 982 of 2014, Regulation 52 (1) 2014 the following regulation is relevant for the process going forward:

"*Any actions undertaken in terms of the previous NEMA regulations and which can be undertaken in terms of provisions of these Regulations must be regarded as having been undertaken in terms of the provision of these Regulations".*

In order to comply with the abovementioned condition of GN R 982 of 2014, a comparison of relevant activities listed under the 2010 EIA Regulations and the 2014 Regulations is included in **Table 5.** Site specific activities are also listed.

Table 5: Listed activities

Relevant Listed Activities under the 2010 EIA Regulations	Corresponding Listed Activity under the 2014 EIA Regulations	Project implications	Environmental impacts assessed
GN R 544, 18 June 2010: Activity 10 The construction of facilities or infrastructure for the transmission and distribution of electricity - (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or (ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	**GN R 983, 4 December 2014: Activity 11** The development of facilities or infrastructure for the transmission and distribution of electricity :- i. outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; or ii. inside urban areas or industrial complexes with a capacity of 275 kilovolts or more.	The project will include the construction of 2 X 132kV integration power lines, linking the existing Blanco substation to the newly proposed Narina substation.	The impacts of the proposed powerlines have been assessed by the various specialists. **Refer to Section G3**
	GN R 983, 4 December 2014: Activity 12 The development of: (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (vii) marinas exceeding 100 square metres in size; (viii) jetties exceeding 100 square metres in size; (ix) slipways exceeding 100 square metres in size; **(x) buildings exceeding 100 square metres in size;** (xi) boardwalks exceeding 100 square metres in size; or (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs- (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; - excluding- (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; or (ee) where such development occurs within existing roads or road reserves.	Depending on which alternative is approved, the substation building will be required (details to be provided during detail design phase)	The impacts of the proposed project have been assessed by the various specialists. **Refer to Section G3**
GN R 544, 18 June 2010: Activity 13 The construction of facilities or infrastructure for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic metres;	**GN R 983, 4 December 2014: Activity 14** The development of facilities or infrastructure, for the storage, or for the storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more, but not exceeding 500 cubic metres.	During construction fuel tanks may be required. The volume will be confirmed and accommodated accordingly in line with the approved EMPr.	The impacts of the proposed project have been assessed by the various specialists. Mitigation has also been included in the draft EMPr. **Refer to Section G3 and Appendix 7**
GN R 544, 18 June 2010: Activity 18 The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: (i) a watercourse;… but excluding where such infilling, depositing , dredging, excavation, removal or moving; (a) is for maintenance purposes undertaken in accordance with a management plan agreed to by the relevant environmental authority; or (b) occurs behind the development setback line.	**GN R 983, 4 December 2014: Activity 19** The infilling or depositing of any material of, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- (i) a watercourse; (ii) the seashore; or (iii) the littoral active zone, an estuary or a distance of 100 metres inland of the high-water mark of the sea or an estuary, whichever distance is the greater – but, excluding where such infilling, depositing , dredging, excavation, removal or moving- (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; or (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies	The proposed project entails the construction of access roads for use during the construction phase and operational phase (For maintenance purposes) which cross over drainage lines and non-perennial watercourses occurring in the area. The installation of pylons associated with the loop-in and loop-out lines may also impact on any cross drainage lines and non-perennial watercourse or wetlands encountered in the study area. However, as far as possible proposed towers and substations are to be located out of the wetlands and watercourses. The exact location of these	A detailed wetland assessment was undertaken and is enclosed in **Appendix 6.9. The mitigation measures have been included in the draft EMPr in Appendix 7.**

		structures will be determined by means of a walk-through of the sites at the Detailed Design stage i.e. post receipt of the EA, by both the terrestrial and wetland ecologists.	
GN R 544, 18 June 2010: Activity 22 **The construction of a road, outside urban areas,** i. with a reserve wider than 13.5 meters; or ii. **where no reserve exists where the road is wider than 8 meters,** or iii. for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	**GN R 983, 4 December 2014: Activity 24** **The development of-** (i) a road for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or **(ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres.**	Access roads for construction and maintenance of the proposed infrastructure may be constructed. As far as possible existing routes will be used. No detail regarding the access routes is currently available.	The construction of roads and infrastructure has been assessed and included in the draft EMPR. A site walk-down will be undertaken with specialists where after the EMPr will be updated to address these impacts.
GN R 544, 18 June 2010: Activity 23 The transformation of undeveloped, vacant or derelict land to- (i) residential, retail, commercial, recreational, industrial or institutional use, inside an urban area, and where the total area to be transformed is 5 hectares or more, but less than 20 hectares, or (ii) residential, retail, commercial, recreational, industrial or institutional use, outside an urban area and where the total area to be transformed is bigger than 1 hectare but less than 20 hectares; - except where such transformation takes place for linear activities.	**GN R 983, 4 December 2014: Activity 28** Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.	The substation and powerline development is larger than 1ha.	The impacts of the proposed project have been assessed by the various specialists. Mitigation has also been included in the draft EMPr. **Refer to Section G3 and Appendix 7**
GN R. 544 of 2010: Activity 26 Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	**GN R983, 4 December 2014: Activity 27** The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for – (i) the undertaking of a linear activity; (ii) maintenance purposes undertaken in accordance with a maintenance management plan.	Clearance of vegetation for the proposed power lines and substations areas will be required to a certain degree. The exact size of the area of indigenous vegetation to be cleared will be confirmed during the site walk-down with the specialists. This will be undertaken before any construction takes place.	The impacts of the proposed project have been assessed by the various specialists. Mitigation has also been included in the draft EMPr. **Refer to Section G3 and Appendix 7**
GN R. 544 of 2010: Activity 47 The widening of a road by more than 8 metres, or the lengthening of a road by more than 1 kilometre – i. where the existing reserve is wider than 13,5 meters; or ii. where no reserve exists, where the existing road is wider than excluding widening or lengthening occurring inside a urban area	**GN R 983, 4 December 2014: Activity 56** The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre- (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	Depending on the alternative approved, some of the existing roads may need to be widened.	The construction of roads and infrastructure has been assessed and included in the draft EMPR. A site walk-down will be undertaken with specialists where after the EMPr will be updated to address these impacts.
GN R 545, 18 June 2010: Activity 8 The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.	**GN R 984, 4 December 2014: Activity 9** The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.	The project entails construction of 400kV power lines outside an urban area, as agriculture is the predominant land use.	The impacts of the proposed powerlines have been assessed by the various specialists. **Refer to Section G3**
GNR. 546 of 18 June 2010,Activity 4 The construction of a road wider than 4 metres with a reserve less than 13,5 metres. (d) In Western Cape ii. All areas outside urban areas.	**GNR. 985 of 4 December 2014,Activity 4** The development of a road wider than 4 metres with a reserve less than 13,5 metres In Western Cape: i. Areas outside urban areas; (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or ii. In urban areas: (cc) Areas zoned for conservation use; or (dd) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	The proposed project could entail the construction of access roads for use during the construction phase and operational phase (for maintenance purposes) outside of an urban area. As far as possible existing access roads will be used, as well as the powerline servitude within the study area. Details will be provided at the detail design stage in conjunction with the specialists.	The construction of roads and infrastructure has been assessed and included in the draft EMPR. A site walk-down will be undertaken with specialists where after the EMPr will be updated to address these impacts.

GNR. 546 of 18 June 2010 Activity 10 The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. (e) In Western Cape ii. All areas outside urban areas	**GN R. 985 4 December 2014,Activity 10:** The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. (g) In Western Cape: i. All areas outside urban areas; or	The construction camp may store hazardous material for use in the construction of the proposed project and the substation design will include transformer oil ponds. The capacities of hazardous material and the size of the ponds will be determined during the detail design phase, that is, the combined capacity thereof will be confirmed.	The potential impacts have been assessed and included in the draft EMPr **– refer to Appendix 7.**
GNR. 546 of 18 June 2010 Activity 12 The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; (b) Within critical biodiversity areas identified in bioregional plans.	**GN R. 985 4 December 2014 , Activity: 12** The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; Within critical biodiversity areas identified in bioregional plans; iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas; or iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	Clearance of vegetation for the proposed power lines and substations areas will be required to a certain degree. The exact size of the area of indigenous vegetation to be cleared for the pylons are unknown at this stage, since the location of the pylons will be determined by the terrestrial ecologists by means of walk-through at the Detailed Design stage, i.e. post receipt of the EA. The approximate extent of removal of indigenous vegetation for the proposed Alternative Site substations are as follows: Alternative site 1 (substation): 4ha Alternative site 2 (substation): 0ha Alternative site 3 (substation): 2ha Alternative site 4 (substation): 1ha Alternative site 5 (substation): 0ha	The impacts of the proposed project have been assessed by the various specialists. Mitigation has also been included in the draft EMPr. **Refer to Section G3 and Appendix 7.** **A specialist walk-down will also take place before any construction commences.**
GN R. 546 of June 2010 Activity 13 The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: (1) the undertaking of a process or activity included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008), in which case the activity is regarded to be excluded from this list. (2) The undertaking of a linear activity falling below the thresholds mentioned in Listing Notice 1 in terms of GN No. 544 of 2010. (a) Critical biodiversity areas and ecological support areas identified in systematic biodiversity plans adopted by the competent authority. (c) In Western Cape: Outside urban areas, the following: (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ff) Areas within 10 km from national parks or world heritage sites or 5 km from any protected areas identified in terms of NEMPAA or from the core area of a biosphere reserve.		**Please refer to comment above.**	The impacts of the proposed project have been assessed by the various specialists. Mitigation has also been included in the draft EMPr. **Refer to Section G3 and Appendix 7.** **A specialist walk-down will also take place before any construction commences.**
GNR. 546 of 18 June 2010 Activity 16 The construction of: (iv) buildings with a footprint exceeding 10 square metres in size; or (v) infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line. (d) In Western Cape	**GN R. 985, 4 December 2014 Activity 14** The development of- (i) canals exceeding 10 square metres in size ; (ii) channels exceeding 10 square metres in size; (iii) bridges exceeding 10 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area exceeds 10 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area exceeds 10 square	The proposed development is less than 5.5 kilometres south of Ruiterbos Nature Reserve (part of the Outeniqua Nature Reserve Complex). Alternative Site 5 occurs within Ecological Support Areas and Critical Biodiversity Areas.	The impacts of the proposed project have been assessed by the various specialists. Mitigation has also been included in the draft EMPr. **Refer to Section G3 and Appendix 7.** **A specialist walk-down will also take place before any construction commences.**

(ii) Outside urban areas in: (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve	metres in size; (vi) bulk storm water outlet structures exceeding 10 square metres in size; (vii) marinas exceeding 10 square metres in size; (viii) jetties exceeding 10 square metres in size; (ix) slipways exceeding 10 square metres in size; (x) buildings exceeding 10 square metres in size; (xi) boardwalks exceeding 10 square metres in size; or (xii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs – (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour		
GN R. 546, 10 June 2010 Activity 19 The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (d) In Western Cape: ii. All Areas outside urban areas;	**GN R. 985 4 December 2014 Activity18** The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. In Western Cape: All areas outside urban areas: (aa) Areas containing indigenous vegetation; (bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or In urban areas: (aa) Areas zoned for conservation use; or (bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.	The construction of roads and infrastructure has been assessed and included in the draft EMPR. A site walk-down will be undertaken with specialists where after the EMPr will be updated to address these impacts.	The construction of roads and infrastructure has been assessed and included in the draft EMPR. A site walk-down will be undertaken with specialists where after the EMPr will be updated to address these impacts.
GN R. 54618 June 2010 Activity 24 The expansion of: (c) buildings where the buildings will be expanded by 10 square metres or more in size; or (d) infrastructure where the infrastructure will be expanded by 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line. d) In Western Cape: ii. Outside urban areas in; (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority …… (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	**GN R. 985 4 December 2014: Activity : 23** The expansion of: (c) buildings where the buildings will be expanded by 10 square metres or more in size; or (d) infrastructure where the infrastructure will be expanded by 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line. d) In Western Cape: ii. Outside urban areas in; (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans (gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve	The exact positions of the proposed pylons will be determined in consultation with the wetland ecologist by means of a walk-through, at the detailed design stage i.e. post receipt of the EA. The proposed development is less than 5.5 kilometres south of Ruiterbos Nature Reserve (part of the Outeniqua Nature Reserve Complex). Alternative Site 5 occurs within Ecological Support Areas and Critical Biodiversity Areas.	The impacts of the proposed project have been assessed by the various specialists. Mitigation has also been included in the draft EMPr. **Refer to Section G3 and Appendix 7.** **A specialist walk-down will also take place before any construction commences.**

In accordance with the EIA Regulations (2010), an EIR must contain all the information that is necessary for the competent authority to consider the application and to reach a decision and must include those points included in Regulation 31(2) and Government Notice 543 which are laid out in Table 6. In order to facilitate review by the competent authority, this report is structured around these requirements.

Table 6: Information contained in the FEIR

Government Notice 543 and Regulation 31 Requirements	Relevant Section of the Report
Details of the EAP who compiled the report and the expertise of the EAP to carry out an environmental impact assessment	Table 1 and paragraphs that follow
A detailed description of the proposed activity	Section A
A description of the property on which the activity is to be undertaken and the location of the activity on the property.	Refer to the Project Summary
A description of the environment that may be affected by the activity and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity.	Section B and Section E
Details of the public participation process conducted including: (i) Steps undertaken in accordance with the plan of study; (ii) A list of persons, organisations and organs of state that were registered as interested and affected parties; (iii) A summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response of the EAP to those comments; and (iv) Copies of any representations and comments received from registered and affected parties.	Section C-4 and Appendix 5
A description of the need and desirability of the proposed activity	Section A-4
A description of identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity.	Section D
An indication of the methodology used in determining the significance of potential environmental impacts.	Section F
A description and comparative assessment of all alternatives identified during the environmental impact process.	Section D
A summary of the findings and recommendations of any specialist report or report on a specialised process.	Section E
A description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures.	Section F and G
An assessment of each identified potentially significant impact.	Section G
A description of assumptions, uncertainties and gaps in knowledge.	Section F
A reasoned opinion as to whether the activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation.	Section H-1
An environmental impact statement which contains a summary of the key findings and a comparative assessment of the positive and negative implications.	Refer to the Table within Section H-1
A draft environmental management programme	Appendix 7
Copies of any specialist reports and reports on specialist processes.	Appendix 6
Any specific information that may be required by the competent authority.	Project Summary

Integrated Environmental Management (IEM)

IEM is a philosophy for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels.

The Department of Environmental Affairs (DEA) Integrated Environmental Management Information Series guidelines were also consulted during this S&EIR application process.

A-2.2 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) (NWA) aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in responsible ways.

Of specific importance to this application is Section 19 of the NWA, which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices.

Due to the various wetlands, rivers, streams, tributaries and drainage lines that occur within the project area, according to the NWA, the proposed Blanco substation and power line project may trigger the following water uses listed in Section 21:

(c) impeding or diverting the flow of water in a watercourse; and
(i) altering the bed, banks, course or characteristics of a watercourse.

Accordingly, the proposed project may thus require a **Water Use Licence (WUL)**, which is administered by the Department of Water and Sanitation (DWS).

A-2.3 Other Legal Requirements

A-2.3.1 Acts

Constitution of the Republic of South Africa
The Constitution of the Republic of South Africa has major implications for environmental management. The main effects are the protection of environmental and property rights, the change brought about by the sections dealing with administrative law, such as access to information, just administrative action and broadening of the *locus standi* of litigants. These aspects provide general and overarching support and are of major assistance in the effective implementation of the environmental management principles and structures of the NEMA. Section 24 in the Bill of Rights of the Constitution specifically states that:

Everyone has the right -
- To an environment that is not harmful to their health or well-being; and
- To have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that -
  - Prevent pollution and ecological degradation;
  - Promote conservation; and
  - Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection. As part of its implementation strategy, the National Spatial Biodiversity Assessment was developed.

This Act is applicable to this application for environmental authorisation, in the sense that it requires the project applicant to consider the protection and management of local biodiversity.

National Heritage Resources Act, 1999 (Act No. 25 of 1999)
This Act legislates the necessity for cultural and heritage impact assessment in areas earmarked for development, which exceed 0.5 hectares (ha) and where linear developments (including roads) exceed 300 metres in length. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)
The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes.

Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)
The Act recognises that everyone has a Constitutional right of access to any information held by the state and by another person when that information is required to exercise or protect any rights. The purpose of the Act is to foster a culture of transparency and accountability in public and private bodies and to promote a society in which people have access to information that enables them to exercise and protect their rights.

A-2.3.2 Provincial Policies and/or Guidelines

Integrated Environmental Management (IEM)
IEM is a philosophy for ensuring that environmental considerations are fully integrated into all stages of the development process. This philosophy aims to achieve a desirable balance between conservation and development (DEAT, 1992). The IEM guidelines intend encouraging a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels.

The DEA Integrated Environmental Management Information Series guidelines are also considered during this S&EIR application process.

National Spatial Biodiversity Assessment
The National Spatial Biodiversity Assessment (NSBA) classifies areas as worthy of protection based on its biophysical characteristics, which are ranked according to priority levels.

Protected species – Provincial Ordinances
Provincial ordinances were developed to protected particular plant species within specific provinces. The protection of these species is enforced through permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

George Municipal Spatial Development Framework (SDF) – Final Draft May 2013
The Spatial Development Framework (SDF) for George Local Municipality (Final draft May 2013) covers the Municipality's 5 238km² jurisdictional area which accommodates over 175 000 people and extends from the dry and climatically extreme Little Karoo in the north, to the wetter, more temperate Garden Route in the south. It is an area of considerable natural assets and beauty, including: expansive mountains and forests, wilderness areas, a varied coastline, and extensive lakes, rivers and estuaries. Its natural assets include parts of the Garden Route National Park and the Baviaanskloof Wilderness Area. This municipal area also includes fertile farmlands and timber plantations along the coastal plain, fruit orchards in the Langkloof and arid grazing areas in the Little Karoo. Three important national roads, namely the N2, N9 and N12, traverse the area, and George regional airport serves the Southern Cape and Little Karoo, including the neighbouring towns of Mossel Bay, Oudtshoorn, Knysna and Plettenberg Bay.

In terms of the **natural and cultural environment** within the George municipal area, the following **strengths** and **weaknesses** have been identified by this SDF. These include the following:

Strengths (natural and cultural environment):

- The municipal area is well endowed with rich and diverse terrestrial, marine and aquatic ecosystems, scenic attractions, and cultural landscapes, which collectively provide the attraction on which the local tourism economy is based;
- Significant progress has been made in mapping the area's natural assets, providing sound information as a basis for informing development and land use management decision-making;
- A start has been made with recording the municipal area's cultural and scenic assets;
- The municipal area's fertile soils and favourable climate can support increased farming and forestry activities;
- There is sufficient land to accommodate future settlement needs without damage to the environment or loss of agricultural or forestry land.; and
- The new Garden Route National Park has bolstered conservation.

Weaknesses (natural and cultural environment):

- The lake systems and estuaries are under stress as a result of a reduction in the quality and quantity of water entering the lakes, in turn related to agriculture, urban encroachment and associated habitat loss, increased tourism and recreation, and the introduction of invasive, alien species;
- Valuable agricultural and plantations land has been under pressure for urban development;
- Increasing development on steep slopes detracts from the area's visual quality and causes erosion and landslides;
- The area has few beaches, limited in carrying capacity;
- Residential development has restricted public access to coastal resources; and
- Whilst growth of the tourism and leisure sectors has bolstered rural development, impoverished rural communities remain marginalised.

External opportunities and threats which impact on this municipal area in terms of the **environment** include the following:

External opportunities:

- Mainstreaming of environmental awareness;
- Broad based adoption of 'green' technologies;
- Growing interest in cultural heritage of place;
- Voluntary adoption of conservation measures by land owners; and
- Environmental advocacy and activism

External threats:

- Climate change & sea level rise;
- Invasive alien vegetation infestation;
- Natural disasters (i.e. drought, floods, wild fires, etc.); and
- Complacency and poor monitoring and regulation of the environment.

SDF Objectives:

The general purpose of this municipal SDF is to set-out the local authority's goals, strategies and supporting policies to achieve, in the medium to long term, positive changes in the spatial organisation of its jurisdictional area towards a sustainable development future.

In terms of the draft Provincial *Guidelines for the Preparation of Credible Municipal Spatial Development Frameworks,* SDFs should:

- Be informed by a clear understanding of the spatial performance of the municipal area, and its role in the regional space economy;
- Be consistent with national and provincial spatial policies, and interpret their local application;

- Give spatial expression to the municipality's overarching vision, aims and strategic objectives, as contained in the municipal Integrated Development Plan (IDP);
- Articulate a clear spatial vision for the municipality's urban and rural areas, and specify the strategies to be implemented to realise this vision;
- Provide policy guidance to direct decision-making on the nature, form, scale and location of urban and rural development, land use change, infrastructure development, disaster mitigation, and environmental resource protection;
- Establish a policy framework for more detailed plans and guide the short and medium term proposals for local areas within the municipality;
- Provide a clear framework for public and private investment in infrastructure in the area;
- Be capable of implementation and monitoring; and
- Be grounded in public and political consensus around the plan's strategic framework.

This SDF is meant to articulate a clear spatial vision for a municipality's urban and rural areas, and specify strategies to be implemented to realise this objective. This spatial perspective provides the development context for the SDF with a planning vision, mission and guiding Principles. This SDF details **5 development strategies**, which includes the following:

- Restructuring and integrating the dysfunctional urban fabric, together with a public transport system and urban renewal interventions;
- Strengthening the economic vitality by enhancing the regional and local space economy, strategic developments to diversify and strengthen the economy, consolidating and reinforcing nodes of economic activity, and infrastructure services provision;
- Creating quality living environments through sustainable urban growth management, managing a hierarchy of city activity nodes, the use of strategic vacant land to take up new development demand, the densification of urban areas, and the provision of housing & public facilities;
- Safeguarding the environmental integrity and assets by establishing a city-wide open space system and environmental corridors, maintaining the functionality of critical biodiversity areas, applying the principles of the spatial planning categories, mitigating against impacts of climate change, managing visual landscapes and corridors as well as heritage resources; and
- Enhance the rural character and livelihood by protecting the productive landscape, managing the subdivision of land and by enhancing the rural livelihood and promoting integrated rural development.

In terms of the above mentioned strategies, the renewal and upgrade of degraded urban areas and dysfunctional human settlements is a clearly defined objective with the identification of 5 urban renewal zones within this municipal area. One of these urban renewal areas, namely the **Blanco area** is briefly discussed below:

Urban Renewal zone 2: Blanco area

Originally Blanco developed as a distinct settlement from George, but now it is an integral part of the George urban area. Despite significant "estate" type development in the area, it has managed to retain many historic buildings and its unique pastoral village character and ways of life.

The Municipality will maintain the present environmental, rural and settlement character of Blanco through the following activities:

- Maintain 'tight' urban edges to protect the rural character of the area;
- Apply land use management guidelines to protect the human scale and pastoral character of the village (including the placement of buildings close to street boundaries);
- Permit sensitive mixed use development and densification along major routes (George Street and Montagu Street), including tourism-related facilities; and
- Allow infill residential development to densities of 20-30 units ha on identified vacant land parcels.

The proposed Western By-pass affects Blanco. Four alignment options for this route were investigated as part of the EIA process associated with the project. Environmental approval was given in July 2010 for the Gwaing-Blanco alignment in the Northern Sector and quarry alignment alternative 3 for the Southern Sector. This route must be considered for all future developments taking place in this area.

Blanco Local Structure Plan (Spatial Development Plan), May 2009

As a result of the rapid expansion and transformation of Blanco during the past few years, this area was identified as one of the areas in George that requires more detailed forward planning than what was presented in the George Municipal SDF and therefore necessitated the development of a local structure plan (SDF) which has the objective of clearly defining effective guidelines and policies for the appropriate management of this area in terms of increased development pressure and inappropriate land use.

In terms of demographics the following statistics is relevant to the Blanco area:

- Population size of approximately 5 500;
- Approximately 120 stay in informal dwelling areas;
- 18% of the 52% economically active people are unemployed;
- 90% of the population in the Blanco area earn less than R3,200 per month; and
- The type of employment in the Blanco area is evenly spread among all categories but from skills and development point of view, 11% of the population work in elementary occupations.

An analysis (through site visits and land use surveys) was conducted by a task team in order to better understand the Blanco and immediate surrounding area. The following aspects relevant to this area was revealed through this study

Development Pressure:

- Due to the recent investment interest, the rural and agricultural areas have become under pressure for development;
- The need to ensure a balance between the preservation of agricultural resources and urban development has become inevitable;
- The impact of new residential developments on the existing road infrastructure is perceived problematic.

Urban edge:

- The determination of an urban edge to control and manage urban expansion has become inevitable;
- The urban edge should be determined in accordance with the approach, principles and criteria in the George Spatial Development Framework;
- The urban edge in this area is particularly informed by the distinctive characteristics of the area such as the topography, differentiated land uses and agriculture.

Village Charm:

- The old village charm of Blanco should be preserved and enhanced to create an attractive and well functioned town which fulfills the needs of the inhabitants as well as the visitors to the area;

Densification:

- New provincial policy promotes the principle of densification due to its cumulative positive impacts;
- Given the absence of an approved densification policy, densification is implemented on an ad hoc basis with certain new developments at relatively low densities.

Vacant land:

- There is limited underutilized and vacant land within the urban area which could through proper planning be used more efficiently;

- The historical function of the Village Green area must be re-determined and developed with appropriate land uses.
- Vacant agricultural zoned land has become increasingly more in demand for further development;
- Forward planning is required to identify appropriate land uses and to manage future development.

Tourism:
- Although limited tourist facilities exist, the positive impact of tourism and the possible contribution and spin-offs for the local economy of Blanco has not been realized by the various role players.
- An effective and practical tourism plan to promote tourism in Blanco needs to be compiled.

Needs of the community:
- Due to municipal budgetary constraints, the needs of the inhabitants are not always fulfilled as anticipated;
- One of the functions of a SDF is to identify the community needs and to address / implement the identified municipal IDP projects;
- Identified needs include, additional affordable housing, range of housing stock for different income groups, adequate recreation facilities, employment opportunities (economic development), revitalization programmes to uplift the urban built form, social upliftment services and programmes.

Integration:
- Given the historic settlement pattern, the town is still affected by the segregation of the various cultural groups.
- This should be addressed by practical and effective integration actions such as the provision of integrated housing projects and open space network linking the various neighbourhoods as well as facilities

Revitalisation:
- The current appearance of the built form necessitates urgent revitalization actions to enhance the area;
- The neglected visual appearance of the built form and streetscape could be attributed to the general lack of pride.
- The identified gateways / sense of arrival into the town and its critical function as a welcoming agent are underestimated and needs to be addressed
- The town lacks a communal focal point and should be addressed.

Functions of roads:
- The role and function of Montagu and George street and not defined and should be addressed.
- Various aspects, such as pedestrian safety, public transport, appropriate land uses, parking and streetscape should be addressed.

Effective strategies and actions:
- Strategies must be identified and implemented for the enhancement of tourism and revitalization programmes and actions**.**

In terms of the **restoration and conservation of the natural environment** within the Blanco area the following objectives have been defined:

- To reinstate the “sense of place” and function of the gateways;
- To limit and control development within environmentally less sensitive areas;
- To develop an integrated open space network; and
- To control pollution.

A-3 DETAILS OF THE APPLICANT

The details of the project applicant are:

Name of Applicant	Postal Address	Relevant Numbers
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A-4 NEED AND DESIRABILITY OF THE PROJECT

Eskom Transmission Grid Planning initiated a study to investigate possible solutions to address transformation constraints at Proteus Main Transmission station, as well as sub-transmission constraints experiences on the network supplying the Blanco area. The Blanco area is supplied from the Proteus MTS, which forms part of the Southern Cape Customer Load Network (CLN).

Proteus substation consists of 2 X 500MVA, 400/132kV transformers and supplies Blanco 132kV substation and all the loads north of Blanco via 3 X 48kV, 132kV lines, from the Proteus MTS. Proteus MTS also supplies the 66kV network through 2 X 80MVA 132/66kV transformers and the 66kV network can also be back-fed from the Blanco substation. The load forecast for Proteus MTS indicates that the transformers will be supplying a peak demand of 502MVA in 2013, and would therefore not comply with the N-1 Grid Code criteria.

The Network Development Plan (NDP) indicates that one of the 3 X 132kV lines from Proteus to Blanco has been in operation for 23 years and is about to reach its 25 year life expectancy and will require refurbishment. The remaining 132kV network consists of single 132kV lines supplying Outeniqua, Uniondale, Dysselsdorp and Oudtshoorn substations.

To resolve the network constraints, three strengthening options were considered, which involved various upgrades of different infrastructure. However based on analysis, it was agreed that the construction of the new Blanco MTS, would be the least life cycle option (see below).

The Blanco area requires a new 400kV substation to alleviate the Proteus MTS transformer capacity issues and the N-1 distribution 132kV network constraints. It is evident that new loads around the Blanco area will not be accommodated without violating the loading and voltage conditions of the existing 132kV lines and the voltage limits. The proposed Blanco substation and line project will therefore alleviate current capacity constraints in the Blanco area through the following:

- Cater for load growth on the Distribution 132kV network;
- De-load the Proteus MTS;
- Resolves sub-transmission N-1 voltage and thermal loading constraints; and
- Saving system losses on the 132kV network.

The solution is recommended as it is the least life cycle cost solution, is sufficient over the 20 year planning window period and would reduce overall network system losses. The fault limits at the new proposed MTS and surrounding substations would remain within the rupturing capacity of the terminal equipment. It is further recommended that the 2 x 132kV Proteus-Blanco lines be operated as normally open points to further de-load Proteus MTS and to reduce overall transmission system losses. The new MTS must be located close to the existing Blanco substation.

In terms of the need for the project, the following information was extracted from the Eskom Planning Report, namely *Western Grid: Blanco Network Strengthening Planning Report (March 2012):*

During N-1 contingencies of the sub transmission 132kV lines, the studies indicate and verify the sub transmission constraints indicated in 2010 Network Development Plan (NDP) for the George area. The loss of one of the 3x132kV lines from Proteus to Blanco will result in the other two bear conductor lines being loaded at 96% of their rate A limit in year 2015, and will begin to overload into the 20 year planning window. The loss of the Blanco-Knysna 132kV line currently results in low voltages at the Knysna substation.

The NDP also indicates that one of the 3x132kV lines from Proteus to Blanco has been in operation for 23 years and is about to reach its 25 year life expectancy, and will therefore require refurbishment. The remaining 132kV network consists of single 132kV line supplying Outeniqua, Uniondale, Dysselsdorp and Oudtshoorn substations and is not compelled to be N-1 Grid Code compliant.

To resolve the above mentioned network constraints, it is recommended to establish a new 400/132kV (*Narina Substation*) Blanco Transmission Substation with 2x500MVA transformation. The solution is preferred, as it is the least life cycle cost solution, it is sufficient over the 20-year planning window period and would reduce overall network system losses.

Blanco area requires a new 400kV substation to alleviate Proteus MTS transformer capacity issues and the N-1 distribution 132kV network constraints. It is evident that new loads around the Blanco area will not be accommodated without violating the loading and voltage conditions of the existing 132kV lines and the voltage limits.

The preferred option is recommended for the following reasons:

- It caters for load growth on the Distribution 132kV network;
- It de-loads Proteus MTS;
- Resolves sub-transmission N-1 voltage and thermal loading constraints;
- It results in the highest saving in system losses on the 132kV network; and
- Lowest life cycle cost option.

In terms of desirability (*placement/location*) of the project, the following information was extracted from the Eskom Planning Report:
(The existing) Blanco substation is an electrical node where the existing 132kV and 66kV lines intersect. It is also close to the (Droerivier-Proteus) 400kV line, where it need(s) to connect to for the support infeed, and is also close to the largest load centre (George).

Locating the Narina MTS substation as close as possible to Blanco substation makes sense from the point of view of loading, as well as existing electrical infrastructure.

From an industry cost point of view, the most cost effective option is always to have a strong infeed close to the largest load centre, and to minimise the building of additional lines by locating the infeed close to the Distribution network.

The preferred location for Narina substation will minimize the cost of creating the required infrastructure

strengthening.
The preferred location is recommended for the following reasons:

- Requires shorter periods for EIA and servitude acquisition for a substation only; and
- Lowest life cycle cost option.

The Guideline on Need and Desirability published by the Western Cape Department of Environmental Affairs & Development Planning[29] (DEA&DP), lists 14 questions to determine the need and desirability. Table 7 includes answers relevant to the proposed project.

Table 7: Needs and Desirability

Need (timing)
Question 1: Is the land use (*associated with the activity being applied for*) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority? (*i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP*). **Answer: Yes** With reference to the proposed project, the siting of power lines is addressed under Objective 5 of the Provincial Spatial Development Framework (PSDF). Objective 5: Conserve the sense of place of important landscapes, of the Provincial Spatial Development Framework, highlights the importance of tourism to the Provincial economy. The PSDF also stipulates that, with regard to the siting and design of future power lines and other visibly substantial infrastructural development, the relevant provincial guidelines should be followed, and proposals should include provision for environmental, visual and heritage impact assessments. The PSDF notes that the shortest-distance approach to the alignment of transmission lines raises issues of visual blight, unviable shaped land parcels, need for access roads and destruction of cultural landscapes. The George SDF notes that productive agricultural areas should be protected and scenic landscapes and features safeguarded. The SDF has a planning horizon of 25 years. Together with the Integrated Development Plan (IDP) of the Municipality, it is reviewed annually. The EAP recommends that Alternative Site 5 be approved by the DEA, as it is the most compatible option in terms of meeting the land use planning and policy documents that have a bearing on the identification of a suitable site alternative. Alternative Site 1 to 4 are not supported (please refer to Section D-1.3 in the Final EIR that provides a comparison of all the Alternatives).
Question 2: Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur here at this point in time? Answer: **Yes** At this point in time, as part of the Strategic Grid Study, the proposed Narina (Blanco) 400kV/132kV MTS substation and Droerivier Proteus loop-in and loop-out powerline project is a priority project, as there are two other projects (*currently at the Scoping Phase*) dependent on the approval of it. The two projects are the Blanco (Narina) to Droërivier development and construction of a 200km long 400kV transmission power line from the proposed Blanco Substation to the Droërivier Substation at Beaufort West in the Western Cape Province **and** the Gourikwa to Blanco development and construction of a 50-60km long 400kV Transmission power line from the Gourikwa Substation at Mossel Bay to the proposed Blanco Substation. Therefore, planning of the proposed Narina (Blanco) substation has taken future expansion into consideration.
Question 3: Does the community/area need the activity and the associated land use concerned (*is it a societal priority*)? This refers to the strategic as well as local level (*e.g. development is a national priority, but within a specific local context it could be inappropriate*). **Answer: Yes** On local level, the project has potential socio-economic benefits, such as jobs. On a national level, the project will contribute to strengthen the transmission network of the Southern Cape Customer Load Network (CLN). It is not anticipated that the proposed project would have a significant long-term bearing on the affected Local Municipalities, the local communities and/or on the local economy. The electricity generated by the project will feed into the National Electricity grid, managed by Eskom Transmission.
Question 4: Are the necessary services with adequate capacity currently available (*at the time of*

application), or must additional capacity be created to cater for the development?

Answer: Yes

The existing road (DR1631) facilitates access during and after the construction and operational phases. Existing gravel roads to each of the site alternatives allows for access for construction and maintenance purposes. Additional access roads are to be constructed for the maintenance during the operational phase.

Question 5: Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?

Answer: No

No negative impact is anticipated on municipal infrastructure planning. The infrastructure of the proposed activity would be provided and maintained by the proponent of the project (Eskom).

Question 6: Is this project part of a national programme to address an issue of national concern or importance?

Answer: Yes

The project falls within Strategic Infrastructure Plan (SIP) 10, namely *"Electricity transmission and distribution for all"*. The project serves to *"expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development".* The proposed Narina (Blanco) 400/132kV MTS substation and Droerivier Proteus Loop-in Loop-out powerline project – will enable the transmission of generated electricity to the national grid.

Desirability (Placing)

Question 7: Is the development the best practicable environmental option for this land/site?

Answer: Yes

Alternative Sites 1 to 5 were investigated in detail by the various biophysical and socio-economic and socio-cultural specialist studies. Alternative Sites 1 to 4 are considered a fatal flaw, as per the findings of the Social Impact Assessment, due to the impact that the proposed development will have on existing land uses i.e. agricultural / pastural practices, wedding venue and guest lodges. Alternative Site 5 is currently not used for agriculture and occurs in close proximity to the existing power lines. There is no natural vegetation remaining at the proposed substation at Alternative Site 5. Alternative Site 5 is the most preferred alternative. Refer to the advantages and disadvantages of each alternative in Section D-1.3 of the FEIR.

The Avifaunal Specialist suggests that the proposed powerline at Alternative Site 5 be shifted closer to the existing power line. In this way, the impacts will be reduced. In terms of hydrological impacts, the proposed pylons must be located away from the wetlands and watercourses. Furthermore, mitigation measures such as location of the pylons out of the areas where indigenous vegetation occurs must be implemented, to ensure minimal vegetation clearance. The proposed power lines must be marked with anti-collision devices. Bird Flight Diverters on the earth wires must be installed as per specifications devised by the EWT.

Question 8: Would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF as agreed to by the relevant authorities.

Answer: No

The proposed Narina (Blanco) 400kV/132kV MTS substation and Droerivier Proteus loop-in and loop-out powerline project will enable the transmission of generated electricity to the national grid, which will support the IDPs and SDFs in terms of surety (reliability) of supply.

Question 9: Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in EMFs), and if so, can it be justified in terms of sustainability considerations?

Answer: No

The proposed project will require mitigation of potential negative environmental impacts during the construction phase of the project. During the operational phase of the project, the proposed power lines will be marked with anti-collision devices. Bird Flight Diverters on the earth wires will be installed as per

specifications devised by the EWT. Only pole structures that are approved as "bird friendly" by Eskom's ENVIROTECH Forum should be used. Livestock, grazing and wild animals will continue in the power line servitude. Based on the principles of sustainable development (i.e. social, economic and biophysical factors) Alternative Site 5 is therefore preferred for approval.

Question 10: Do location factors favour this land use (associated with the activity applied for) at this place? (this relates to the contextualization of the proposed land use on the footprint area within its broader context).

Answer: Yes

(The existing) Blanco substation is an electrical node where the existing 132kV and 66kV lines intersect. It is also close to the (Droerivier-Proteus) 400kV line, where it need(s) to connect to for the support infeed, and is also close to the largest load centre (George).

Locating the Narina MTS substation as close as possible to the Blanco Distribution substation is supported from the point of view of loading, as well as existing electrical infrastructure.
From an industry cost point of view, the most cost effective option is always to have a strong infeed close to the largest load centre, and to minimize the building of additional lines by locating the infeed close to the Distribution network.

The preferred location for Narina substation will minimize the cost of creating the required infrastructure strengthening.

Question 11: How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?

Answer:

The impact of the various site Alternatives on the sensitive natural and cultural areas are described in Section D-1.3: Comparative Assessment.

Question 12: How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc)?

Answer:

Construction activities and movement of construction vehicles will increase the ambient noise levels within the area during the construction phase. This may impact on adjacent landowners as well as sensitive faunal species within the study area.

Alternative 1-4 will result in a negative cumulative visual impact on an area where the existing sense of place and character has already been negatively impacted by the Blanco substation and associated power lines. This is not regarded as equitable and further prejudices the landowners in the area who have already been negatively impacted.
In the case of Alternative 5, the substation site is located on the lower slopes of the Outeniqua Mountains in an area that was previously under plantation. The substation site is located ~ 4-5 km north of the Geelhoutboom Road and will be less visible to passing motorists. The substation will be visible from the houses associated with the forestry station located to the north of the site and dwellings located to south and the east of the site located adjacent to the access road. The power lines associated with Alternative 5 are located to the south of an existing power line servitude that runs in an east-west direction through forestry plantations on the lower slopes of the Outeniqua Mountains. The existing power line is not highly visible and does not impact on private landowners. The same is likely to be the case with the power line associated with Alternative 5. The potential impact on the areas sense of place will therefore be lower due to the location of the substation and power line route associated with Alternative 5.

Air pollution is a major criterion for the design of transmission line insulators. Pollution has a negative effect on the insulation system of power lines and substations, which could result in the shutdown of the power line. At present, there is no data available regarding the pollution level in the various regions. Pollution measurements are required to assess whether pollution deposits are within or beyond limits. Generally, the adopted practice is to try and locate power line routes in low or medium

pollution areas, and avoid the power line traversing an area near the coastal belts, industrial belts, large mining areas etc. The sites for the proposed development occurs in areas where agriculture is the main land use and therefore, pollution is not considered to be of major concern and therefore this impact is not significant.

A-6 STATEGIC PROJECTS IN THE REGION

The Scoping and Environmental Impact Reporting (S&EIR) Process for two other projects in the region i.e. proposed Blanco (Narina) to Droërivier 400kV transmission line, and substation upgrade **and** the proposed Gourikwa to Blanco 400kV transmission line, and substation upgrade have commenced in September and October 2015, respectively and the EAP is Envirolution Consulting.

The Blanco (Narina) to Droërivier development entails the construction of a 200km long 400kV transmission power line from the *proposed* Blanco Substation to the Droërivier Substation at Beaufort West in the Western Cape Province.

The Gourikwa to Blanco development entails construction of a 50-60km long 400kV Transmission power line from the Gourikwa Substation at Mossel Bay to the *proposed* Blanco Substation.

The above projects are dependent on the proposed Narina (Blanco) 400/132kV MTS and Droerivier - Proteus Loop in – Loop out lines project. Therefore, this project is a priority project that requires approval before that of the other two projects.

The proposed 400kV transmission power line from the Blanco (Narina) Substation to Droërivier Substation and Gourikwa Substation to the Blanco Substation, forms part of the power corridors that will connect generation pools to one another, and to the major load centres in the country. This backbone and regional power corridor network structure will allow the increasing system demand to be supplied, and the power from new power stations to be integrated more efficiently into the transmission network, and distributed where required, both under system-healthy and system-contingency conditions.

The development of the transmission backbone and the associated regional power corridors were reviewed as part of the Strategic Grid Study which considered the potential development scenarios beyond the 10-year horizon of the Transmission Development Plan (TDP) until 2030. The objective of this strategic study was to align the transmission network with the requirements of the generation future options and those of the growing and future load centres. This Strategic Grid Study has enabled the 10-year TDP to be aligned with the future long-term development of the whole Eskom system.

A Customer Load Network (CLN) is a network within a specific geographical area, which in turn is a subdivision of a Grid. The West Grid consists of four Customer Load Networks, namely Peninsula, Southern Cape, West Coast and Namaqualand. The proposed 400kV Transmission power line from the Blanco Substation to the Droërivier Substation forms part of Eskom's West Grid and the Southern Cape CLN.

The Narina (Blanco) substation is currently proposed to be situated approximately 60km north-east of the Gourikwa substation. The application for the substation does not form part of the S&EIR process for the Gourikwa Substation to the Blanco Substation and the 400kV line between the *proposed* Blanco Substation and Gourikwa Power Station.

Various alternative power line routes have been identified for the above two projects. Refer to Figure 2 for the study area for the proposed Blanco to Droerivier project. Refer to Figure 3 for the study area for the proposed Gourikwa to Blanco project. The relevant approvals will be sought for the above three projects.

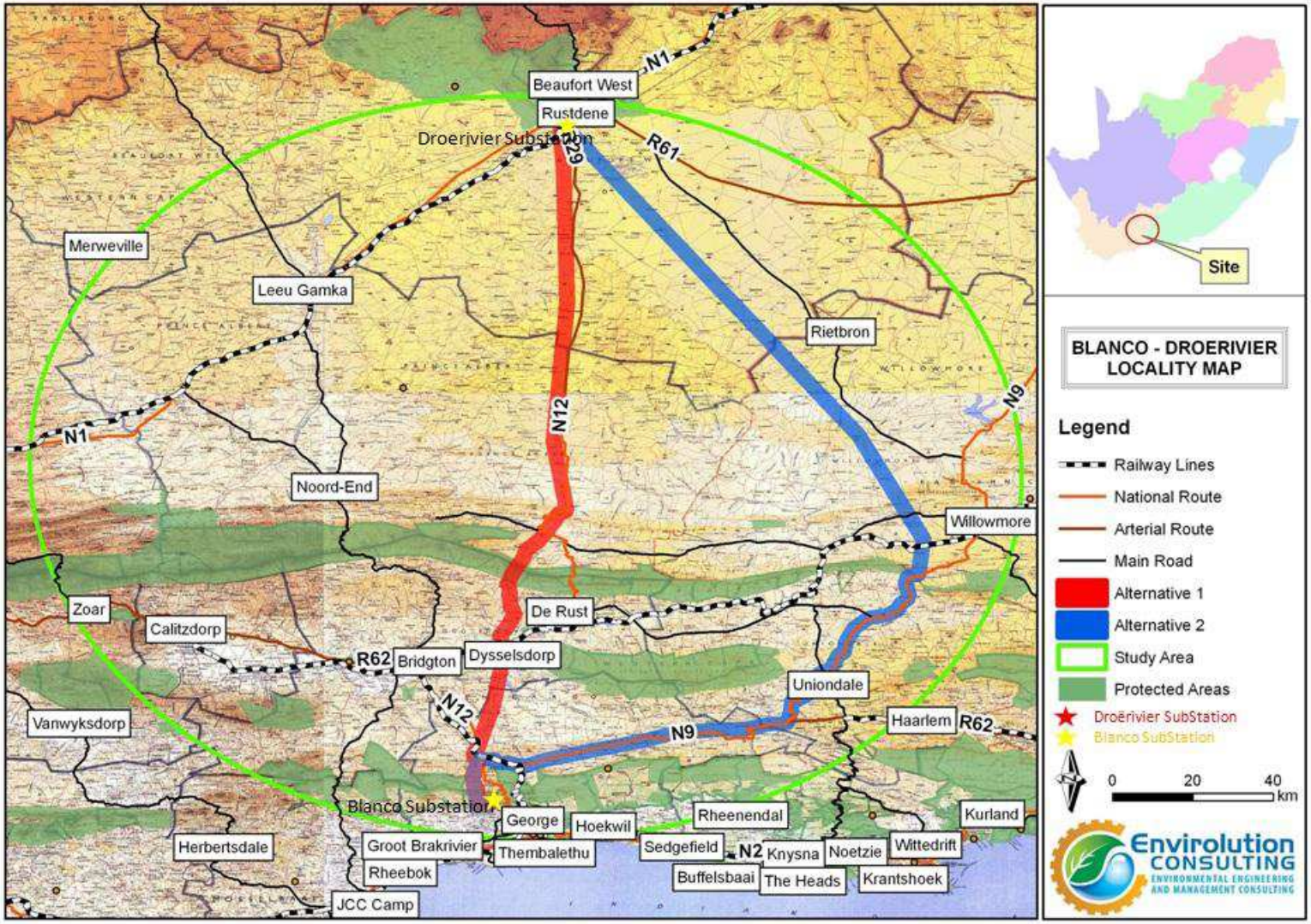

Figure 2: Proposed location for the proposed Blanco to Droerivier project

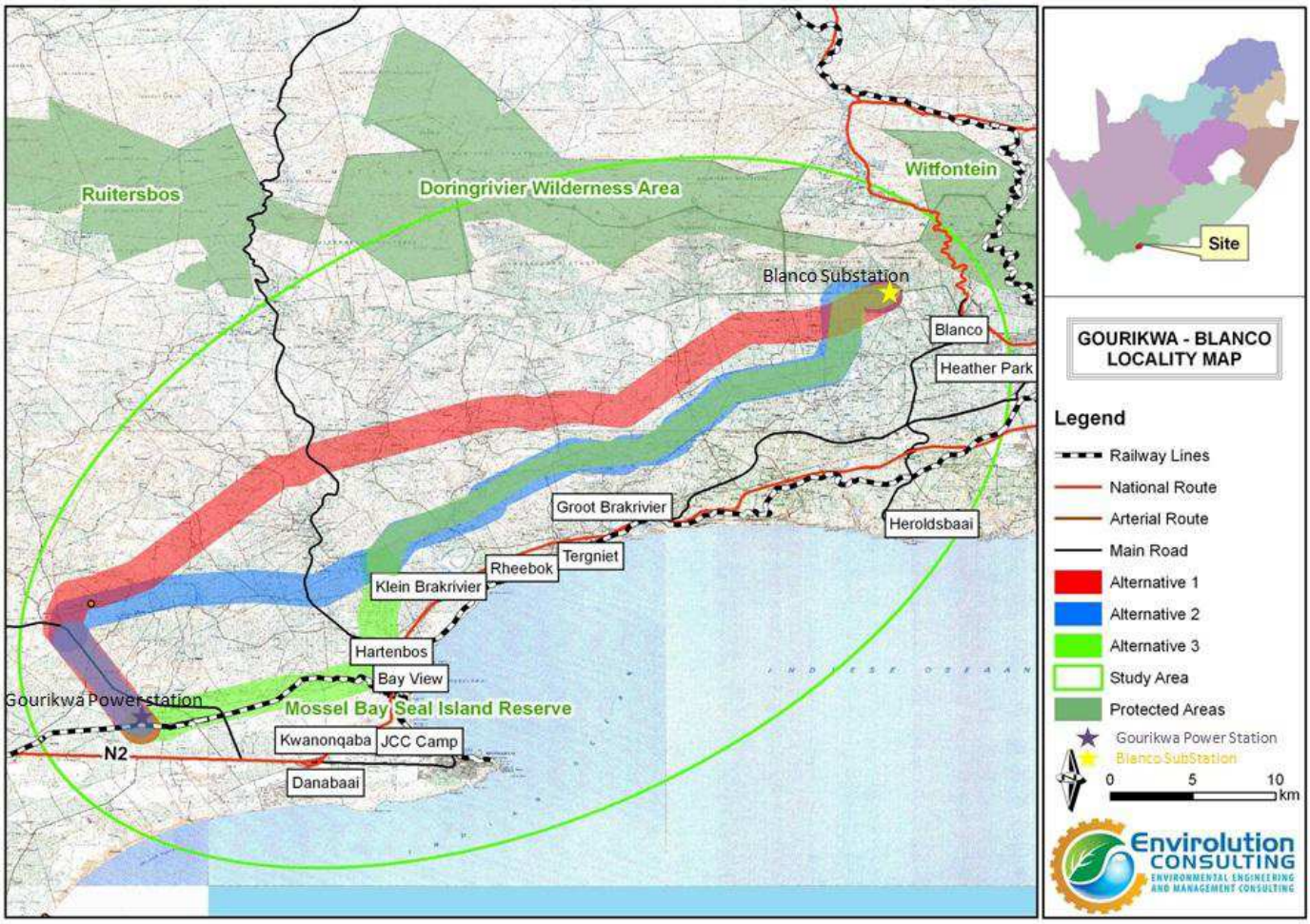

Figure 3: Proposed location of the proposed Gourikwa to Blanco project

A-7 NARINA MTS 132KV INTEGRATION WITH BLANCO

The following information was extracted from the Narina MTS Integration with Blanco Report, by Eskom dated September 2015. The new MTS is planned to feed into the existing Blanco substation (*west of George*). Currently, the Blanco-Proteus 132kV lines and Blanco substation supply all the networks to the east of Blanco (*up to Plettenberg Bay*), and the Oudtshoorn and Outeniqua networks north of Blanco. See Electrical HV Network overview of the area in Figure 4.

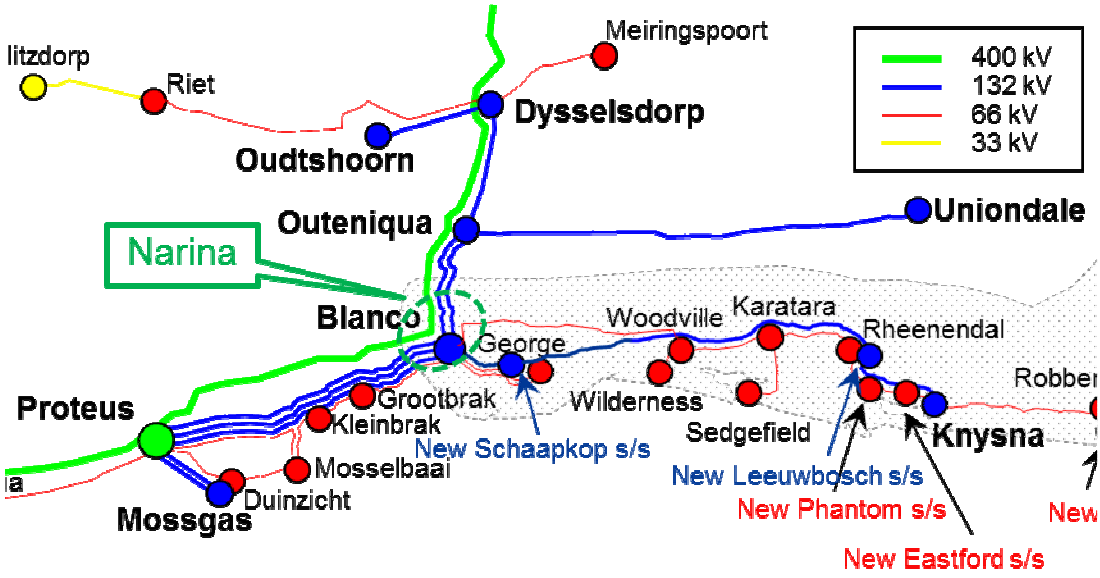

Figure 4: Geographic overview of HV Network connected to Blanco substation

Note that Narina MTS is often referred to as Blanco MTS.

The current network at the existing Blanco substation with all incoming and outgoing lines are illustrated in Figure 5.

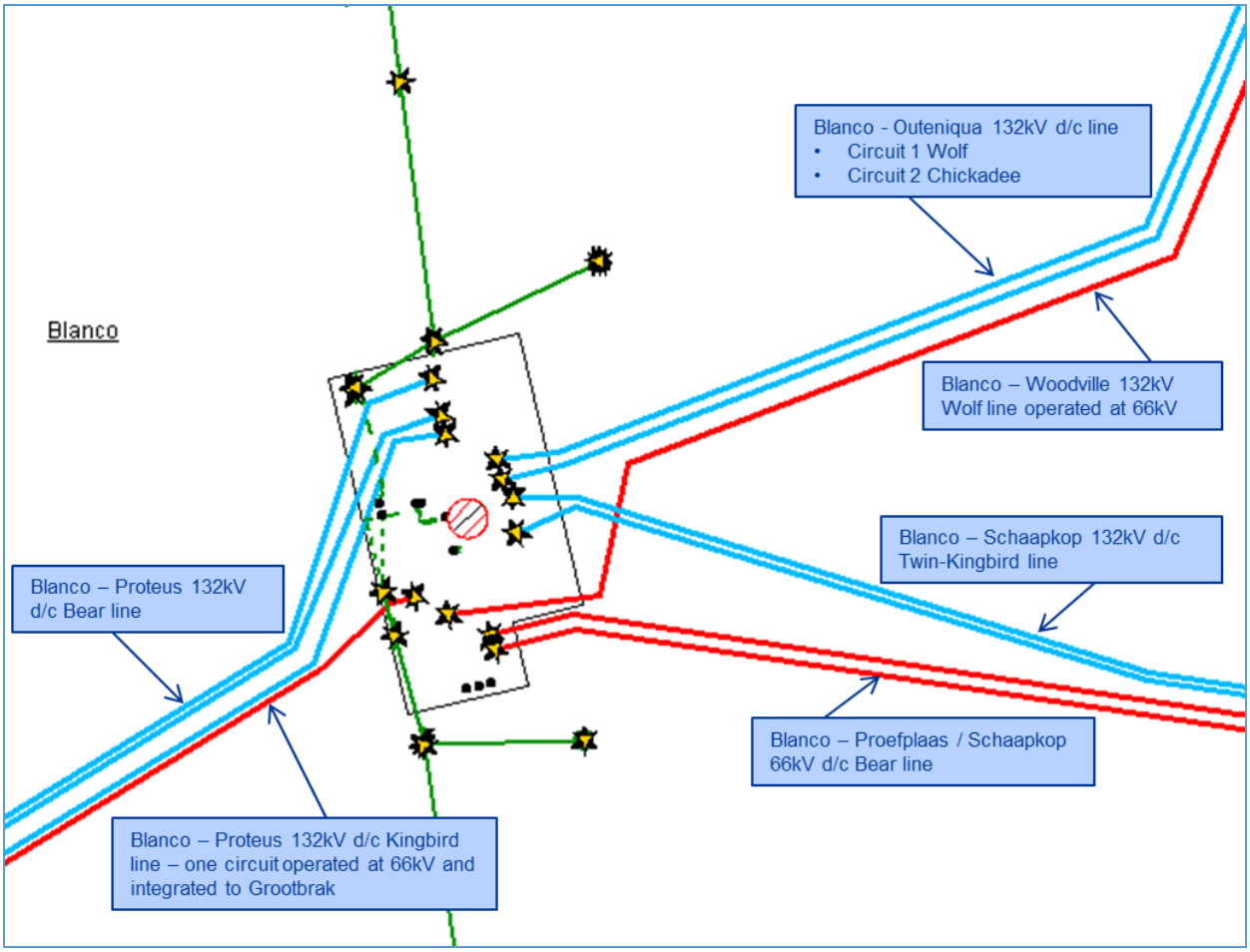

Figure 5: Blanco substation connection to HV (132kV and 66kV) lines

A-7.1 Narina and Blanco 132 kV Integration

Five (5) alternative sites were investigated in this FEIR. Refer to Figures 6 to 10 showing the proposed sites, as well as the proposed High Voltage (HV) lines (enhanced with colored lines to indicate the HV voltage level). The proposed substation name is Narina MTS. The proposed integration of 132kV lines is described below for each site alternative.

The Distribution HV lines integration plans for Sites 1, 3 and 5 are similar. The Outeniqua double circuit line will be turned in to Narina MTS, then the rest of the line to Blanco can be removed and the Blanco-Narina connecting double circuit line (double circuit Twin-Kingbird) can be built on the existing servitude. The proposed length of the 132kV double circuit line that would have to be built is different for each alternative.

Alternative Site 1: (north east close to Blanco)

For site 1, turn both Blanco-Outeniqua 132kV circuits in to Narina and supply Outeniqua from Narina. Then the 132kV double circuit line from there to Blanco can be dismantled and the double circuit (Twin-Kingbird) connecting line from Narina to Blanco can be built on the vacated servitude, and connect to the old Outeniqua feeder bays at Blanco.

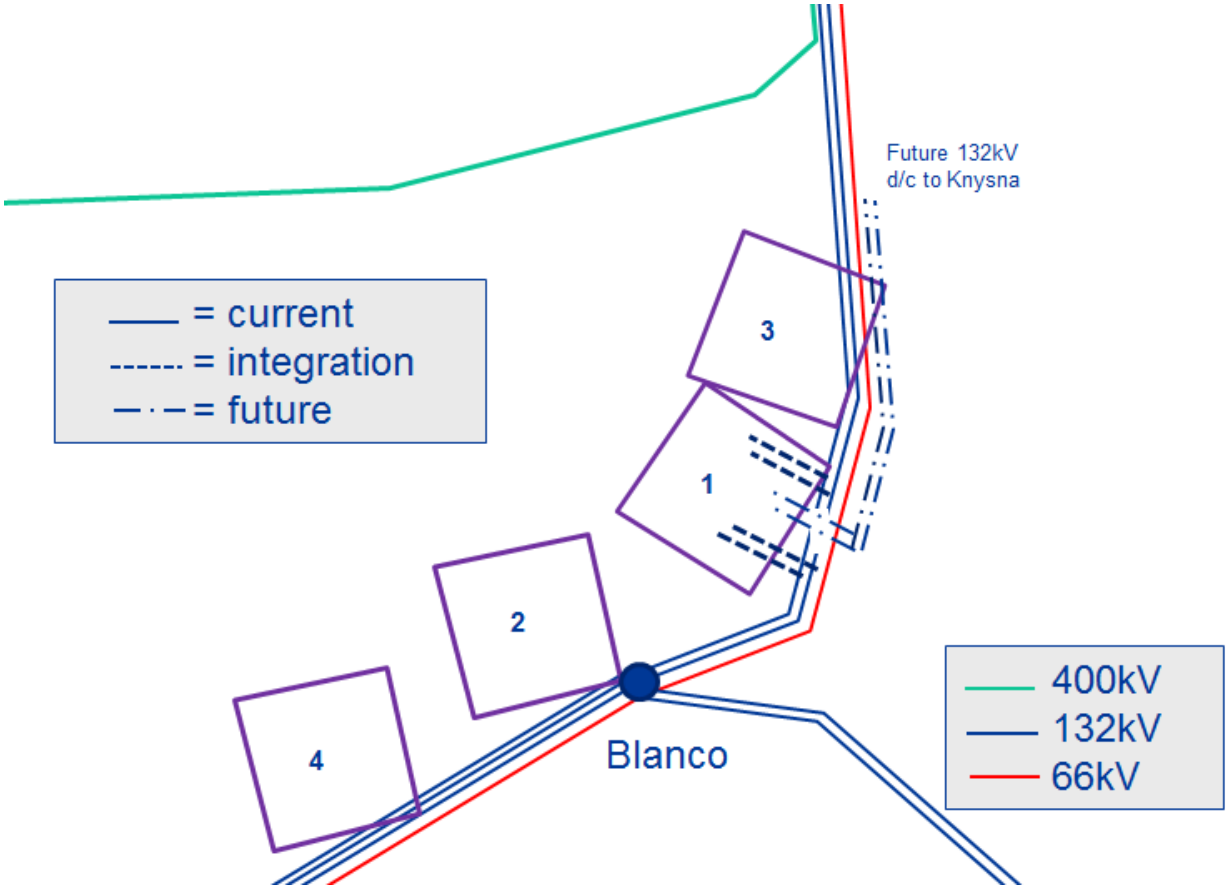

Figure 6: Site 1 132kV Integration

Site 1 Scope of works:

- Connect Narina MTS to the Blanco-Outeniqua 132 kV double circuit line via an in/out configuration, connecting Outeniqua and Blanco substations directly to Narina MTS.
- Break down the approximately 1.5km of 132kV double circuit line between Blanco and Narina. Build a new 132kV double circuit line on the same servitude between the Narina MTS and Blanco substation, utilizing the now vacant Outeniqua feeder bays at Blanco substation (*protection upgraded to connect to Narina MTS*).
- Create normally open points between Blanco substation and Proteus on the 3x 132kV incoming lines.
- An additional double circuit line will be required in future to pick up Knysna substation via a 132kV double circuit line directly from Narina MTS, using the existing servitude of the 132kV, operated at 66kV, line to Knysna. Provision should be made with the layout of the feeder bays in the MTS to avoid any line crossings.

Site 2 - North-west, adjacent to Blanco

Site 2 is adjacent to Blanco substation.

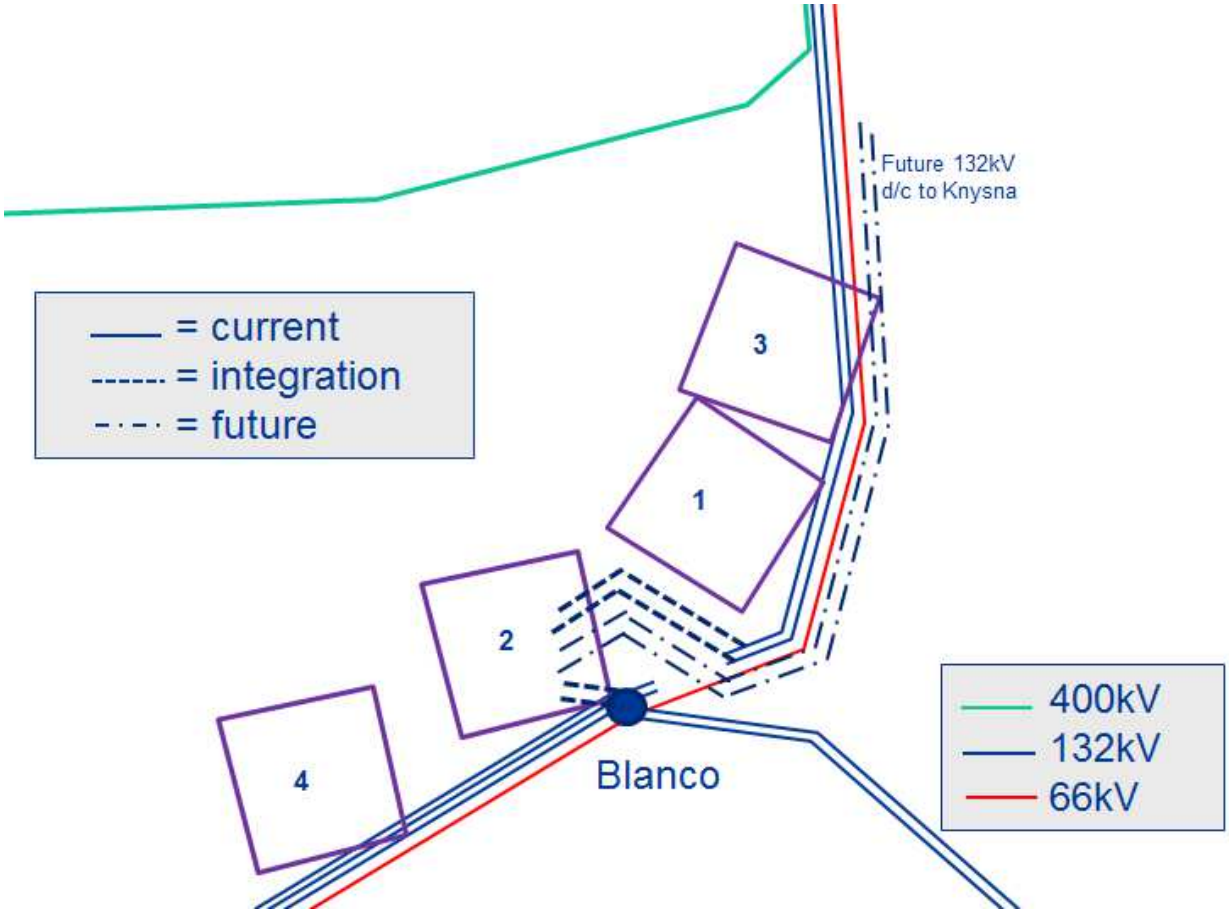

Figure 7: Site 2 132kV Integration

Site 2 Scope of works:

- Connect Narina MTS to the Blanco-Outeniqua 132 kV double circuit line by diverting the Outeniqua line from Blanco to Narina, connecting Outeniqua substation directly to Narina MTS.
- Build a new 132kV double circuit line between Narina MTS and Blanco substation (*or create extended busbar*), utilizing the now vacant Outeniqua feeder bays at Blanco substation (protection upgraded to connect to Narina MTS).
- Create normally open points between Blanco substation and Proteus on the 3x 132kV incoming lines.
- An additional double circuit line will be required in future to pick up Knysna substation via a 132kV double circuit line directly from Narina MTS, using the existing servitude of the 132kV, operated at 66kV, line to Knysna. Provision should be made with the layout of the feeder bays in the MTS to avoid any line crossings. Most likely a 132kV cable network will be required to connect Narina MTS to the Knysna 132kV line to avoid any 132kV line crossings.

Site 3 - North-east, further away than Site 1

Site 3 is similar to site 1, however, the connecting line to be built between Narina and Blanco is longer: turn both Blanco-Outeniqua 132kV lines in to Narina and supply Outeniqua from Narina. Then the 132kV line portions from there to Blanco can be dismantled and the double circuit Twin-Kingbird connecting line from Narina to Blanco can be built on the vacated servitude, and connect to the old Outeniqua feeder bays at Blanco.

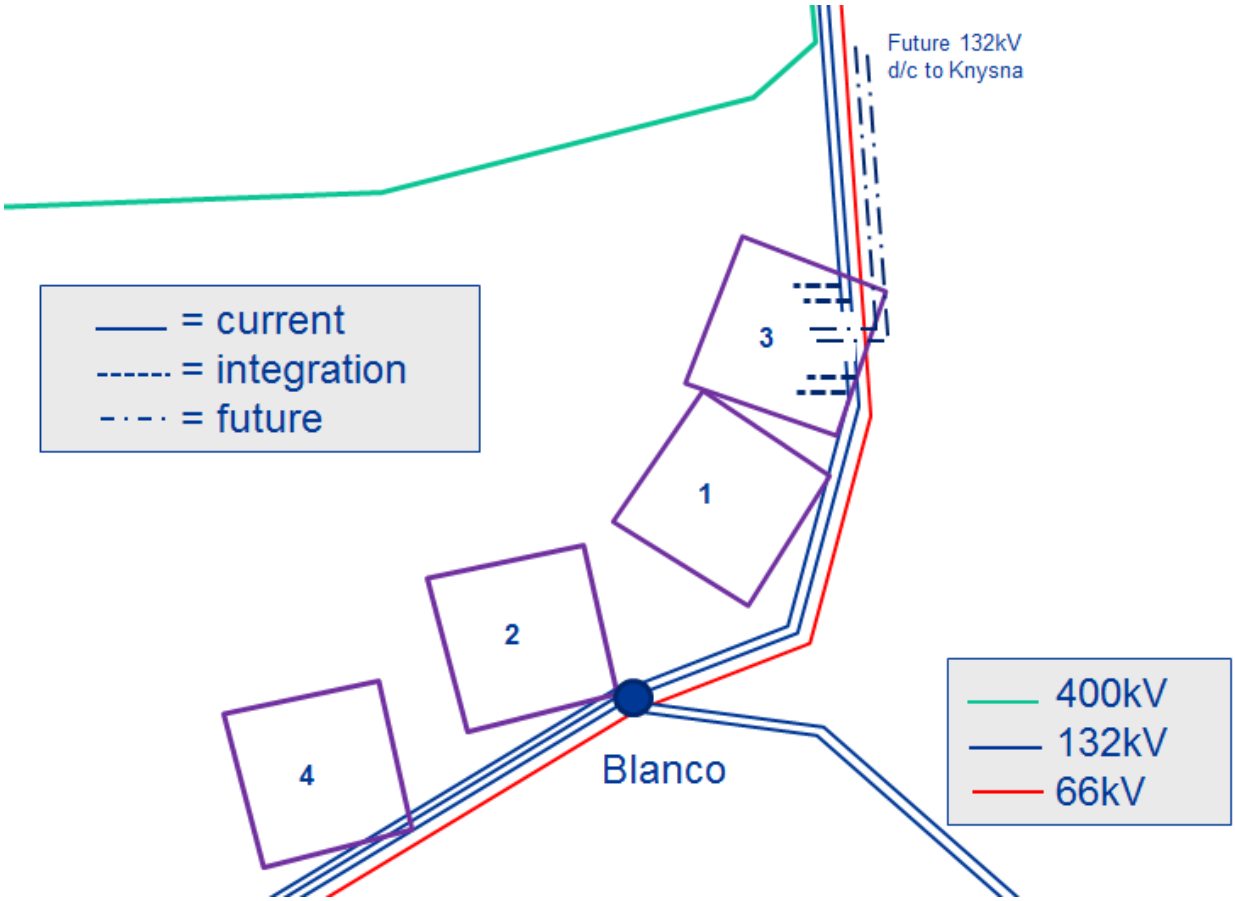

Figure 8: Site 3 132kV Integration

Site 3 Scope of works:

- Connect the Narina MTS to the Blanco–Outeniqua double circuit 132 kV line via an in/out configuration, connecting Outeniqua and Blanco substations directly to Narina MTS.
- Break down the approximately 2km of 132kV double circuit line between Blanco and Narina. Build a new 132kV double circuit line on the same servitude between Narina MTS and Blanco substation, utilizing the now vacant Outeniqua feeder bays at Blanco substation (protection upgraded to connect to Narina MTS).
- Create normally open points between Blanco substation and Proteus on the 3x 132kV incoming lines.
- The existing Knysna s/c 132kV (operated at 66kV) line might have to be diverted to accommodate the MTS on the site.
- An additional double circuit line will be required in future to pick up Knysna substation via a 132kV double circuit line directly from Narina MTS, using the existing servitude of the 132kV, operated at 66kV, line to Knysna. Provision should be made with the layout of the feeder bays in the MTS to avoid any line crossings.

Site 4 - South-west of Blanco

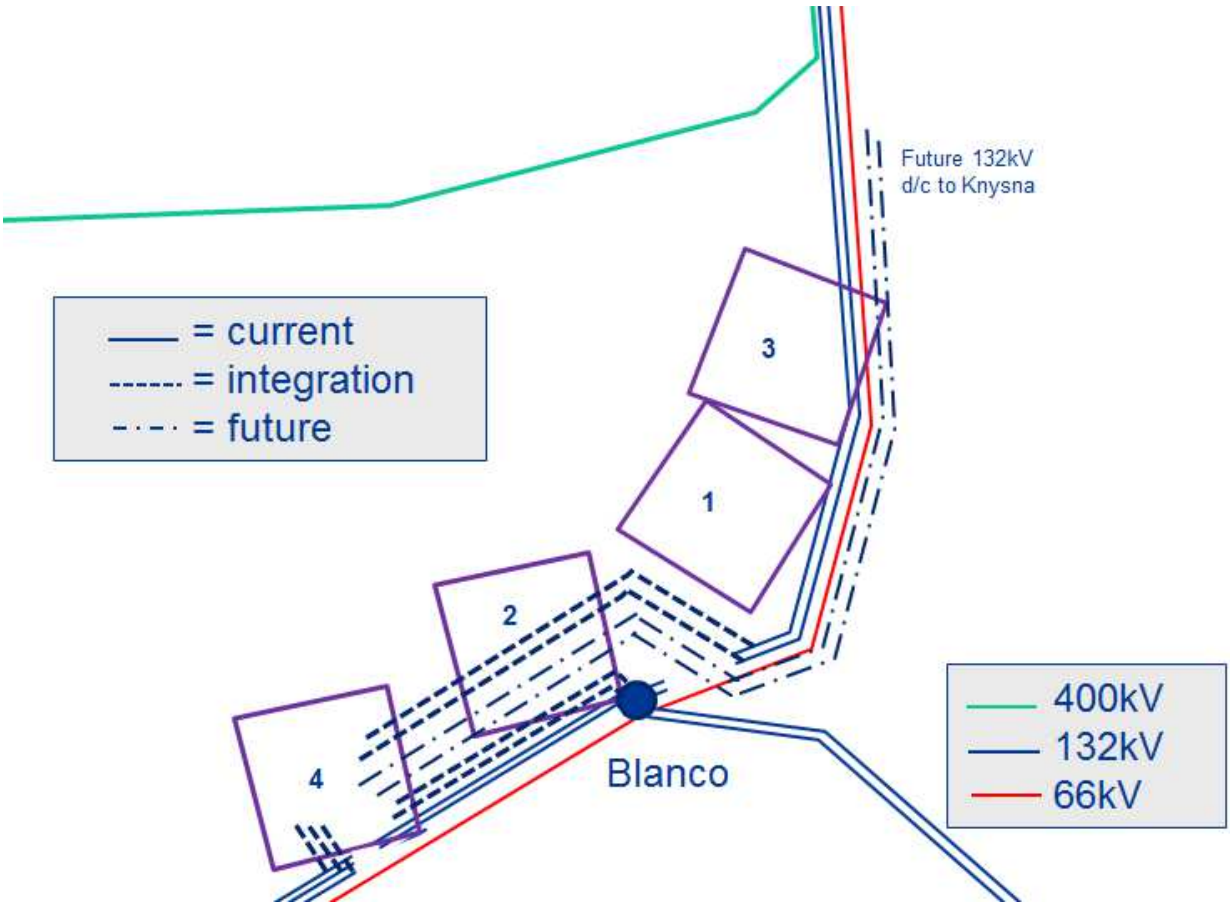

Figure 9: Site 4 132kV Integration

Site 4 Scope of works:

- Connect Narina MTS to the Blanco-Outeniqua 132 kV double circuit line by diverting the Outeniqua line from Blanco to Narina, connecting Outeniqua substation directly to Narina MTS.
- Build a new 132kV double circuit line between Narina MTS and Blanco substation (cannot dismantle that portion of Proteus lines to rebuild on the same servitude as it is Blanco's sole supply), utilizing the now vacant Outeniqua feeder bays at Blanco substation (protection upgraded to connect to Narina MTS).
- Connect Narina MTS to the 3 Blanco-Proteus 132 kV circuits (3 circuits on two double circuit lines) by turning the Proteus lines into Narina, connecting Proteus substation directly to Narina MTS.
- Create normally open points between Blanco substation and Proteus on the 3x 132kV incoming lines.
- An additional double circuit line will be required in future to pick up Knysna substation via a 132kV double circuit line directly from Narina MTS, using the existing servitude of the 132kV, operated at 66kV, line to Knysna. Provision should be made with the layout of the feeder bays in the MTS to avoid any line crossings.

Site 5 - North-east, much further away

- Site 5 is similar to Sites 1 and 3, just the connecting line to be built between Narina and Blanco is longer: turn both Blanco-Outeniqua 132kV lines in to Narina and supply Outeniqua from Narina. Then the 132kV line portions from there to Blanco can be dismantled and the double circuit Twin-Kingbird connecting line from Narina to Blanco can be built on the vacated servitude, and connect to the old Outeniqua feeder bays at Blanco.

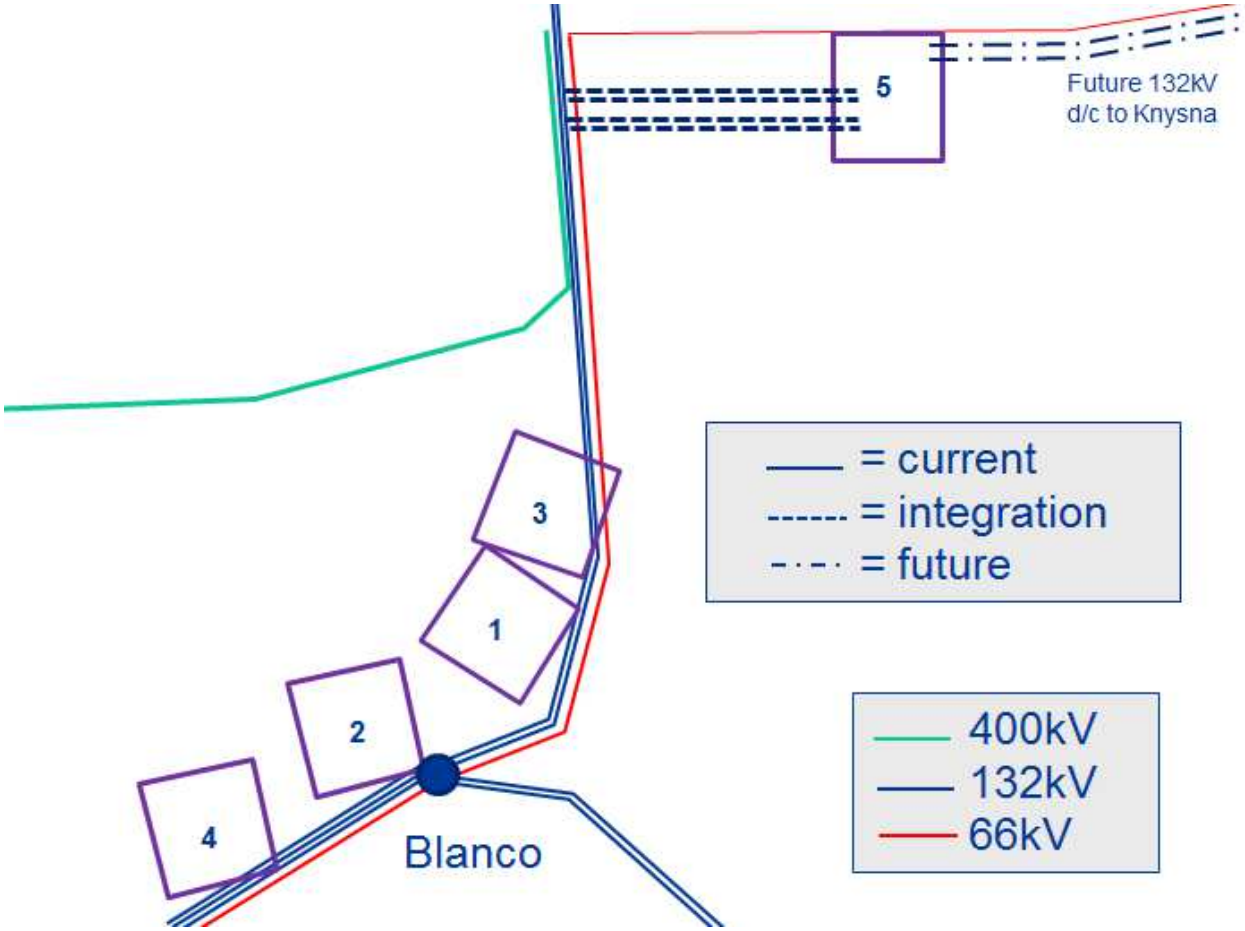

Figure 10: Site 5 132kV Integration

Site 5 Scope of works:

- Connect Narina MTS to the Blanco–Outeniqua double circuit 132 kV line via an in/out configuration, connecting Outeniqua and Blanco substations directly to Narina MTS.
- Break down the approximately 4km of 132kV double circuit line between Blanco and Narina. Build a new 132kV double circuit line on the same servitude, utilizing the same feeder bays at Blanco substation (protection upgraded to connect to Narina MTS).
- Create normally open points between Blanco substation and Proteus on the 3x 132kV incoming lines.
- An additional double circuit line will be required in future to pick up Knysna substation via a 132kV double circuit line directly from Narina MTS, using the existing servitude of the 132kV, operated at 66kV, line to Knysna. Provision should be made with the layout of the feeder bays in the MTS to avoid any line crossings.

Summary of Preferred Alternative in terms of integration

From a technical and cost perspective, the following can be summarized about the preferred alternatives:

- Site 1 is the preferred site. It will allow easy integration to the existing 132kV network and is optimally located for future network expansion towards Schaapkop and Knysna substation, without any 132kV line crossings.
- Site 2 presents problems for future expansion, due to limited access to the 132kV busbar in the MTS. Current and future integration to the 132kV network may have to be via cable networks.
- Site 3 is similar to Site 1 except that the integration line to be built is longer. However, seeing that the 132kV line currently operated at 66kV is crossing the site, this site may pose problems. The line may require to be diverted.
- Site 4 also presents problems for future expansion due to limited access to the 132kV busbar in the MTS. Major infrastructure is required to integrate the MTS to the current network.
- Site 5 is similar to Sites 1 and 3, except that the integration line to be built is much longer.

Therefore, from Eskom's technical and cost perspective, Site 1 is the preferred site, with ease of integration, at the least cost, followed by site 3.

SECTION B: THE RECEIVING ENVIRONMENT

In order to, with any level of confidence, assess the potential impacts of the proposed Narina (Blanco) substation and power line project on the receiving environment, one needs to first assess the baseline conditions found over the study area. Using this *Status Quo* one can then, broadly speaking, determine the likely impacts that will emanate from a specific development typology on a well-defined receiving environment.

B-1 BIOPHYSICAL ENVIRONMENT

B-1.1 Geology and Geotechnical Suitability

The underlying geology of the project area comprises 50% Granite and 50% Quartzite. Refer to the Geology map in **Figure 11.**

B-1.2 Soils, Land Use and Agricultural Potential

The rural areas west and south of Blanco village displays a rich and varied pattern of land use (i.e. forestry and agriculture) and fine grained texture of fields and pastures (including the cultivation of hops) defined further through closely planted trees (often utilised as windbreaks) along former boundaries and along roads and tracks. The area is also traversed by an extensive network of irrigation ditches.

The type of land use within the project area includes cultivated land, forestry and vacant areas.
The main land uses are pastures, vegetables, cereals and fodder production. Berries, hops and fruit are increasingly produced, albeit on a smaller scale.

The composition of the soils within the project area is predominantly prismacutanic and pedocutanic diagnostic horizons and B horizons.

In terms of the agricultural potential of the land within the project area affected by the proposed Blanco substation and power line project an agri-potential assessment was conducted to verify and quantify any potential impacts.

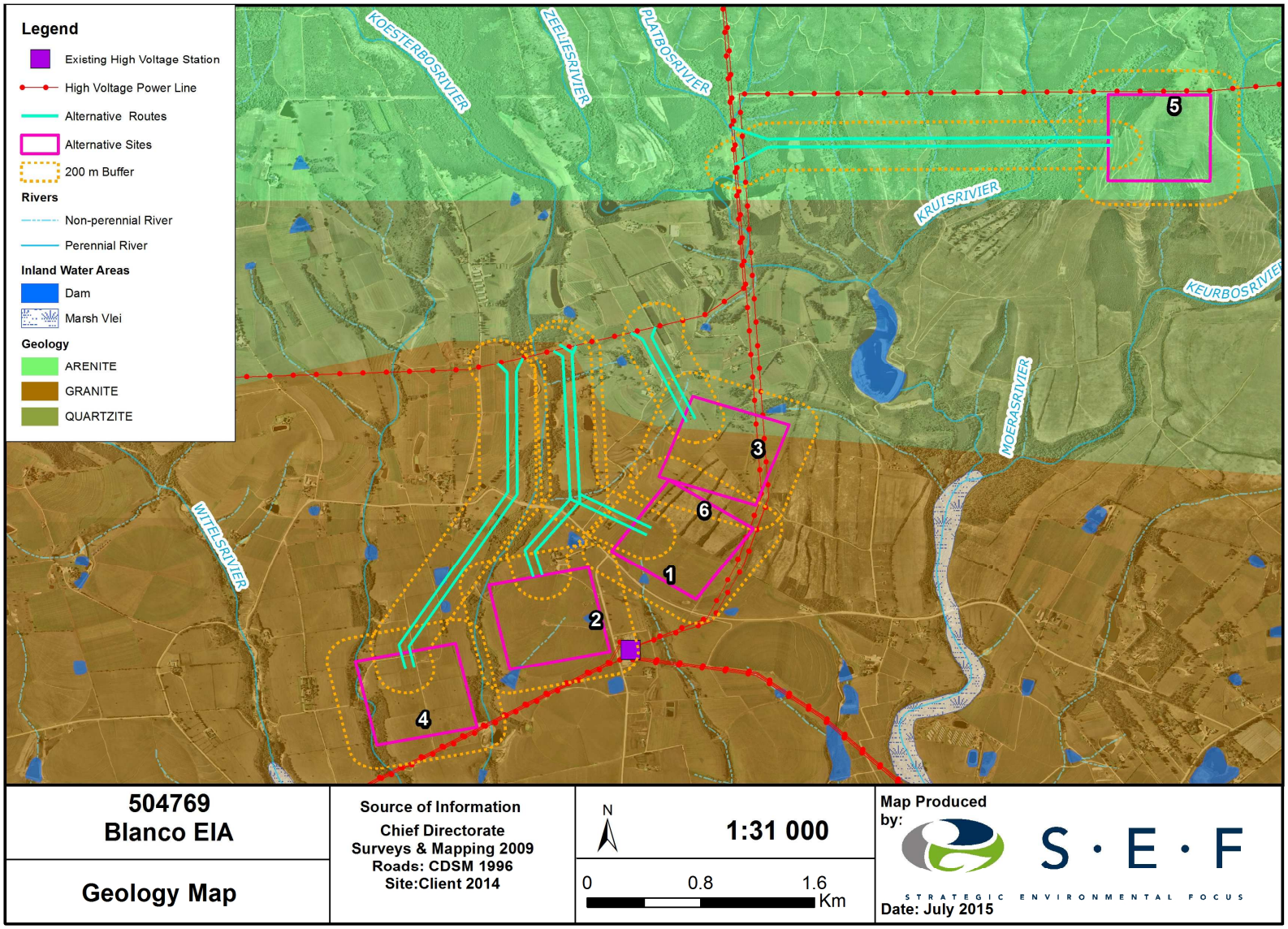

Figure 11: Geology map for the proposed project area

B-1.2 Topography and Hydrology

The general topography of the project area can be described as relatively flat with a gentle sloping gradient. Mountainous terrain is present on the outskirts of the project area.

The Blanco area is traversed by a number of river corridors, the most prominent watercourses being the Keur River (which becomes the Malgas River situated south of the Outeniqua Pass), the Norga River (flowing through the centre of this area) and the Moeras River (meandering south along its western boundary). A number of perennial, non-perennial rivers, wetland systems and dams occur within the project area (**Figure 12**).

In general, the study area has undergone a high level of transformation and is currently intensively utilised for agriculture with very little natural vegetation remaining. Areas within valley-bottom wetlands with permanent and seasonal zonation and associated high water tables contained hydrophylic plants such as *Prionium serratum, Typha capensis*, *Phragmites* sp., *Juncus* sp., *Pteridium aquilinum, Cyperus* sp*., Pycereus macranthus* cf*., P. polystachyos*, *Schoenoplectus brachyceras, Fimbristylis* sp. and *Isolepis* sp. Several Restionaceae containing elements of Ericaceae and Proteaceae were associated with the Champagne soil forms in the northern section of the study area.

The temporary wetland areas consisted of a mixture of facultative wetland and terrestrial species such as *Asparagus burchellii, Searsia glauca, Rapanea melanophloeos*, *Burchellia bubaline, Thermeda triandra, Eragrostis plana, Eragrostis gummiflua*, *Aristida* sp.*,Andropogan* sp*., Setaria sphacelata, Hyparrenhia* sp., *Monopsis decipiens* and *Nidorella anomala*.
Alien vegetation species were numerous and dominated several drainage lines, including species such as *Acacia mearnsii, Solanum mauritianum, Eucalyptus* spp*., Pinus* spp., *Acacia melanoxylon, Crotaderia selloana*, *Bidens pilosa* and *Tagetes minuta.*

B-1.3 Climate

The George area receives approximately 662mm of rain per year, with rainfall occurring throughout the year. This town receives the lowest rainfall (36mm) in June and the highest (78mm) in March. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for George range from 18.2°C in July to 27.6°C in February. The region is the coldest during July when the mercury drops to 6.2°C on average during the night.

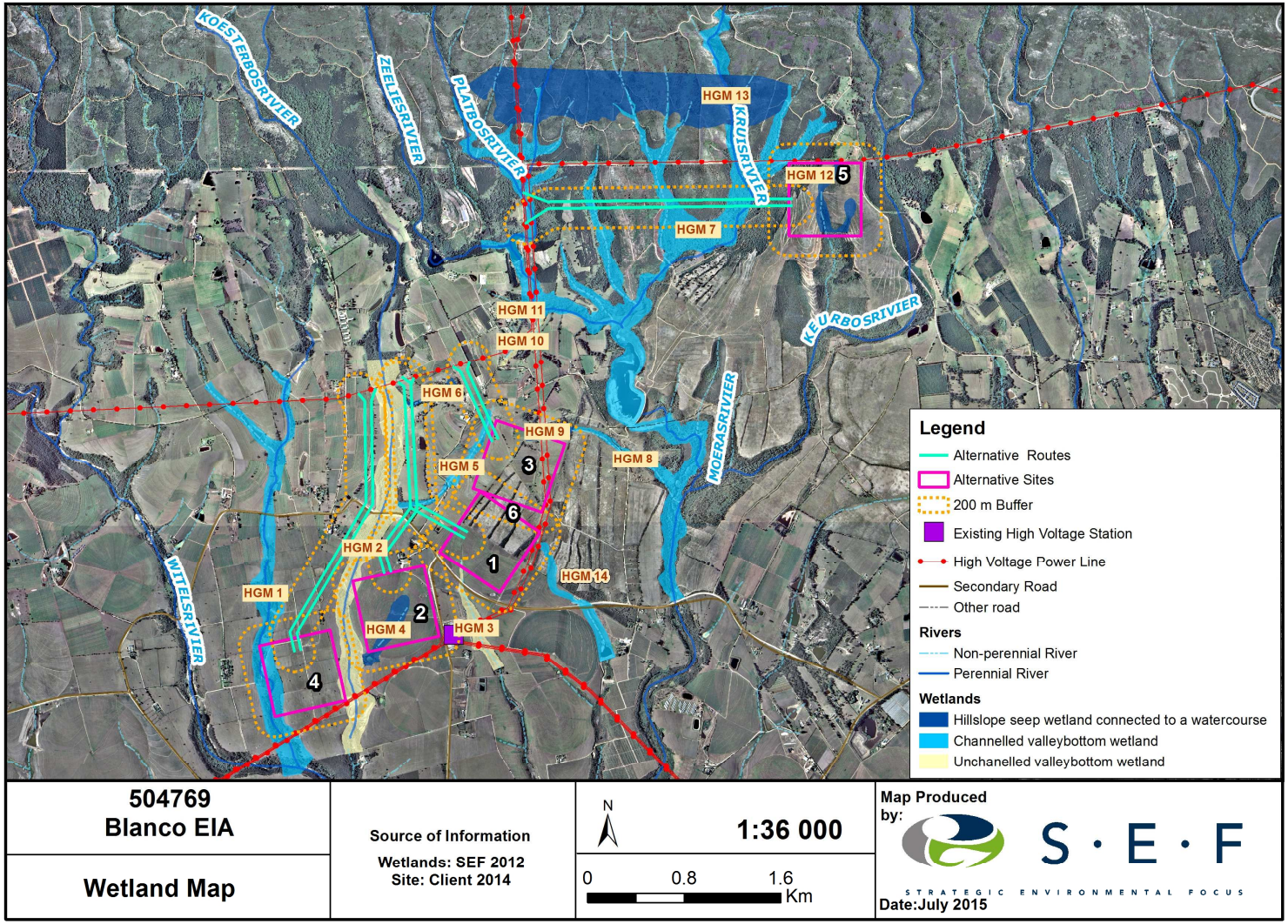

Figure 12: Wetland map for the proposed project area

B-1.4 Ecology

Flora

The study site is located within the Fynbos biome which occupies most of the Cape Fold Belt as well as the adjacent lowlands between the mountains and the Atlantic Ocean. There are three major vegetation complexes within the Fynbos biome namely Fynbos, Renosterveld and Strandveld. Directly translated Fynbos means “fine bush” and comprises an evergreen, fire-prone shrubland characterised by restioid bushes and ericoid shrubs (including families such as Ericaceae, Asteraceae, Rhamnaceae, Thymelaeaceae and Rutaceae) (Mucina & Rutherford, 2006). In structural terms, Fynbos is defined as a shrubland or restioland with a cover of more than 5% Restionaceae which usually contains elements of Ericaceae and Proteaceae. The Fynbos biome is divided into smaller units known as vegetation types. According to Mucina & Rutherford (2006), the study area is situated within the Garden Route Granite Fynbos and Garden Route Shale Fynbos.

The Garden Route Granite Fynbos is limited to the Western Cape Province where it consists of moderately undulating plains and undulating hills on the coastal forelands. Important taxa in the Garden Route Granite Fynbos include tall shrubs such as *Passerina corymbosa*, *Cliffortia serpyllifolia*, *Protea coronata*, *P.lanceolata*, *P.nerriifolia* as well as low shrubs such as *Erica discolour*, *E.peltata*, *Phylica confusa*, *Syncarpha paniculata*, *Agathosma ovata*, and *Hermannia angularis*. Succulent shrubs include *Lampranthus sociorum* and graminoids such as *Tetraria cuspidata*, *Brachiaria serrata*, *Eragrostis capensis*, *Ficinia nigrescens*, *Heteropogon contortus*, *Pentaschistis eriostoma*, *Restio triticeus* and *Themeda triandra*. According to Mucina & Rutherford (2006), this vegetation type is classified as Endangered, with less than 1% conserved in the proposed Garden Route National Park while more than 70% has been transformed by cultivation, pine plantations and urban development.

The Garden Route Shale Fynbos occurs in the Western and Eastern Cape Provinces and includes undulating hills and moderately undulating plains on the coastal forelands. In the wetter areas this vegetation type includes tall, dense proteoid and ericaceous Fynbos while the drier areas are dominated by graminoid Fynbos (Mucina & Rutherford, 2006). Important taxa in the Garden Route Shale Fynbos include *Leucadendron eucalyptifolium*, *Protea aurea subsp. aurea*, *P.coronata*, *Leucospermum formosum*, *Metalasia densa* and *Passerina corymbosa* while the low shrubs include species such as *Acmadenia alternifolia*, *A.tetragona*, *Anthospermum aethiopicum*, *Cliffortia ruscifolia*, *Leucadendron salignum*, *Pelargonium cordifolium* and *Eriospermum vermiforme*. Graminoid species include *Ischyrolepis sieberi*, *Aristida junciformis*, *Brachiaria serrata*, *Cymbopogon marginatus*, *Elegia juncea*, *Eragrostis capensis*, *Restio triticeus*, *Themeda triandra* and *Tristachya leucothrix*.

According to Mucina & Rutherford (2006), Garden Route Shale Fynbos is classified as Least Threatened with only about 1% transformed and infestations of alien species generally being low.

Fauna

Faunal habitat within the predominantly agricultural landscape of the study area included areas of old fields now converted to secondary grassy shrubland, a few small watercourses with associated riparian vegetation, man-made farm dams and stands of exotic trees.

Although previously disturbed, the secondary shrubland provided suitable feeding and breeding habitat for many bird, mammal, reptile and invertebrate species. The stands of exotic trees on site likely provided shelter for many faunal species especially birds and bats. Stands of exotic trees, especially in transformed landscapes, provide shelter for roosting, perching and nesting.

Watercourses and wetlands are usually areas of high faunal diversity as the riparian environment and while dense vegetation provides abundant cover, feeding and breeding habitat for many species of invertebrates, birds, mammals, reptiles and amphibians. When it is available, surface water provides drinking water for many faunal species while the soft substrate provides perfect burrowing environments for mammals, reptiles and invertebrates. The increase in prey and vegetation attracts a high diversity of birds, as well as terrestrial

mammals and reptiles, including predators. Watercourses and the associated riparian vegetation also tend to be corridors of movement through the landscape for fauna and flora. They are especially important in cultivated or transformed landscapes where most of the natural terrestrial habitat has been destroyed or transformed.

Refer to **Figures 13 and 14** for maps showing the **regional vegetation** and **critical biodiversity** of the project area.

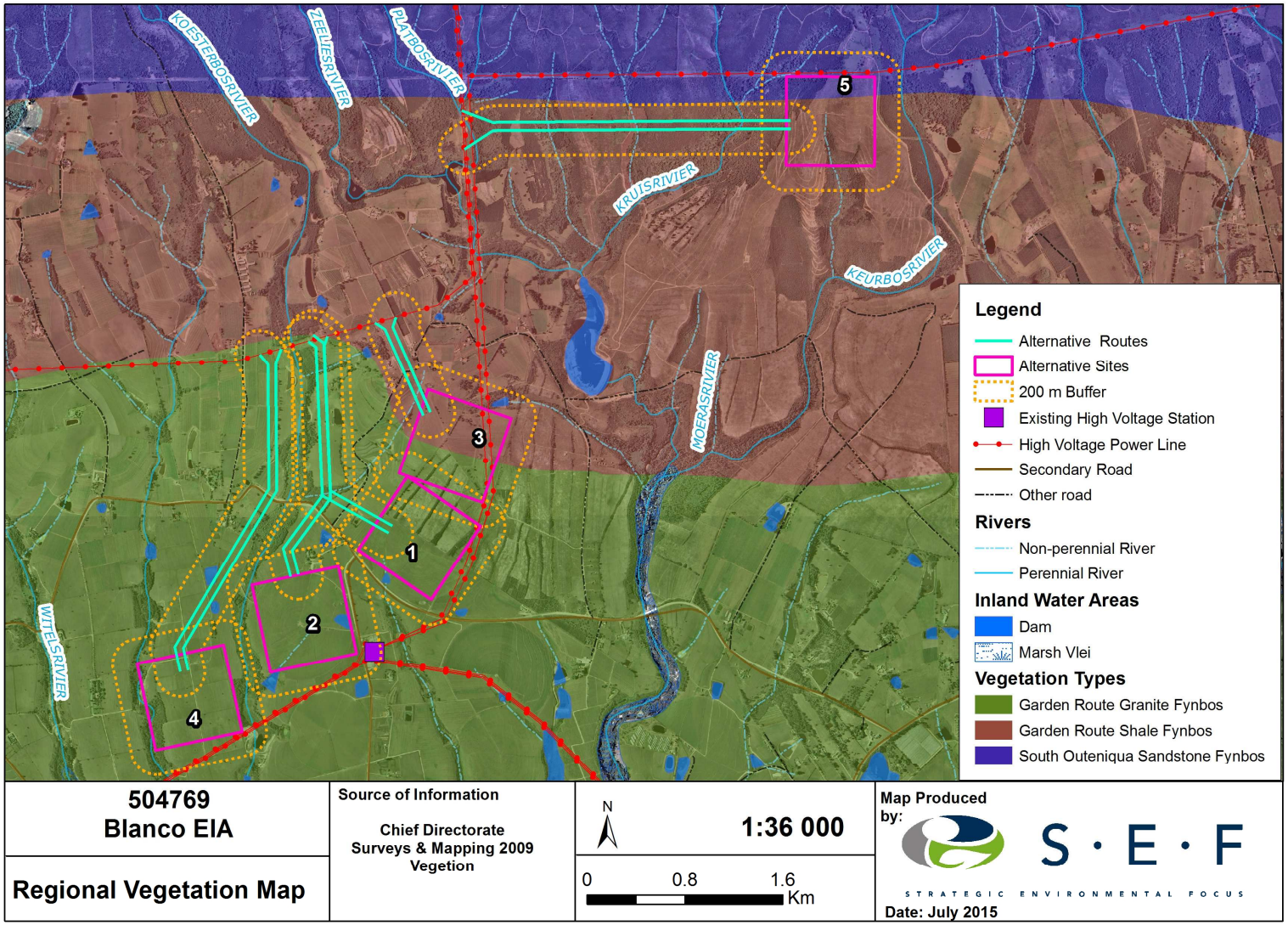

Figure 13: Regional vegetation map for the proposed project area

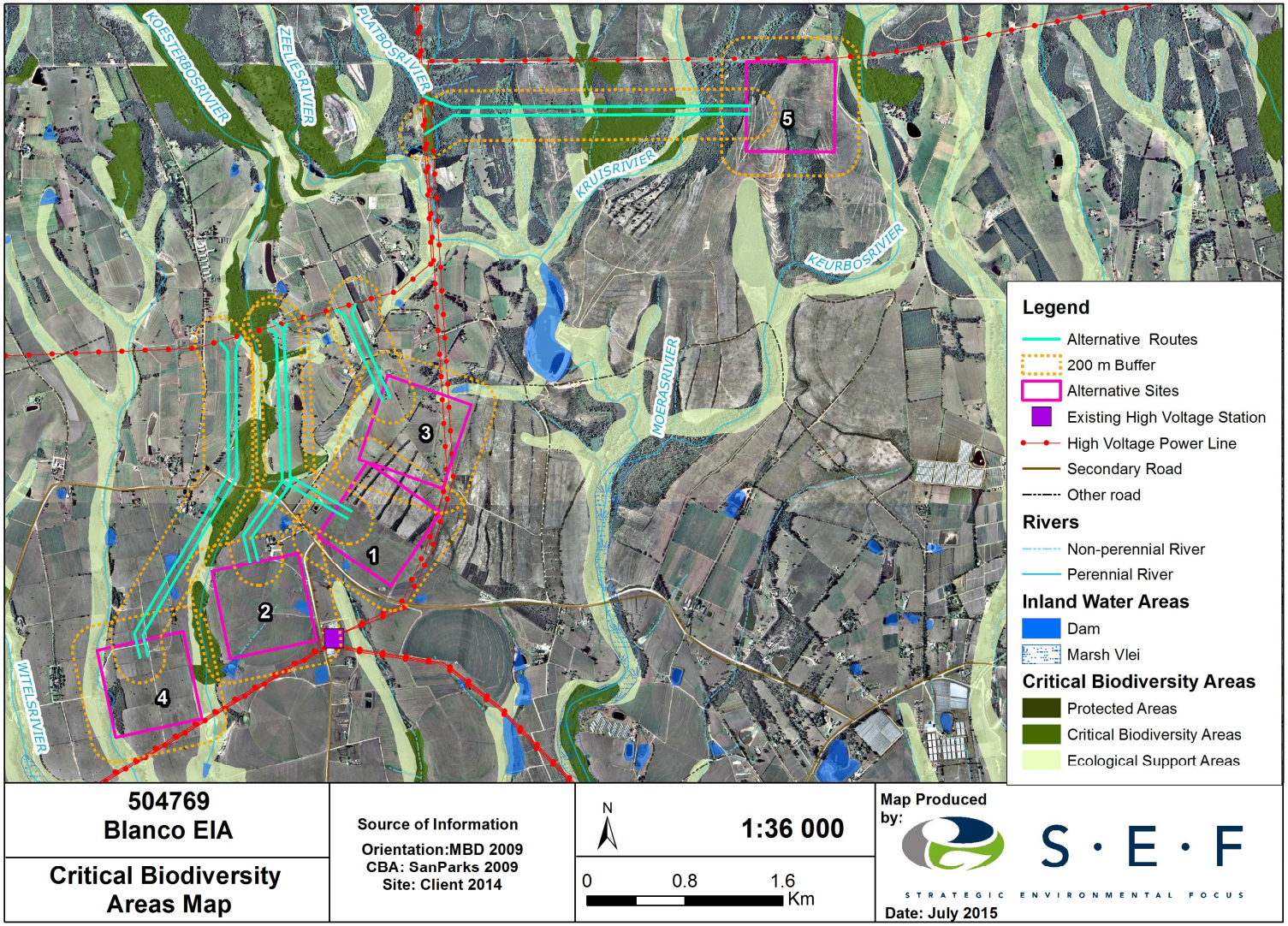

Figure 14: Critical biodiversity map for the proposed project area

B-2 SOCIAL ENVIRONMENT

B-2.1 Demographics

George Local Municipality forms part of the Eden District Municipality and is situated in the middle of Knysna, Oudtshoorn, Mossel Bay and Hessequa Local Municipalities. The municipality is classified as a category B municipality, and is inter alia responsible for basic service delivery. George is located along the N2 highway. Its strategic location along the N2 highway to Cape Town and the Eastern Cape facilitates mobility of people, goods and services.

According to Census 2011, the local municipality has a total population estimated at 193 672. Of the population, 50,4% are coloured, 28,2% are black African, 19,7% are white, with other population groups making up the remaining 1,7%.

Of those 20 years and older, 6,0% have completed primary school, 35,4% have some secondary education, 29,3% have completed matric, and 11,7% have some form of higher education. Of the mentioned age group, 3,9% have no form of schooling.

There are 79 544 economically active (employed or unemployed but looking for work) people in the municipality, 20,7% are unemployed. 27,6% of the 37 947 economically active youth (15 – 34 years) in the municipality are unemployed (www.statssa.gov.za).

B-2.2 Visual

The Blanco area is part of a regional settlement pattern within the Garden Route between the Outeniqua Mountains and the sea. The mountains and river corridors define the space and contribute to a **unique sense of place**. This sense of place (defined by the river corridors, agricultural environment mountains) in this area is a contributing factor to the increased popularity and interest in this town as a destination.

Scenic value can be described as the reaction to aesthetics of the environment as perceived by an individual or a group and therefore it is a very subjective perception.

The terrain of the study area is generally described as *undulating hills* and *moderately undulating plains.* The north of the study area consists of *low mountains,* which are formally known as the Outeniqua Mountain Range.

Overall, the study area is considered to have a very high visual and scenic quality by virtue of the landscape and environment. Sense of place is strongly pastoral, defined by green, picturesque farmland and fields set against the backdrop of the dramatic Outeniqua Mountains and punctuated by meandering, bush-lined rivers. Development outside of the towns and built up areas is domestic in scale, and sparsely spread.

B-2.3 Heritage

The project area is situated within a unique rural cultural landscape which has a strong vibrant history and character which is quite distinguishable from the neighbouring town (namely George). The Blanco rural cultural landscape displays a relatively fine grained subdivision pattern, creating a patchwork of varied land use (although predominantly agriculture orientated). The landscape is further defined by traditional landscape features and patterns such as closely planted trees, creating the impression of fields and pastures as '"rooms" within the land.

Background history of Blanco, George (extract from Vidamemoria, 2015)
Henry Fancourt White purchased a portion of the farm Modder River in 1848, of which Frances Cook bought a portion and renamed the farm Oaklands. The rest was subdivided into erven later known as a little village

called 'Whitesville' named in honour of Henry Fancourt White. At the suggestion of Henry White, the name was changed to Blanco, the Spanish term for white. In 1859 Henry White built an exquisite double storey thatched mansion, which he named Blanco House. In 1903 his son Ernest Montagu White renamed the house Fancourt in honour of his father. The main route from Mossel Bay to the Langkloof passed through Blanco and commercial enterprises were soon established along the route and the village was also the main postal centre. Physical character of agricultural area that developed to the west of Blanco is characterised by major elements including mountain backdrop of the Outeniqua Mountains, farming hills and associated development and infrastructure.

B-2.4 Noise

Noise control must form part of the planning stage of any development. During the construction phase of the proposed substation and powerline project, noise may be generated as a result of construction related activities such as: the use of machinery and equipment, and the movement of construction vehicles etc. These potential noise impacts must be mitigated, where possible, and mitigation measures should be included in an Environmental Management Programme for the project. .

B-2.5 Air Quality

Vehicles travelling on exposed surfaces, earthworks as well as wind are the main generators of dust. The nuisance and aesthetic impacts associated with the dust generated during the construction phase of the proposed substation and powerline project should be minimal, if mitigating measures are implemented.

Dust generated off the earth's surface is generally regarded as a nuisance rather than a health or environmental hazard. On a large scale dust will impair atmospheric visibility; however, in the context of the proposed activity, the impact of dust production on air quality should be minimal taking into account that effective dust suppression techniques are available and have been included as potential mitigation measures. The nuisance aspect of dust will be minimal as the project area is sparsely populated.

SECTION C: ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

C-1 APPROACH TO THE EIA

An EIA is an effective environmental planning tool. It identifies the environmental impacts of a proposed project and assists in ensuring that a project will be environmentally acceptable and integrated into the surrounding environment in a sustainable way.

The EIA for this project complies with the requirements of NEMA and the EIA Regulations, 2010 of the DEA. The guiding principles of an EIA are listed below.

Definition of the term "environment"

The term "environment" is used in the broadest sense in an environmental impact assessment. It covers the physical, biological, social, economic, cultural, historical, institutional and political environments.

C-2 GUIDING PRINCIPLES FOR AN EIA

The EIA must take an open participatory approach throughout. This means that there should be no hidden agendas, no restrictions on the information collected during the process and an open-door policy by the proponent. Technical information must be communicated to stakeholders in a way that is understood by them and that enables them to meaningfully comment on the project.

There should be ongoing consultation with Interested and Affected Parties (I&APs) representing all walks of life. Sufficient time for comment must be allowed. The opportunity for comment should be announced on an on-going basis. There should finally be opportunities for input by specialists and members of the public. Their contributions and issues should be considered when technical specialist studies are conducted and when decisions are made.

The eight guiding principles that govern the entire process of EIA are as follows (see Figure below):

- **Participation:** An appropriate and timely access to the process for all interested parties.
- **Transparency:** All assessment decisions and their basis should be open and accessible.
- **Certainty:** The process and timing of the assessment should be agreed in advanced and followed by all participants.
- **Accountability:** The decision-makers are responsible to all parties for their action and decisions under the assessment process.
- **Credibility:** Assessment is undertaken with professionalism and objectivity.
- **Cost-effectiveness:** The assessment process and its outcomes will ensure environmental protection at the least cost to the society.
- **Flexibility:** The assessment process should be able to adapt to deal efficiently with any proposal and decision making situation.
- **Practicality:** The information and outputs provided by the assessment process are readily usable in decision making and planning.

An S&EIR process is considered as a project management tool for collecting and analysing information on the environmental effects of a project. As such, it is used to:

- Identify potential environmental impacts;
- Examine the significance of environmental implications;
- Assess whether impacts can be mitigated;
- Recommend preventive and corrective mitigating measures;
- Inform decision makers and concerned parties about the environmental implications; and
- Advise whether development should go ahead.

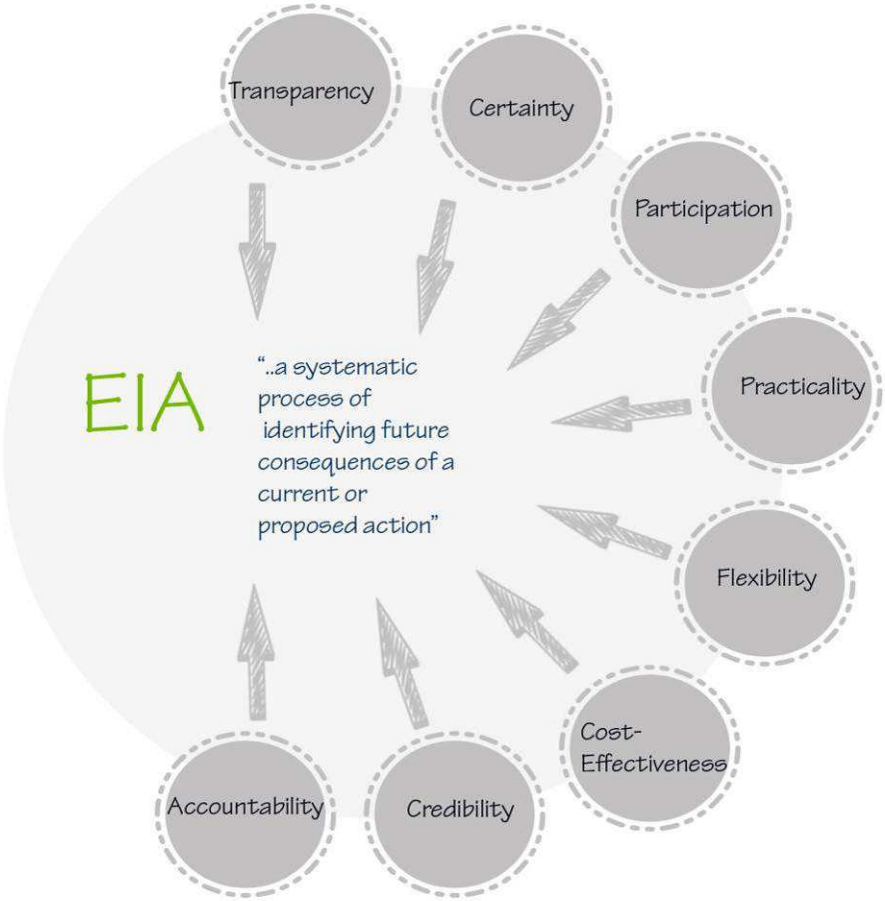

Figure 15: The eight guiding principles for the EIA process

An S&EIR process typically has four phases, as illustrated in the Figure below. The Public Participation process forms an integral part of all four phases and is discussed in greater detail in Section C – 4 of this final Scoping Report.

C-3 S&EIR TECHNICAL PROCESS

This section provides a summary of the technical process to be followed for this S&EIR process.

Figure 16: Flow diagram of the Scoping and EIR process

C-3.1 Pre-application Consultation with the DEA

No pre-consultation meeting was held between SEF and DEA. The EAP conducting the S&EIR process for the applicant, in support of their application for an environmental authorisation, is deemed to have a good

understanding of the information requirements of the Department for the proposed substation and power line project, such that the Department's specific information requirements are deemed to have been met for the scoping phase of this project.

C-3.2 Application for Authorization

The application form informing the Department of intent to obtain an environmental authorisation was submitted to the DEA on the 23rd of October 2012. The project was subsequently registered and assigned the reference number **DEA Ref: 14/12/16/3/3/2/424 (Appendix 3).**

C-3.3 Information Gathering

Early in the EIA process, the technical specialists identified the information that would be required for the impact assessment and the relevant data was obtained. In addition, the specialists sourced available information about the receiving environment from reliable sources, I&APs, previous documented studies in the area and previous EIA Reports.

C-3.4 Specialist Studies

The following specialist studies were identified to be undertaken during the EIR phase (Refer to **Appendix 6**):

- Agri-economic Assessment by John Phipson of Mzanzi Agriculture (July 2015)
- Agricultural Potential Assessment by Prof B. Schloms, Prof. F Ellis, etc (July 2015);
- Ecological (including Fauna, Avifauna & Floral) Assessment by Karin van der Walt and Robyn Phillips of SEF (August 2015);
- Heritage Impact Assessment by Quahnita Samie of Vidamemoria (July 2015);
- Social Impact Assessment by Tony Barbour (July 2015);
- Town Planning by Candice Maasdorp of Sustainable Planning Solutions (August 2015); and
- Traffic Impact Statement by Pieter Arangie of ITSE (August 2015).
- Visual Impact Assessment by Mandy van der Westhuizen of NuLeaf (August 2015);
- Wetland Assessment by Willem Lubbe of SEF (August 2015).

C-4 PUBLIC PARTICIPATION PROCESS

The principles of NEMA govern many aspects of the S&EIR process, including consultation with I&APs. These principles include the provision of sufficient and transparent information to I&APs on an ongoing basis, to allow them to comment; and ensuring the participation of historically disadvantaged individuals, including women, the disabled and the youth.

The principal objective of public participation is thus to inform and enrich decision-making. This is also the key role in the scoping phase of the process. Refer to Appendix 5A for the Report on the Public Participation Process at the Scoping Phase.

C-4.1 Identification of Interested and Affected Parties

I&APs representing the following sectors of society have been identified in terms of Regulation 55 of the EIA Regulations R543 of 2010 (**see Appendix 5.3a** for a complete I&AP distribution list):

- Provincial Authorities;
- Local Authorities;
- Ward Councillors;
- Parastatal/ Service Providers;
- Non-governmental Organisations;

- Local forums/ unions; and
- Adjacent Landowners.

C-4.2 Public Announcement of the Project

The project was announced on the 24th of January 2013 in the following manner:

- Publication of media advertisements (in English and Afrikaans) in the George Herald (local newspaper) and Die Burger (regional newspaper) (refer to Appendix 5.3a and 5.3b, respectively;
- On-site notices advertising the S&EIR process were placed at the proposed substation site alternatives (1-4) and A3 notices were placed at visible locations and venues in the town of Blanco (refer to Appendix 5.2a and 5.2b); and
- Distribution of letters by fax/ post/ email to I&APs including Registration and Comment Sheets (refer to Appendix 3).

C-4.3 Open House and Focus Group Meeting

An open house public meeting was held at "Ibis Place" Country House on Thursday 7th of February 2013, from 16:00–19:00. The proposal was discussed and presented in poster format, detailing the project information. I&APs were given the opportunity to raise their issues and concerns, if any, and to discuss these matters with the project team (SEF and Eskom).

At the Open House meeting held in February 2013, landowners in attendance requested more detailed information regarding the proposals (refer to Appendix 5.5a). Additional information was distributed to the landowners on 28 March 2013, and a comment period of approximately 14 days was allowed. A landowners meeting took place on 19 February 2013 (refer to Appendix 5.5.c). A follow up meeting was then arranged with the landowners on 8 May 2013, to discuss the comments received and plan a way forward (refer to Appendix 5.5d).

C-4.4 Draft Scoping Report

I&APs and relevant State Departments were given the opportunity to raise comments or issues either in writing, by fax or email on the Draft Scoping Report for a period of 40 days (**from 24th of January 2013 until 4th of March 2013**). The availability of the Draft Scoping Report was announced by means of personal letters to all the registered I&APs on the distribution list, and by adverts placed in the abovementioned newspapers.

In addition, the Draft Scoping Report was distributed for comment as follows:

- Left in a public venue (George and Blanco Public Library);
- Hand-delivered/ couriered to the relevant authorities; and
- Posted on SEF's website at http://www.sefsa.co.za.

All the comments and concerns raised by I&APs during the S&EIR process have been captured in a Comment and Response Report. Refer to Appendix 5.6a for the actual comments received from the State Departments and Appendix 5.6b for comments received from the landowners during the Scoping Phase. The Comments and Responses Report (State Department comments) is in Appendix 5.7a) and the Comments and Responses Report (Landowner's comments) is in Appendix 5.7b).

C-4.5 Final Scoping Report

A period of 30 calendar days (19th of August 2013 to 17th of September 2013) was provided for the review and comment of the Final Scoping Report (FSR). The FSR was updated with comments raised by I&APs during

the DSR review period. Comments were submitted directly to the DEA in response to the FSR. DEA accepted the FSR on **11 October 2013.**

Refer to the database of registered I&APs at the Scoping Phase in Appendix 5.4.

C-4.6 Specialist Integration Meeting

A Technical Specialists Integration Workshop was held on 22 April 2015, after the specialists have undertaken initial site investigations to identify and describe potential issues and determine potential impacts, and compiled draft reports.

The purpose of the Technical Specialists Workshop was to present the specialists' initial findings and integrate these findings to determine which site alternative and associated Transmission route alignment may be considered the preferred option for the project.

Each specialist, based on their visit to the site and their experience, ranked the alternatives according to preference, i.e. preferred.

Based on the technical input provided by Eskom, inputs of the various specialists, as well as scope changes ; site alternatives were dismissed during the early EIR, and particular site and route alternatives were assessed by the specialists in further detail. Where it became clear that identified impacts cannot be avoided, practical mitigation measures were prescribed and included in this EIR and the draft EMPr to reduce the significance of the impacts.

C-4.7 Draft Environmental Impact Report

The finding of the Impact Assessment Phase was presented in the Draft EIR and EMPr (including the specialist studies conducted) that was available for public review and comment.

A period of **30 calendar days (19th of August 2015 – 18th of September 2015**) was provided to the **State Departments and Registered I&APs** for the review and commenting phase of the Draft EIR. The availability of the Draft EIR was been announced by means of personal letters to all the registered I&APs on the distribution list. Refer to the notification letter in Appendix 5.8).

In addition, the Draft EIR was distributed for comment as follows:

- Left at public venues (Blanco and George Public Libraries);
- Hand-delivered/ couriered to the relevant authorities; and
- Posted on SEF's website at http://www.sefsa.co.za.

All the comments and concerns raised are captured in a Comments and Responses Report (refer to Appendix 5.11). Refer to Appendix 5.10 for the actual comments received upon public review of the DEIR.

C-4.8 Final Environmental Impact Report

The EIR has been updated with comments and/or concerns raised by I&APs. The CRR is attached to the Final EIR. The Final EIR has been submitted to the DEA and registered I&APs simultaneously for review. Registered I&APs have been advised to submit any additional comments on the Final EIR directly to the DEA for consideration towards an Environmental Decision. The letter notifying I&APs of availability of the FEIR for public review is in Appendix 5.13.

The database of I&APs was updated following public review of the DEIR. Refer to the database of registered I&APs at the EIR phase in Appendix 5.9.

C-4.9 Focus Group Meeting

A Focus Group Meeting took place with the landowners on 3 September 2015 at Step-A-side Conference Centre, George. Refer to the minutes of the meeting and the attendance register in Appendix 5.12. An Open House Meeting was also held on the same day, where the same information was presented.

SECTION D: ALTERNATIVES

D-1 IDENTIFICATION OF ALTERNATIVES

The EIA procedures and regulations stipulate that the environmental investigation needs to consider feasible alternatives for any proposed development. Therefore, a number of possible proposals or alternatives for accomplishing the same objectives should be identified and investigated. During the EIR phase of the project, the identified alternatives will be assessed, in terms of environmental acceptability as well as socio-economic feasibility. To define the term alternatives as per Government Notice No. 543 of the NEMA EIA Regulations 2010 means:

"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to:

(a) The property on which or location where it is proposed to undertake the activity;
Refer to Section D-1.1. below that provides more details of the location alternatives.

(b) The type of activity to be undertaken;
There are no feasible and reasonable activity alternatives as Eskom is mandated to provide electricity in an efficient and sustainable manner, including its generation, transmission, and distribution and sales. Eskom Holdings is the biggest producer of electricity in South Africa; it also transmits electricity via a transmission network which supplies electricity at high voltages to a number of key customers and distributors. Eskom is a vertically integrated company licensed to generate, transmit and distribute electricity. The transmission licence is held by Eskom Transmission, the transmission network service provider (TNSP). Planning the transmission network is the responsibility of the Grid Planning Department in the Transmission Division. There are no feasible and reasonable activity alternatives.

(c) The design or layout of the activity;
The powerline routes are not fixed and the corridor that was assessed in this FEIR provides guidelines for powerline routing and substation site selection. The layout of the proposed infrastructure for the proposed substation and the power lines (e.g. pylons) will be determined at the detailed design stage, post receipt of the Environmental Authorisation (EA). A team of specialists including the terrestrial and wetland ecologists will walk-through the study area to determine the exact location of the proposed structures, taking into cognisance the avoidance of sensitive environmental areas. Details regarding the number, tower design and other support infrastructures associated with the power line and substation will be finalised. The design/layout of the activities will therefore be confirmed by the key specialists and the design engineers prior to construction.

There are various tower design options available for use in the transmission line development. A variety or combination of tower designs are likely to be utilised for construction of the lines, depending on the characteristics and needs of the land and communities concerned. The section below describes the type of tower designs that could be placed along the length of the transmission line development. The final tower design alternatives will be decided based on a walk down of the proposed corridors, and upon discussion with the relevant parties involved.

The type of tower structure proposed for the 400kV Loop-in Loop-out power line is a ~~515 H (Heavy) Self - Supporting Suspension Tower~~ (developed by Eskom in 1983) which will support quad (X4) wolf conductors in conjunction with ~~120KN~~ glass insulators. The spacing between the sub-conductors is estimated at 380mm and the midspan ground clearance of this tower (in order to achieve optimal electrical performance) is approximately 9.1m.

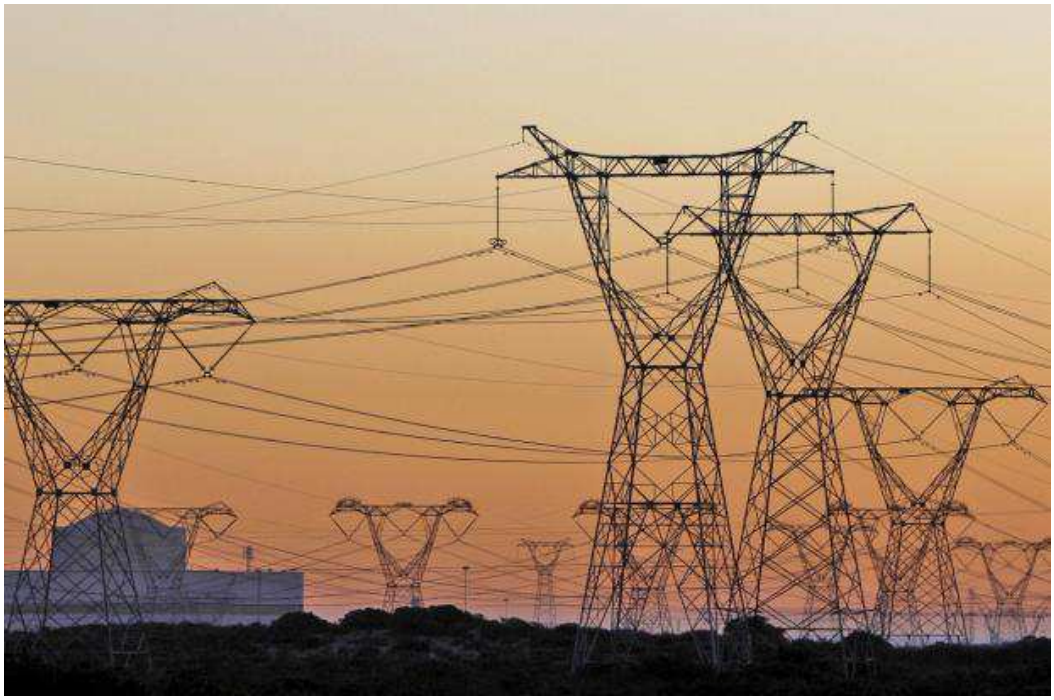

Figure 17: An example of the type of tower structure (namely the 515 series) proposed to support the 400kV power line (internet source: http://www.greenbusinessguide.co.za/eskom-power-supply-tight)

(d) The technology to be used in the activity;
There are no feasible and reasonable technology alternatives.

(e) The operational aspects of the activity; and
Eskom undertakes routine maintenance on their infrastructure. There are no feasible and reasonable operational alternatives.

(f) The option of not implementing the activity."
Refer to Section D-1.3.

The alternatives below will be further investigated during the EIR phase of the project:

D-1.1 Substation (Site/ Location) Alternatives

Scoping of alternatives – criteria and methodology
A site investigation (4th of September 2012) was conducted by the project team (Eskom and SEF) to assess the suitability of each of the alternative sites (from an engineering and environmental perspective) proposed for the substation site. Further visits to the area were undertaken on the 19th of February 2013, as well as 26th of June 2013, to review two additional alternatives.

The original scope of the project entailed four (4) alternative substation locations, with the associated powerlines (**Appendix 4.1**). These alternatives were published for comment in January 2013, in the Draft Scoping Report (DSR). Based on feedback from landowners at the Open House Meeting held in February 2013, further alternatives were suggested, which were considered by Eskom (**Appendix 4.2**). This resulted in the addition of Alternatives 5 and 6. These were presented in the Final Scoping report made available for public comment. The number of alternatives therefore increased to seven (7) alternatives. Due to the increase in substation size (due to civil requirements), from 350 X 350m to the current 600 X 600m, the number of alternatives has been reduced to five (5) alternatives. The alternatives considered during the process, are included in **Appendix 4.**

In so far as the criteria for the development of alternatives is concerned, the main criteria that was considered were related to environmental, social and economic considerations, as well as eskom's technical considerations. The methodology applied to the consideration of alternatives used the following approach:

- Alternative recommended or suggested by Eskom or I&AP;
- Eskom to consider the proposal from a technical point of view before any consideration;
- If go ahead provided by Eskom, specialists to consider in terms of the specific studies and provide detailed assessments; and
- Alternatives then to be presented for consideration.

The above methodology was implemented during the environmental process, specifically the end of the Scoping process, as well as the EIA phase. Due consideration was given to all the alternatives recommended, and the final 5 alternatives have been considered by all the appointed specialists, and their findings have been outlined in the FEIR.

Alternative substation site 1

This substation site is proposed on the north eastern side of the existing 132kV Blanco substation, across the existing gravel road – Geelhoutboom road. The site is located on agricultural land and will impact on a centre pivot.

Alternative substation site 2

This alternative is located immediately North West of the existing 132kV Blanco substation, and South West of Alternative 1. This site also impacts on irrigated agricultural land, a number of residential dwellings, and there is an existing 132kV powerline coming into the existing substation.

Alternative substation site 3

This alternative is located north of alternative 1 and Geelhoutboom Road, and approximately 1.5km north east of the existing Blanco substation. It is quite close to the existing Droerivier – Proteus 400kV powerline, with the shortest proposed powerline route. The existing 132kV powerline passes through the site.

Alternative substation site 4

This alternative is located approximately 1.2km south west of the existing Blanco substation. The site lies beyond an existing gravel road, on an established horse stud farm, and will affect a perennial river and associated vegetation.

Alternative substation site 5

This alternative is located in the foothills of the Outeniqua Mountains, approximately 4.5km north east of the existing Blanco substation. A small forestry station, including a number of dwellings is located north of the proposed site.

D-1.2 Power Line Route (Design/Layout) Alternatives:

Power line route alternative 1:

This powerline route is approximately 1.5km long, and runs in a north-westerly direction, before turning and heading north to link up with the existing Droerivier – Proteus 400kV powerline. The line crosses two non-perennial rivers / drainage lines.

Power line route alternative 2:

This powerline route is approximately 1.8km long, and heads in a north easterly direction before it joins the powerline route for Alternative 1. The route runs across agricultural land and crosses the Geelhoutboom Road.

Power line route alternative 3:

This is the shortest powerline route, approximately 1.2km, and is the closest to the existing Droerivier – Proteus 400kV powerline. The proposed route crosses agricultural land, and also occurs in close proximity of a few dwellings.it also cuts across the access road linking Farm Uitsig to the Geelhoutboom Road.

Power line route alternative 4

This alternative is approximately 3.5km in length, and runs in a northerly direction before turning north east, and then north before linking with the existing Droerivier – Proteus 400kV powerline. The route crosses agricultural land, and crosses the Geelhoutboom Road.

Power line route alternative 5

This alternative is approximately 4km and runs in an easterly direction from the proposed substation location to the existing Droerivier – Proteus 400kV powerline.

Design alternatives will be proposed based on the environmental sensitivities as well as various alternatives for connection to the local grid in the Blanco area.

D-1.3 COMPARATIVE ASSESSMENT

Advantages are marked with a (✓) while disadvantages are marked with (**X**) under the subsequent headings.

Table 8: Location / Site Alternatives Comparative Assessment

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
Agricultural Potential	**X** Negative impact on overall van Greunen Boerdery operation and ripple effect on loss of jobs and income generated by farming activities. There will be a negative impact in terms of loss of jobs and income generated by agricultural practices.	**X** Negative impact on overall van Greunen Boerdery operation and ripple effect on loss of jobs and income generated by farming activities. There will be a negative impact in terms of loss of jobs and income generated by agricultural practices.	**X** Negative impact	**X** Negative impact on overall farming operations and the ripple effect on loss of jobs and income generated by farming activities. There will be a negative impact in terms of loss of jobs and income generated by agricultural practices.	✓ Least impact on production of agricultural crops as the site consists mainly of unmanaged Eucalyptus and Black Wattle thickets (forestry). There was no evidence of farm infrastructure on the site.
	X Impacts on existing agricultural activity and pasture fields. The impact will be permanent and irreversible, not only on farm profits, but also on the dynamics of the overall farming operation. The centre pivot for irrigation will be impacted. The dairy operation will be affected and lead to economic losses.	**X** Impacts on existing agricultural activity. The impact will be permanent and irreversible, not only on farm profits, but also on the dynamics of the overall farming operation. The centre pivot for irrigation will be impacted. The dairy operation will be affected and lead to economic losses.	**X** Impacts on extensive area of visibly under grazed rangeland. There will be impacts on cattle. Maize crop production will be affected and will lead to economic losses.	**X** Impacts on existing agricultural activity. The impact will be permanent and irreversible, not only on farm profits, but also on the dynamics of the overall farming operation. Kikuyu or grazing land will be affected. This alternative affects pasture husbandry (used for horses and cattle).	**X** A small extent of pasture fields will be impacted for the proposed substation site. However, this impact is not significant.
	X Negative economic impacts of the installation phase of the substation and the proposed transmission networks.	**X** Negative economic impacts of the installation phase of the substation and the proposed transmission networks.		**X** Negative economic impacts of the installation phase of the substation and the proposed transmission networks.	
	X Negative impacts in terms of long-term loss of productive land per pylon is not more than a few m^2.	**X** Negative impacts in terms of long-term loss of productive land per pylon is not more than a few m^2.		**X** Negative impacts in terms of long-term loss of productive land per pylon is not more than a few m^2.	
	✓ Any compensation for temporary damage done during the installation will be by Eskom and its contractors.	✓ Any compensation for temporary damage done during the installation will be by Eskom and its contractors.		✓ Any compensation for temporary damage done during the installation will be by Eskom and its contractors.	
Ecological	✓ No natural vegetation	✓ No natural vegetation	✓ No natural vegetation	✓ No natural vegetation	✓ The route follows the

	remaining.	remaining.	remaining. This alternative has the least impact from a floral perspective as the proposed substation and powerline traverses transformed areas.	remaining. This alternative has the least impact from a floral perspective as the proposed substation and powerline traverses transformed areas.	existing 132kV powerline which crosses vegetation such as exotic plant species.
			✓ Least impact from an avifaunal perspective as this is the shortest route and is in close proximity to the existing power lines.		
	X Natural faunal habitat occurs within the study area includes the Koesterbos River and associated riparian vegetation.	X Natural faunal habitat occurs within the study area includes the Koesterbos River and associated riparian vegetation.		X Natural faunal habitat occurs within the study area includes the Koesterbos River and associated riparian vegetation.	X The proposed powerline route in its current location is not preferred from a faunal perspective. The faunal specialist recommended that the powerline route be shifted further towards the existing 132kV powerline, as impacts already exist in this area.
					✓ The location of the proposed substation is where no natural vegetation remains. Construction must however occur outside of the Important Bird Area (IBA).
					X The habitat consists mainly of exotic trees and a small area of indigenous vegetation in areas were wetlands and drainage lines occur. Therefore, birds may occur in these areas. Therefore, mitigation measures such as bird flappers, anti-collision devices on the power lines and so on are required for this Alternative.
Wetlands and Watercourses	X The power line route is not preferred as it occurs	X The power line route is not preferred as it occurs	✓ This is the shortest route, which would potentially	X Although the power line route does not cross any	X The most sensitive wetland environment was

	parallel to the HGM 2 (unchannelled valley bottom wetland).	parallel to the HGM 2 (unchannelled valley bottom wetland).	decrease the likelihood of impacts to wetlands, as long as no pylons are constructed within a wetland and are therefore regarded as the recommended option from a wetland perspective.	wetlands, it is not preferred as it occurs parallel to the HGM 2 (unchannelled valley bottom wetland) which is a sensitive wetland and is the longest route.	assessed towards the northern side of Alternative 5 route alignment. In case Alternative 5 are chosen as the preferred route, power lines should be constructed on the southern side of the existing power lines in order to avoid these sensitive seepage wetlands. In addition to route and site options, several specific and general mitigation measures were also recommended that should be adhered to in order to reduce potential impacts on wetlands within the study area.
Heritage			✓ This site is most preferred by the heritage specialist.		
Socio-economic impacts	X There would be disturbance to well-established farming operations (impact on loss of productive farm land)				
	X There is an increased risk of damage by construction vehicles, damage to farm infrastructure such as irrigation lines, fences and farm gates. This site therefore is a fatal flaw.	X There is an increased risk of damage by construction vehicles, damage to farm infrastructure such as irrigation lines, fences and farm gates. This site therefore is a fatal flaw.	X There is an increased risk of damage by construction vehicles, damage to farm infrastructure such as irrigation lines, fences and farm gates. This site therefore is a fatal flaw.	X There is an increased risk of damage by construction vehicles, damage to farm infrastructure such as irrigation lines, fences and farm gates. This site therefore is a fatal flaw.	✓ The site alternative was previously planted with alien trees for forestry purposes. The site has a poor location for farming of productive crop. There are no existing farmland that will be affected.
	X There could be a negative impact on the viability of farms, as local farming activities are severely constrained and affected by the proposed location and alignment of the servitude and substation, which inherently affects the livelihood of these local	X There could be a negative impact on the viability of farms, as local farming activities are severely constrained and affected by the proposed servitude and substation.	X There could be a negative impact on the viability of farms, as local farming activities are severely constrained and affected by the proposed servitude and substation.	X There could be a negative impact on the viability of farms, as pasture fields will be impacted.	✓ No impact on loss of viability in terms of agriculture as the site occurs on forestry plantations.

	farmers.				
Traffic impacts	✓ There is direct access possible off DR1631 to the proposed substation. Acceptable shoulder sight distances can be achieved.	✓ There is direct access possible off DR1631 and DR1628 to the proposed substation. Acceptable shoulder sight distances can be achieved.	✓ There is indirect access possible via DR1631 or DR1634 to the proposed substation. Right-of-way servitude/s will be required. Acceptable shoulder sight distances can be achieved.	✓ There is indirect access possible via DR1631 to the proposed substation. A right-of-way servitude will be required. Shoulder sight distances along DR1631 might be an issue and need to be resolved.	✓ There is direct access possible off DR1639 to the proposed substation. Acceptable shoulder sight distances can be achieved.
Technical and cost implications for the proposed Narina MTS 132kV Integration with Blanco	✓ Preferred site as it will allow easy integration to the existing 132kV network and is optimally located for future network expansion towards Schaapkop and Knysna substation without any 13kV line crossings.	X Not preferred as it presents problems for future expansion due to limited access to the 132kV busbar in the MTS. Current and future integration to the 132kV network may have to be via cable networks.	✓ This site is similar to Site 1 except that the integration line to be built is longer. However, seeing that the 132kV line currently operated at 66kV is crossing the site, this site may pose problems. The line may require to be diverted.	X This site also presents problems for future problems due to limited access to the 132kV busbar in the MTS. Major infrastructure is required to integrate the MTS to the current network.	✓ Site 5 is similar to Site 1 and Site 3 except that the integration line to be built is much longer.
	✓ Least cost implications.		X Costly to construct the integration line.		X Costly to construct the integration line.

Alternatives 1 to 4 are not supported as these sites affects productive agricultural practises and loss of established farm land as a result of the proposed substation and power lines. This will impact negatively on the landowners in terms of food production, loss of jobs, income and livelihoods.

Alternative 5 is supported as the proposed development will have the least impact on production of agricultural crops, as the site consists mainly of unmanaged Eucalyptus and Black Wattle thickets (forestry). There was no evidence of farm infrastructure on the site. The Environmental Assessment Practitioner (EAP) recommends that the proposed power line be shifted as close as possible to the existing 132kV power line, as impacts exist already. The shifting of the proposed powerline to immediately south of the existing powerline would not place additional impacts on the Important Bird Area (IBA) to the north.

Bird Flight Diverters on the earth wires must be installed as per specifications devised by the Endangered Wildlife Trust (EWT). Bird flappers and anti-collision devices must be installed on the power lines as there are various wetlands and watercourses in this area. The exact location of the pylons must be determined in consultation with the terrestrial and wetland ecologist by means of a walk-through of the site at the detailed design stage. i.e. post receipt of the Environmental Authorisation (EA). As far as possible, pylons must not be located in or within 32m of a wetland and watercourse. There is no natural vegetation remaining at the proposed substation site.

D-1.4 No Go Alternative

The no-go alternative can be regarded as the baseline scenario against which the impacts of the proposed power lines and substation are evaluated. This implies that the current biophysical and socio-economic conditions associated with the proposed routes and sites for the substation, will be used as the benchmark against which to assess the possible changes (impacts) to these conditions as a result of the power lines and substation. The status quo of the environment would remain and there would be no significant impacts in terms of the biophysical and socio-economic impacts, which are listed in Section F of the report.

In most cases, the no-go alternative will imply that the identified negative impacts of proceeding with the project will not be incurred. Conversely, selection of the no-go alternative will also result in the benefits (including the potential economic development and related job creation, and increased security of electricity supply for the local areas) of the project not being realised.

Should the project not be approved, the existing land use activities (*mainly agriculture*) will continue and there will not be any negative socio-economic impacts on the landowners. The visual impacts associated with the proposed construction and operational phases of the project would not take place and the status quo will remain.

The project qualifies as a Strategic Infrastructure Project (SIP 10), namely *"Electricity transmission and distribution for all".* The project serves to *"expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. Align the 10-year transmission plan, the services backlog, the national broadband roll-out and the freight rail line development to leverage off regulatory approvals, supply chain and project development capacity".*

Given the Government's objectives of ensuring the sustainable supply of electricity to all communities, and Eskom's mandate to provide electricity to its region, the 'no development' option is not considered a viable alternative to the project.

SECTION E: SPECIALIST STUDIES

At the inception of the EIA, a site visit was undertaken and information regarding the proposal was gathered. Initial potential environmental issues and impacts were also identified, and based on these, certain specialist studies were identified, that needed to be undertaken during the EIA phase of the process. These included the following:

- Agri-economic Assessment by John Phipson of Mzanzi Agriculture (July 2015) (refer to Appendix 6.2).
- Agricultural Potential Assessment by Prof B. Schloms, Prof. F Ellis, etc (July 2015) (refer to Appendix 6.1).
- Ecological (including Fauna, Avifauna & Floral) Assessment by Karin van der Walt and Robyn Phillips of SEF (August 2015) (refer to Appendix 6.3).
- Heritage Impact Assessment by Quahnita Samie of Vidamemoria (July 2015) (refer to Appendix 6.4).
- Social Impact Assessment by Tony Barbour (July 2015) (refer to Appendix 6.5).
- Town Planning by Candice Maasdorp of Sustainable Planning Solutions (August 2015) (refer to Appendix 6.6).
- Traffic Impact Statement by Pieter Arangie of ITSE (August 2015) (refer to Appendix 6.7).
- Visual Impact Assessment by Mandy van der Westhuizen of NuLeaf (August 2015) (refer to Appendix 6.8).
- Wetland Assessment by Willem Lubbe of SEF (August 2015) (refer to Appendix 6.9).

This section of the report confirms the Terms of Reference applied to the studies above, as well as providing a summary of the specialist findings. All specialist studies, along with CV's of the project team members are enclosed in **Appendix 6** of this FEIR.

E1. AGRI-ECONOMIC ASSESSMENT

Terms of reference

- Assessment of the farming practices, taking into account the agricultural potential confirmed by the agricultural specialists;
- Assess the impact on the viability of the affected farms, should a substation and associated powerlines be constructed;
- Suggest / recommend the preferred alternative from an economic point of view; and
- Recommend any mitigation measures based on the findings of the study.

Specialist conclusions

After taking all relevant economic considerations into account, as evidenced when assessing the direct and indirect economic contributions made by the proposals, it is self-evident that, measured against a wide cluster of economic indicators, Site No.5 should be the site selected for the proposed substation. The specialist also indicated that Sites 1, 2 and 4 are not preferred. Site 3 is marginal.

E2. AGRICULTURAL POTENTIAL ASSESSMENT

Terms of reference:

This study included soil observations and classifications of dominant soil types (in accordance to the South African Soil Classification System) within the study areas. In addition to this, the following physical soil properties were determined within the study areas:

- Soil form (Soil type);
- Texture (as %clay);
- Effective depth;
- Soil colour; and
- Erosion sensitivity.

The expected end deliverable of the assessment would be a detailed report, to include a Soil Map, indicating different soil types as map units within the study areas. The Soil Map is accompanied by an Agricultural Potential Map illustrating the suitability of the identified soil map units against the proposed land use (namely the construction of a substation and associated power lines). In addition to the above mentioned requirement, the following criteria were fulfilled as components of the APA:

- In situ soil observations and classification of the investigated study areas;
- Sampling for determination of soil nutrients availability;
- Submission of representative soil samples to an accredited laboratory for analytical assessment;
- Data analysis and interpretation of analytical results in terms of soil quality and fertility status;
- The grouping of uniform soil patterns within uniform terrain into map units, with respect to observed limitations to the proposed land use;
- Evaluation of the agricultural potential of the demarcated soil map units;
- Assessment of the erosion sensitivity of the study areas based on the nature of the soils and topography;
- An impact assessment of soil erosion and further potential impacts of the proposed land use activity on the agricultural potential and land capability of the study areas; and
- Report compilation in terms of requirements of the Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983).

Due to the increase in substation size, the agricultural potential study was updated in August 2015 (**Refer to Addendum** in **Appendix 6**), and an updated significance rating was provided.

Specialist Conclusions
The agricultural assessment concluded that **alternative five (5)** should be selected as the preferred alternative for the proposed substation, as it will have the smallest impact on production of (present) agricultural crops. However, potentially the best soils in the highest rainfall zone occur here. In terms of the remainder of the sites, alternatives 2 and 4 seem to be the best options from a soil suitability point of view. Very few differences occurred when considering the impact of the proposed powerline routes.

E3. ECOLOGICAL ASSESSMENT

Terms of reference:
The terms of reference for the floral and faunal assessments were as follows:

- Provide a description of the dominant floral and faunal species occurring in the study area, including floral composition and structure;
- Describe the threatened, endemic, rare or protected plant and animal species, and/or potential habitats in the area under investigation;
- Map the sensitivities of ecological habitat associated with the study area;
- List the floral and faunal species identified during the field survey as well as species expected to inhabit the study site;
- List the threatened, endemic, rare or protected plant and animal species that could occur on the site, GPS those confirmed to occur and indicate the confirmed localities on a map; and
- Provide an impact assessment and recommend mitigation measures for species of conservation concern that may be affected by the proposed project.

Specialist conclusions:
The study area occurs within the Fynbos biome and more specifically within the Garden Route Granite Fynbos and Garden Route Shale Fynbos vegetation types. The Garden Route Granite Fynbos ecosystem is currently listed as Endangered while the Garden Route Shale Fynbos ecosystem is listed as Vulnerable in terms of Section 52 of NEMBA (Government Gazette, 2009). However, the study area was largely transformed and supported very limited to no indigenous vegetation.

As the study area was predominantly transformed through agriculture and supported limited indigenous plant species, no natural vegetation communities could be described and subsequently no areas of high ecological sensitivity were identified. Areas that were found to support faunal communities, such as farm dams, the Koesterbos River and associated riparian habitat, a portion of secondary shrubland and stands of exotic trees, were classified as medium and medium-low sensitivity. The Koesterbos River and associated riparian vegetation represents an important corridor for movement through the landscape and is situated in the centre of the study area.

Certain bird species susceptible to the impacts of powerlines usually congregate around waterbodies such as farm dams and will move between such features in search of food, water and shelter. It is advised that the powerline routes avoid traversing such features and bisecting major corridors for movement between such features. Construction activities and powerline routes also avoid the Koesterbos River. **Substation alternatives 3 and 4** and associated powerlines will offer the least impact from a **floral** perspective as they traverse only transformed areas, while **alternative 3** will offer the least impact from an **avifaunal** perspective as the powerline route is short (alternative 3) and is in close proximity to existing powerlines.

E4. HERITAGE IMPACT ASSESSMENT

Terms of reference:

- Submission of a Notification of Intent to Develop (NID) to Heritage Western Cape (HWC) for consideration; and
- Undertake a Heritage Impact Assessment (HIA), if required by HWC.

Specialist conclusions:

From a heritage resource management perspective, **Alternative 3** has been identified as the preferred alternative. Within alternative 3, mitigation measures to reduce potential visual impact should be implemented. Should alternatives 2, 4 or 5 be selected, mitigation measures to reduce potential visual impact should be implemented. Should alternatives 1 or 6 be selected, mitigation measures to reduce potential visual impact should be implemented and additional archaeological investigation is likely. Should proposed intervention areas 1 or 2 be selected, a buffer area should be implemented so as to ensure no heritage impact on structures identified.

The positions of all identified cemeteries are to be noted when selecting the final sub-station site and powerline route. The farm cemetery (corners marked by points D001-D003) may not be impacted by any sub-station footings or infrastructure. The grave/s at D006 may not be impacted by powerline infrastructure. The graves at L001 no longer appear to be threatened due to the changes in layout. Proposed changes to layout would not result in any significant new archaeological impacts provided the recommendations are adhered to and no new archaeological impact studies are required, over and above this statement, to address the changes (Halkett 2015:3).

The archaeologist must be informed of the selected substation site and powerline route in order to determine if a walk down must be undertaken. If any unmarked graves containing human remains are found during the construction phase, the site should be cordoned off and an archaeologist must be contacted to undertake an investigation (Halkett 2014: 12 and 2015:3).

Recommendations stemming from the visual impact assessment relate to mitigation of visual impacts associated with new roads, rehabilitation of access roads, consolidation of infrastructure, lighting and making use of already disturbed sites rather than pristine.

E5. SOCIAL IMPACT ASSESSMENT

Terms of reference:
The approach to the Social Impact Assessment (SIA) study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines have been endorsed by the national DEA, and are based on international best practice. The key activities in the SIA process embodied in the guidelines include:

- Describing and obtaining an understanding of the proposed intervention (type, scale, location), the communities likely to be affected and determining the need and scope of the SIA;
- Collecting baseline data on the current social environment and historical social trends;
- Identifying and collecting data on the key social issues related to the proposed development. This requires consultation with affected individuals and communities;
- Assessing and documenting the significance of social impacts associated with the proposed intervention;
- Identifying alternatives and mitigation measures.

- In this regard the study involved:
- Review of socio-economic data;
- Review of relevant planning and policy frameworks for the area;
- Site specific information collected during the site visit to the area and interviews with key stakeholders;
- Review of information from similar projects;
- Identification of social issues associated with the proposed project.

Specialist conclusions:

Impact on farming operations
The establishment of the substations would result in a permanent loss of 36 ha of land. In the case of Alternative 1-4 the land affected is productive farm land that is currently being farmed. In terms of the power line routes, the power line routes for Alternative 1-4 also traverse productive farm lands. The landowners that stand to be most impacted are the ones on whose property the proposed substations are located. These are Nelius van Greunen (Alternative 1, 2 and 3), Plattner Estates (Alternative 4) and Power Construction (Alternative 3).

In addition to the loss of 36 ha of productive farmland the findings of the SIA also indicate that the presence of existing power lines appears to impact on the productivity of dairy cows. As a result grazing time under the power lines is limited and cows have to be moved on a regular basis. As a result land under and within the vicinity of the power lines is not fully utilised. This represents an additional loss of potential agricultural land over and above the 36 ha associated with the substation footprint.

Maintenance of power lines also impacts on farming operations. The contractors require access to the power line servitude. Depending on the timing of the maintenance this can impact on farming activities located in the vicinity of the power lines. The movement of maintenance vehicles can also damage farmland and farm infrastructure, such as fences, gates and irrigation equipment. Maintenance workers not familiar with or respectful of farming activities can also forget to close farm gates. The impacts on farming activities are therefore not only associated with the loss of land directly affected by the substation and the power line towers, but impacts are also associated with impact on productivity of dairy herds, loss of productive land and activities associated with maintenance. All of the landowners in the area affected by Alternative 1-4 are likely to experience such impacts.

Alternative 5 is located in an area that was previously planted with alien trees (plantation area). Due to its location the area identified for the proposed substation has not been developed for farming. No existing

farming activities will therefore be affected. The power line associated with Alternative 5 also does not cut across established farmland. The impacts on existing farming operations associated with Alternative 1-4 will therefore be significantly greater than the impacts associated with Alternative 5.

The Agricultural Assessment found that the area affected by the substation associated with Alternative 5 had the highest agricultural potential. As a result Alternative 5 was the least preferred. However, it should be stressed that there are no farming activities currently taking place in the area where the substation for Alternative 5 is located. Therefore, from a social impact perspective, Alternative 5 will not impact on existing farming activities. While the substations associated with Alternative 1-4 are all located on lower potential agricultural land, all of these areas are currently being farmed. The development of a large 600 x 600 m substation will therefore result in the loss of 36 ha of productive farmland which will impact on the livelihoods of the affected landowner/s. In this regard the initial Agricultural Assessment of the original 7 Alternatives did not assess impact associated with the loss of 36 ha on the farming operations of the affected farm owners that would be affected by Alternative 1-4. At the time of finalising the SIA the findings of the Economic Agricultural Assessment commissioned to assess the impact associated with the loss of 36 ha of land were not available. However, the loss of such a large area may impact on the economic viability of the farms impacted by Alternative 1-4. This may represent a **Fatal Flaw**.

Impact on tourism

The Geelhoutboom area is identified as tourist area and forms part of the Hops Route. The area also contains a number of farm based B&Bs and is popular area for mountain biking. In terms of the proposed project the properties that stand to be most negatively affected include Uitsig Farm, Groenewiede and Arendsrus.

Uitsig Farm is an established wedding and event venue that caters for a maximum of 130 guests and includes a guest house that can accommodate 10 people. The selling points are the views and the rural setting. In addition, the facility is located within 6 km of George and the George Airport. The facility is therefore accessible and there is adequate accommodation within 6 km of the venue. The power lines associated with Alternative 3 and 6 are located within 30 m of the wedding venue and facilities on Uitsig Farm. The visual impacts associated with the power lines would have a significant negative impact on the qualities that make Uitsig an attractive and sought after wedding and event venue. Based on the findings of the SIA these impacts would, in all likelihood, severely compromise the future viability of the venue. In addition, the impact on the owners of the facility this would also impact on the guest houses in the area that provide accommodation for guests.

Groeneweide Farm (Portion 7 of Farm 217) is located immediately to the north of Uitsig Farm. The activities on the farm include propagation of strawberries for the export market and a guest house, which accommodates 10 people. The existing Proteus - Droerivier 400kV power line traverses the southern section of the farm near the entrance and also forms the eastern boundary of the property. The power lines associated with Alternative 3 and 6 would add to the impacts already associated with the existing power lines, which in turn, would impact negatively on the farms sense of place and its potential as tourist destination.

Arendsrus is located in the foothills of the Outeniqua Mountains, to the north of the Nico van Rensburgs Farm (Portion 61 of Geelhoutboom 217). Access to the guest house is via a gravel road that runs past the van Rensburg's dairy. The power line route for Alternative is located adjacent to this road and will have a negative visual impact on visitors to the facility. The power lines associated with Alternative 1 and 2 are also likely to have a negative visual impact for visitors to the area.

Impact on sense of place

The impact on the areas sense of place associated with Alternative 1-4 will be significantly greater that the impact associated with Alternative 5.

The reasons for this are linked to:

- The expanded size of substations, from 8.7 ha to 36 ha. This represents more than a fourfold increase in size;
- The proximity of Alternative 1-4 (substation and power lines) in relation to existing farm houses in the area. The substation sites associated with Alternative 1-4 are all located within 20 m (Alternative 2) to 200 m (Alternative 2, 3 and 4) of farm houses. The power lines associated with Alternative 1-4 all pass within 50 m of at least one farmstead. The affected property owner's sense of place will therefore be significantly affected by Alternative 1-4;
- The proximity of the Alternative 1-4 (substations) in relation to the Geelhoutboom Road and visibility to passing motorists. The substation sites for Alternative 1, 2 and 3 are all located within 100-300 m of the Geelhoutboom Road. The substation sites for Alternative 4 is located ~ 1.5 km from the road respectively and is therefore likely to be less visible;
- The power lines associated with Alternative 1-4 all cross public roads (Geelhoutboom Road and road that provides access to Uitsig and Groeneweide). The power lines will therefore be visible to motorists using these roads.

In the case of Alternative 5, the substation site is located on the lower slopes of the Outeniqua Mountains in an area that was previously under plantation. The substation site is located ~ 4-5 km north of the Geelhoutboom Road and is likely to be less visible to passing motorists as it is located away from the road. The substation will be visible from the houses associated with the forestry station which is located immediately to the north of the site. The site may also be visible from houses located to east, south and west of the site. However, the closest houses are located ~ 800 m, 1 km and 3 km from the site respectively. The power lines associated with Alternative 6 are located to the south of an existing power line servitude that runs in an east-west direction through forestry plantations on the lower slopes of the Outeniqua Mountains. The existing power line is not highly visible and does not impact on private landowners. The potential impact on the areas sense of place will therefore be lower due to the location of the substation and power line route associated with Alternative 5.

E6. TOWN PLANNING OVERVIEW

A Town Planning Report was compiled by Sustainable Planning Solutions (SPS) and covered the following scope:

- To provide information relating to the land portions affected by the proposed alternatives;
- Highlight any challenges and constraints pertaining to any of the proposed alternatives, in favour of the construction and registration of the servitude for this proposed powerline and substation;
- Highlight any statutory processes or approvals required in order to allow the proposed substation and powerline servitude;
- Review all spatial planning policies affecting the study area;
- Undertake a spatial contextual analysis of the surrounding area; and
- Review all alternatives developed by Eskom on the basis of the contextual analysis, legal and spatial planning policy framework.

The Town planning report concluded that from a legal perspective there are no title deed restrictions prohibiting the proposed substation and powerline servitude. The town planner recommends the implementation of alternative 5. A land use approval process (rezoning and subdivision) will be required for the establishment of the substation.

E7. TRAFFIC IMPACT STATEMENT

A transport Impact Statement was compiled by ITS engineers (ITSE), and the main scope of the statement was provide an indication of the transport impact, specifically as a result of the expected increase in traffic volumes during the construction phase. The expected transport during the maintenance period will be

significantly lower due to the low operational traffic volumes. The focus of the statement was therefore on evaluating the geometric characteristics of the access routes, rather than the transport impact associated with the increase in volumes.

The statement provided an overview of the existing conditions, i.e. Existing cross sections and surface conditions, as well as existing traffic volumes. The site accesses were also considered, noting that the specific access position for the approved site will be confirmed with the Roads Authority during the design stage of the project.

A traffic impact analysis was undertaken, taking into account the following:

- construction phase traffic;
- site-generated trips (estimated);
- addition of the construction phase traffic to the existing traffic volumes to determine the traffic conditions during the construction phase; and
- all alternatives were evaluated in terms of the traffic impact associated with each alternative.

The TIS concluded and recommends the following:

Existing Traffic Conditions

- The current demand on the existing road network in the site vicinity is low and the road network and intersections operate at acceptable levels of service.

Construction Phase

- It is expected that the construction phase of the proposed development could generate less than 50 vehicular trips during the average weekday peak hours, which is insignificant.
- Access to the site alternatives is proposed off the existing road network via existing farm roads/accesses. The specific access position for the approved site will be confirmed with the Roads Authority during the design stage of the project.
- Five different alternatives were evaluated and Site 1 is the preferred site from a transport perspective. The Power line alignment for Site 1 also does not cross any major public road and is mostly over agricultural land, which makes Site 1 the preferred substation site. Site 2 is also ideal, but the other **3** sites become less attractive the further they are from DR1631. Road maintenance and the required right of-way access servitudes makes the other **three** sites less attractive from a transport perspective.

Operational Phase

The operational phase of this project is not expected to generate significant traffic volumes. The typical day-to-day activities will probably only be service vehicles undertaking general maintenance at the site. It is not expected that there will be permanent staff on site and the trip generation for the substation during the operational phase will be insignificant.

E8. VISUAL IMPACT ASSESSMENT

Terms of reference:
The study was undertaken using Geographic Information Systems (GIS) technology as a tool to generate viewshed analyses and to apply relevant spatial criteria to the proposed facility. A detailed Digital Terrain Model (DTM) for the study area was created from 20m interval contours supplied by the Chief Directorate National Geo-Spatial Information.

The approach utilised to identify potential issues related to the visual impact included the following activities:

- The creation of a detailed DTM of the potentially affected environment;
- The sourcing of relevant spatial data. This includes cadastral features, vegetation types, land use activities, topographical features, site placement, etc.;
- The identification of sensitive environments upon which the proposed facility could have a potential impact;
- The creation of viewshed analyses from the proposed development area in order to determine the visual exposure and the topography's potential to absorb the potential visual impact. The viewshed analyses take into account the dimensions of the proposed structures.

Issues related to the proposed Blanco Substation and powerline project include the following:

- The visibility of the proposed infrastructure to, and potential visual impact on, users of national roads (N2, N9, N12), arterial roads (R102, R504) and secondary roads.
- The visibility of the proposed infrastructure to, and potential visual impact on farmsteads and settlements.
- The visibility of the proposed infrastructure to, and potential visual impact on residents of built-up centres and populated places (i.e. the towns of Blanco, Heather Park and George).
- The visibility of the proposed infrastructure to, and potential visual impact on protected and conservation areas (i.e. the Witfontein Nature Reserve and the Doringrivier Nature Reserve)1.
- The potential visual impact of associated infrastructure (i.e. access roads and cleared servitudes) on sensitive visual receptors.
- Potential visual impacts associated with the construction phase.
- The potential visual impact of operational, safety and security lighting of the facility at night.
- The visibility of the proposed infrastructure to, and potential visual impact on the landscape quality defined by natural features (i.e. the mountains).
- The potential impact of the proposed infrastructure on the visual character and sense of place of the region.
- The potential impact of the proposed infrastructure on tourism, with specific reference to tourist access routes (i.e. the N3, N9, N12, R102 and R504), tourist destinations (i.e. attractions and accommodation) and the scenic Garden Route.
- Potential cumulative visual impacts.
- The potential to mitigate visual impacts and inform the design process.

Specialist conclusions:
The visibility analyses (or viewsheds) for the project alternatives were calculated from each power line at an offset height of 32m above ground level (i.e. the average height of a 400kV power line). The visibility analysis for each alternative was generated from a number of points along the alignment, spaced at intervals of approximately 400m. Receptor height was set at eye level.

[1] These Provincial and National conservation areas have been sourced from the SANBI database.

The height of the substation will not exceed two storeys (i.e. 6m), therefore the visual exposure of this component will fall within the viewshed generated for each power line alternative.

The analyses show that all project alternatives will be visually exposed to some extent within the study area, due to the tall power line infrastructure. It is thus anticipated that all 6 project alternatives would be visible to observers (i.e. people travelling along roads, residing in towns and at homesteads or visiting the region), and could potentially constitute a high visual prominence, potentially resulting in a visual impact.

The following is of specific relevance regarding the anticipated visual exposure of the 5 alternatives:

Alternative 1

This substation alternative is proposed on the north eastern side of the existing 132kV Yard. The location lies adjacent to the Droerivier Proteus 400kV line on a site currently occupied by a pivot. The power line will connect (or "T") with the existing high voltage power line cross 2 non-perennial rivers, then follow a southerly direction across a road and agricultural land and eventually feed into the proposed new 400kV/132kV substation.

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 1km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography. The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 8) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Large parts of Blanco, part of Heather Park and George, including most of the Fancourt Golf Estate may also be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains Important Bird Area (IBA), located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

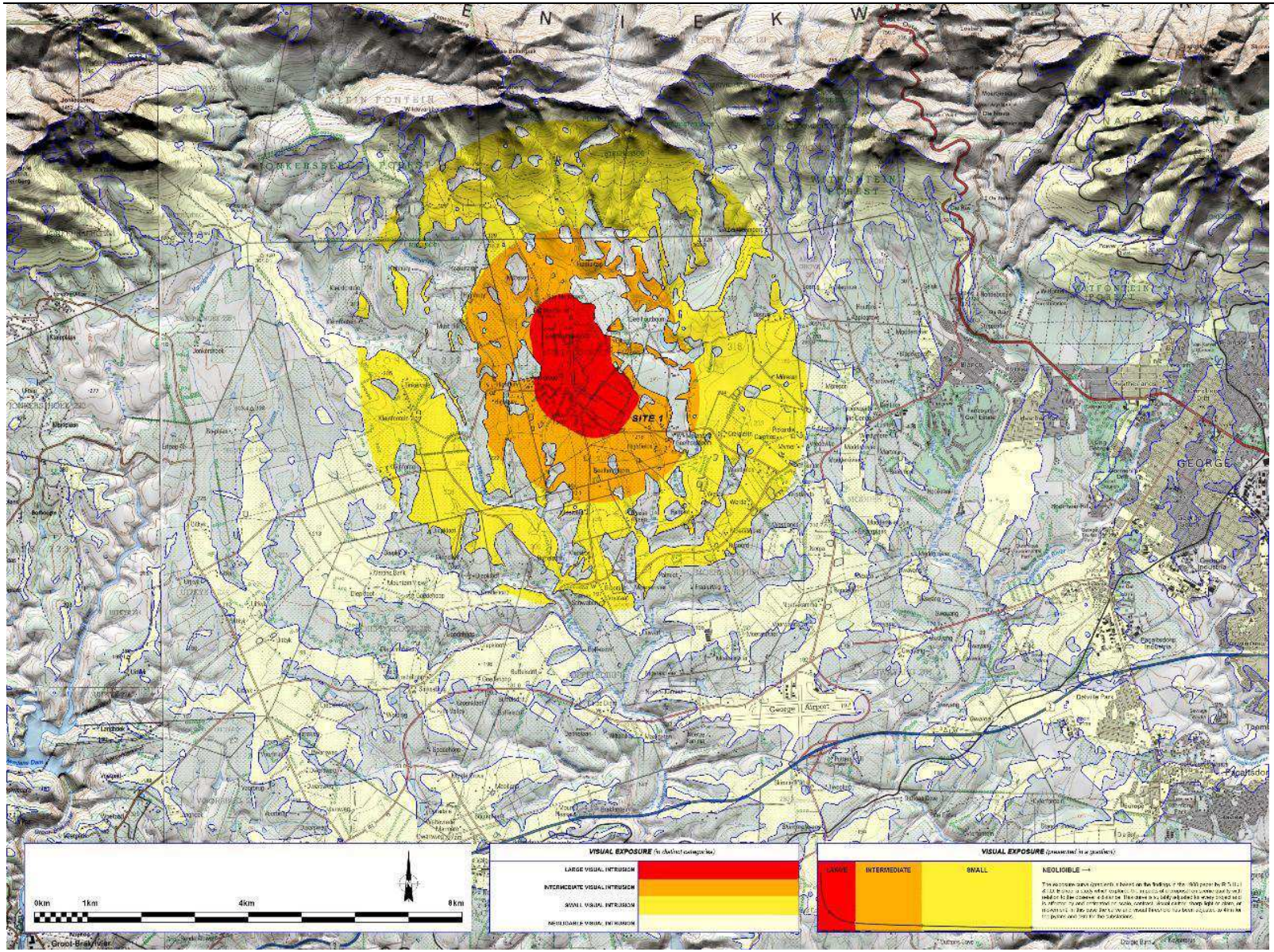

Figure 18: View shed analysis of Alternative 1

Alternative 2

This substation alternative is proposed to the immediate north west of the existing 132kV Yard, and slightly south west of the Alternative 1 site. The associated power line will connect (or "T") with an existing high voltage power line, then follow a southerly route across agricultural land and a non- perennial river. It then follows a south westerly direction across a secondary road before feeding into the proposed new 400kV/132kV substation.

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 1km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 6) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Large parts of Blanco and Heather Park, parts of George and the whole of Fancourt Golf Estate may be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

Alternative 3

This substation alternative is proposed further to the north east of the existing 132Kv yard. The associated power line will connect (or "T") with an existing high voltage power line, cross a non-perennial river, then follow a southerly direction across a road and agricultural land and eventually feed into the proposed new 400kV/132kV substation. 19

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 1km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 5) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Parts of Blanco, Heather Park and George, as well as some parts of the Fancourt Golf estate may be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

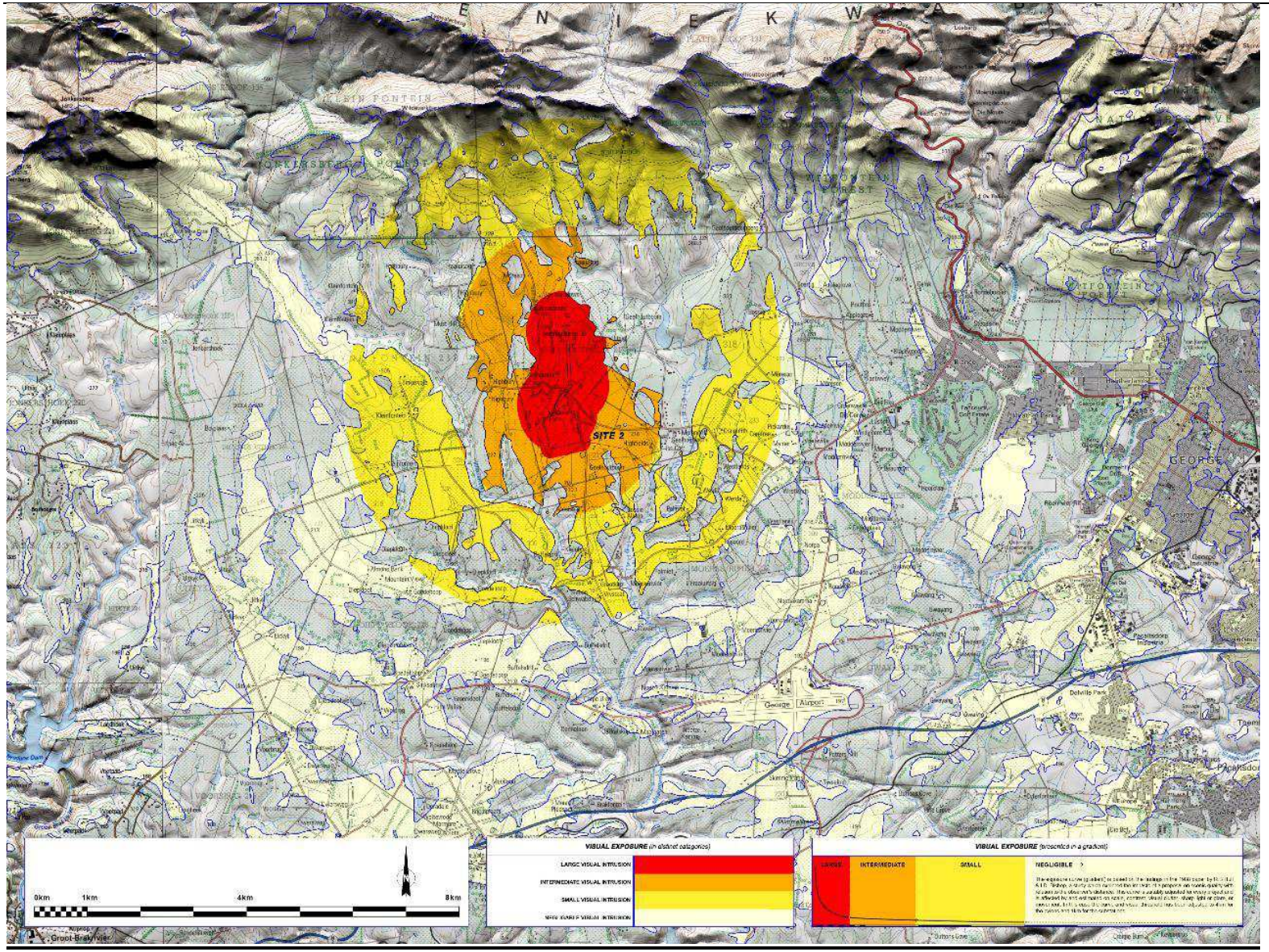

Figure 19: View shed analysis of Alternative 2

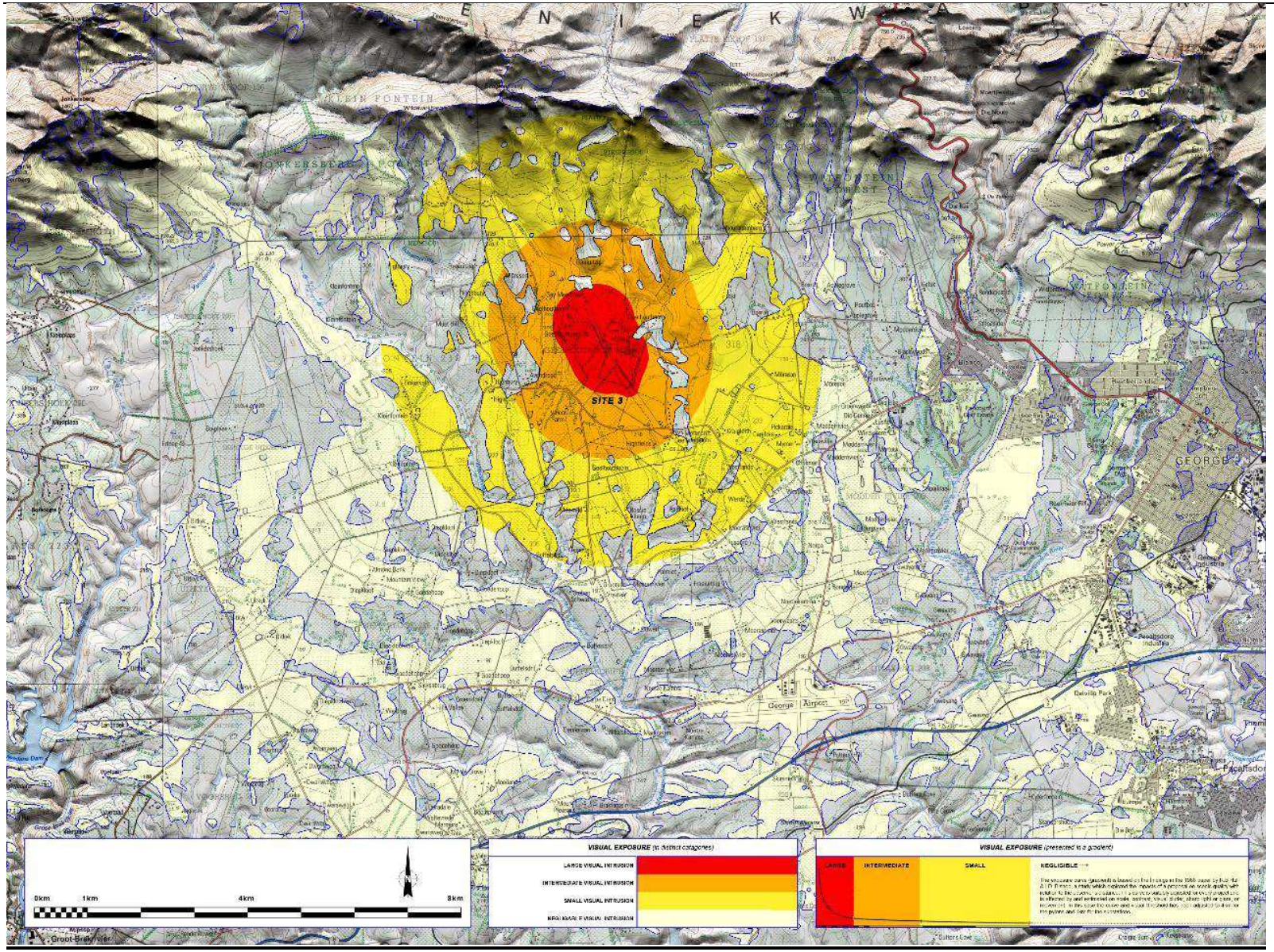

Figure 20: View shed analysis of Alternative 3

Alternative 4

This substation alternative is proposed on the south western side of the existing substation beyond the road and a local wetland/marsh. The associated power line (with an approximate distance of 2.5 km) will connect (or "T") with an existing high voltage power line, then follow a southerly direction across agricultural land, a wetland, a secondary road and a tree line until it will feed into the proposed new 400kV/132kV substation.

This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 2km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limits the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.

A number of homesteads (approx. 6) are located in close proximity to the proposed alignment, as are a number of secondary and other roads. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Large parts of Blanco and Heather Park, parts of George and the entire Fancourt Golf Estate may be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.

In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed, however, but at a distance exceeding 2km.

Alternative 5

This site alternative is located well to the direct east of the existing powerlines, at the foot of the mountains. This site will infringe on steep slopes and forestry. The associated power line (with an approximate distance of 2.5 km) will connect (or "T") with an existing high voltage power line, then follow the route of the existing 132kV powerlines heading eastwards towards Blanco across 2 non-perennial rivers and 1 perennial river, and will feed into the proposed new 400kV/132kV substation. This alternative will be visually exposed to the entire area immediately adjacent to the infrastructure for a distance of about 2km. Beyond this offset, the zone of potential visual exposure becomes increasingly fragmented as a result of the undulating and hilly topography.

The mountainous terrain in the north limit the visual exposure of the proposed infrastructure in that direction, mostly shielding visual exposure to Protected Areas and settlements north of the mountains.
One homestead is located in close proximity to the proposed alignment, and few secondary and other roads are evident. Main roads, railways and potential tourist routes (i.e. the N9, the N2, R404 and R102) may be affected visually, but are located further afield, more than 4km from the proposed infrastructure.

Parts of Blanco, Heather Park and limited parts of George, as well as parts of the Fancourt Golf Estate may be exposed to visual intrusion, but these areas are located more than 5km from the proposed infrastructure.
In terms of scenic resources, the southern slopes of the Outeniqua Mountains will be exposed to potential visual impact, as will limited parts of the Witfontein, Ruitersbos and Doringrivier Nature Reserves. Again these visually exposed areas lie beyond the 5km offset. The Outeniqua Mountains IBA, located on the southern slopes of the mountains will be visually exposed in close proximity.

In terms of the Alternatives, all 5 Project Alternatives will be visually exposed significantly in areas within a 5km radius of the infrastructure. In addition, all Alternatives tend to display an even potential exposure pattern where they traverse flat terrain and more scattered patterns where they encounter elevated topography.

A comparative assessment of the 5 project alternatives revealed that overall, considering all relevant criteria, **Alternatives 3 is considered most preferable from a visual perspective**. Alternatives 1, 2 and 5 are also considered acceptable. Alternative 4 is the least preferable from a visual perspective. None of the Project Alternatives are, however, considered fatally flawed from a visual perspective.

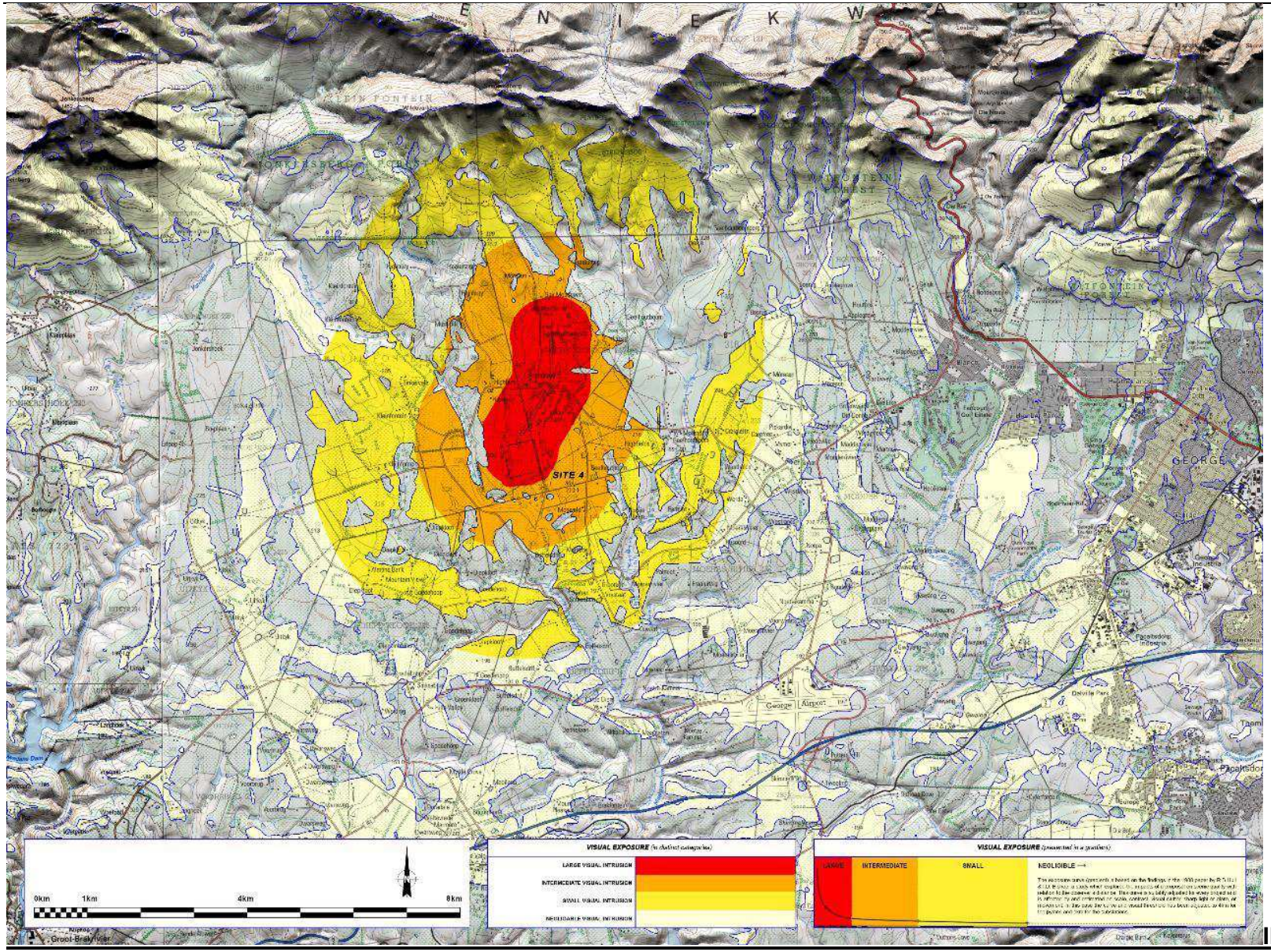

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Figure 21: View shed analysis of Alternative 4

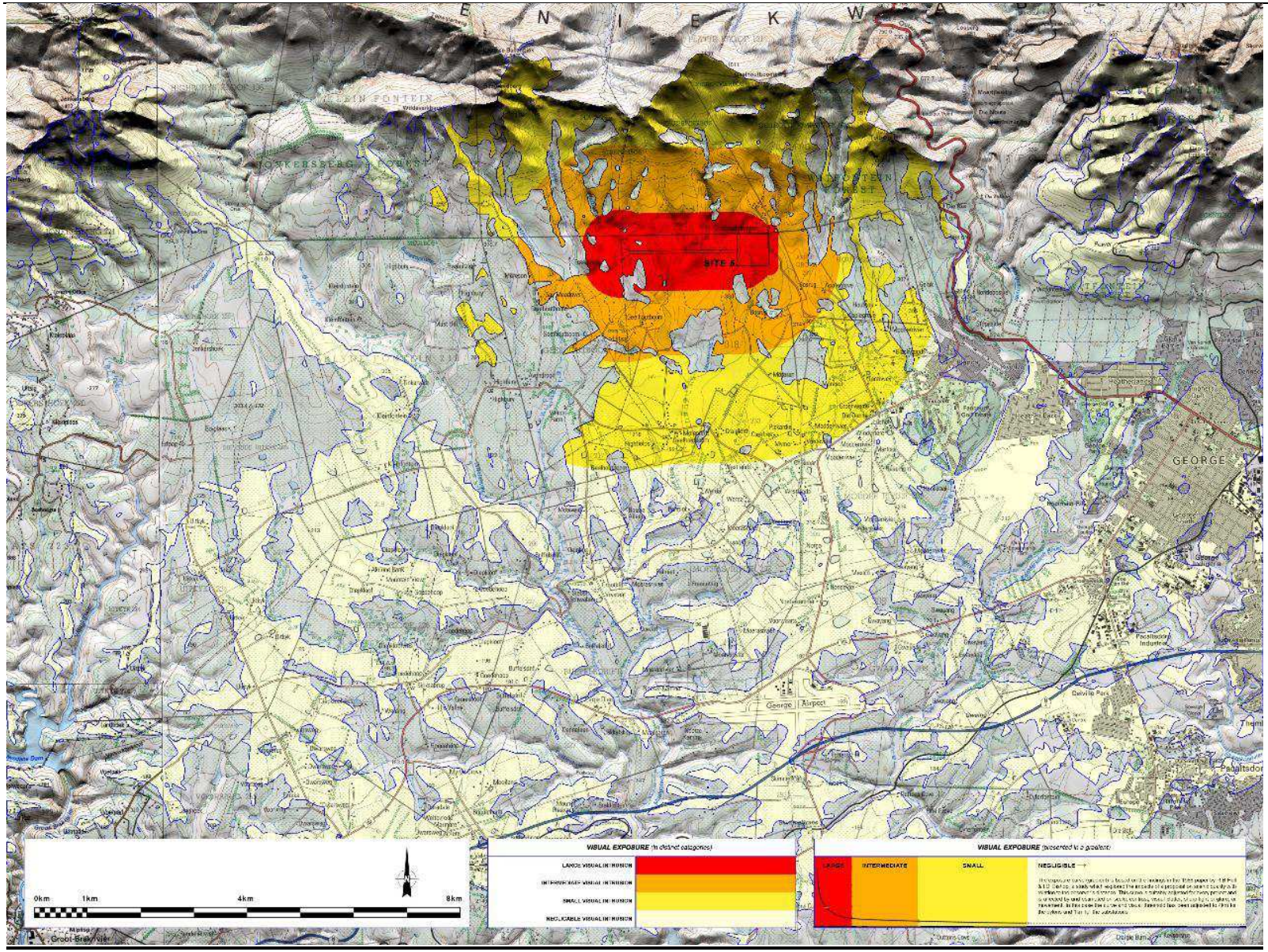

Figure 22: View shed analysis of Alternative 5

E9. WETLAND ASSESSMENT

Terms of reference:

The terms of reference for the current study were as follows:

- Delineate and classify wetland and riparian areas within the study area;
- Determine the Present Ecological State as well as the Ecological Importance and Sensitivity of the identified wetlands within the study area; and
- Identify possible impacts and mitigation measures of proposed activities associated with wetlands within the study area.

The four main wetland indicators used during the wetland delineation process included the terrain unit indicator, soil wetness indicator, and the presence or absence of hydric soils and hydrophytes. Three hydro-geomorphic types were delineated and classified into thirteen separate hydro-geomorphic units within the study area. These include valley-bottom wetlands without a channel, valley-bottom wetlands with a channel and hill slope seepage wetlands that are connected to a watercourse.

Specialist conclusions:

Three hydro-geomorphic types were delineated and classified into fourteen separate hydro-geomorphic units within the study area. These include valley-bottom wetlands without a channel, valley-bottom wetlands with a channel and hillslope seepage wetlands that are connected to a watercourse.

From a functional perspective, wetlands within the study area serve to improve habitat within and downstream of the study area through the provision of various ecosystem services such as streamflow regulation, flood attenuation, groundwater recharge, nitrogen removal, phosphate removal, toxicant removal, particle assimilation and provision of natural resources including habitat for a variety of taxa. Each wetland's ability to contribute to ecosystem services within the study area is further dependant on the particular wetland's Present Ecological State in relation to a benchmark or reference condition. Results of the Wet-health assessment indicated that the Present Ecological State for wetlands within the study area ranged from being moderately modified with some loss of natural habitat to being seriously modified with an extensive loss of natural habitat and associated functional attributes. An Ecological Importance and Sensitivity (EIS) assessment was undertaken to rank associated wetlands in terms of provision of goods and service or valuable ecosystem functions which benefit people, biodiversity support and ecological value, and reliance of subsistence users (especially basic human needs uses). The moderate to low Ecological Importance and Sensitivity assigned to the various wetlands was attributed primarily to the loss of functionality as a result of land use practices, especially cultivation as well as alien vegetation infestation.

Based on the current and proposed activities and taking into consideration the present state of the wetlands and their associated functionality and biodiversity, several potential impacts on wetlands were identified. As a result, several measures are recommended to be undertaken to limit impacts on the associated wetlands. In summary, alternative 4 does not cross any wetlands but is the longest option and runs parallel to HGM 2 (which was deemed a sensitive wetland unit). Alternative 3 has the shortest route, which would potentially decrease the likelihood of impacts to wetlands, as long as no pylons are constructed within a wetland and are therefore regarded as the recommended option from a wetland perspective. The most sensitive wetland environment was assessed towards the northern side of Alternative 5 route alignment. In case Alternative 5 is chosen as the preferred route, powerlines should be constructed on the southern side of the existing powerlines in order to avoid these sensitive seepage wetlands. In addition to route and site options, several mitigation measures are also recommended that should be adhered to in order to reduce potential impacts on wetlands within the study area.

E.10 SUMMARY OF SPECIALIST ASSESSMENT FINDINGS REGARDING ALTERNATIVES

During the compilation of the specialist studies, specialists were requested to highlight their preferred alternative based on their investigations. The table below summarises these outcomes from specialist in the order of their preference. Eskom also undertook technical evaluations of the 5 alternatives and have indicated their preference.

Table 9: Summary table of specialists' preferred alternative/s

	SPECIALIST STUDIES										
ALTERNATIVES	**Agricultural Potential**	**Agri-economic**	**Flora**	**Fauna**	**Heritage**	**Social**	**Town Planning**	**Traffic**	**Visual**	**Wetland**	**ESKOM**
1											
2											
3											
4											
5											

Preferred

SECTION F: ASSESSMENT CRITERIA

F-1 IMPACT IDENTIFICATION AND ASSESSMENT

The assessment criteria must clearly identify the environmental impacts of the proposed development. The environmental impacts identified will be quantified and the significance of the impacts assessed according to the criteria set out below. The EAP must make a clear statement, identifying the environmental impacts of the construction, operation and management of the proposed development. As far as possible, the EAP must quantify the suite of potential environmental impacts identified in the study and assess the significance of the impacts according to the criteria set out below. Each impact will be assessed and rated. The assessment of the data must, where possible, be based on accepted scientific techniques, failing which the specialist is to make judgements based on his/ her professional expertise and experience.

F-1.1.1 Assessment Procedure: Proposed Impact Assessment Methodology

For the purpose of assessing impacts of the proposed development, during the EIR phase, the project will be divided into two phases from which impacting activities can be identified, namely:

Construction Phase:	All the construction related activities on site, until the contractor leaves the site.
Operational Phase:	All activities, including the operation and maintenance of the proposed development.

The activities arising from each of these phases will be included in the impact assessment tables. This is to identify activities that require certain environmental management actions to mitigate the impacts arising from them. The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure.

Extent The physical and spatial scale of the impact.	Footprint	The impacted area extends only as far as the activity, such as footprint occurring within the total site area.
	Site	The impact could affect the whole, or a significant portion of the site.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
	National	The impact could have an effect that expands throughout the country (South Africa).
	International	Where the impact has international ramifications that extend beyond the boundaries of South Africa.

Duration The lifetime of the impact, that is measured in relation to the lifetime of the proposed development.	Short Term	The impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than that of the construction phase.
	Short-Medium Term	The impact will be relevant through to the end of a construction phase.
	Medium Term	The impact will last up to the end of the development phases, where after it will be entirely negated.
	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.
	Permanent	This is the only class of impact, which 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.
Intensity Is the impact destructive or benign, does it destroy the impacted environment, alters its functioning, or slightly alter the environment itself?	Low	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but functions and processes continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Probability The likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.	Improbable	The possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is zero (0%).
	Possible	The possibility of the impact occurring is very low, due either to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.
	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%.
	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%.
	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 on. The chance of this impact occurring is defined as 100%.

Mitigation – The impacts that are generated by the development can be minimised if measures are implemented in order to reduce the impacts. These measures ensure that the development considers the environment and the predicted impacts in order to minimise impacts and achieve sustainable development.

Determination of Significance – Without Mitigation – Significance is determined through a synthesis of impact characteristics as described in the above paragraphs. It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. The significance of the impact "without mitigation" is the prime determinant of the nature and degree of mitigation required. Where the impact is positive, significance is noted as "positive". Significance will be rated on the following scale:

No significance: The impact is not substantial and does not require any mitigation action;
Low: The impact is of little importance, but may require limited mitigation;
Medium: The impact is of importance and is therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels; and
High: The impact is of major importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

Determination of Significance – With Mitigation – Determination of significance refers to the foreseeable significance of the impact after the successful implementation of the necessary mitigation measures.

Significance with mitigation will be rated on the following scale:

No significance: The impact will be mitigated to the point where it is regarded as insubstantial;
Low: The impact will be mitigated to the point where it is of limited importance;
Low to medium: The impact is of importance, however, through the implementation of the correct mitigation measures such potential impacts can be reduced to acceptable levels;
Medium: Notwithstanding the successful implementation of the mitigation measures, to reduce the negative impacts to acceptable levels, the negative impact will remain of significance. However, taken within the overall context of the project, the persistent impact does not constitute a fatal flaw;
Medium to high: The impact is of major importance but through the implementation of the correct mitigation measures, the negative impacts will be reduced to acceptable levels; and
High: The impact is of major importance. Mitigation of the impact is not possible on a cost-effective basis. The impact is regarded as high importance and taken within the overall context of the project, is regarded as a fatal flaw. An impact regarded as high significance, after mitigation could render the entire development option or entire project proposal unacceptable.

Assessment Weighting – Each aspect within an impact description was assigned a series of quantitative criteria. Such criteria are likely to differ during the different stages of the project's life cycle. In order to establish a defined base upon which it becomes feasible to make an informed decision, it will be necessary to weigh and rank all the identified criteria.

Ranking, Weighting and Scaling – For each impact under scrutiny, a scaled weighting factor will be attached to each respective impact. The purpose of assigning such weightings serve to highlight those aspects considered the most critical to the various stakeholders and ensure that each specialist's element of bias is taken into account. The weighting factor also provides a means whereby the impact assessor can successfully deal with the complexities that exist between the different impacts and associated aspect criteria.

Simply, such a weighting factor is indicative of the importance of the impact in terms of the potential effect that it could have on the surrounding environment. Therefore, the aspects considered to have a relatively high value will score a relatively higher weighting than that which is of lower importance (Figure below: Weighting description).

Extent	Duration	Intensity	Probability	Weighting Factor (WF)	Significance Rating (SR)	Mitigation Efficiency (ME)	Significance Following Mitigation (SFM)
Footprint 1	Short term 1	Low 1	Probable 1	Low 1	Low 0-19	High 0,2	Low 0-19
Site 2	Short to medium 2		Possible 2	Low to medium 2	Low to medium 20-39	Medium to high 0,4	Low to medium 20-39
Regional 3	Medium term 3	Medium 3	Likely 3	Medium 3	Medium 40-59	Medium 0,6	Medium 40-59
National 4	Long term 4		Highly Likely 4	Medium to high 4	Medium to high 60-79	Low to medium 0,8	Medium to high 60-79
International 5	Permanent 5	High 5	Definite 5	High 5	High 80-100	Low 1,0	High 80-100

Figure 23: Description of bio-physical assessment parameters with its respective weighting

Identifying the Potential Impacts Without Mitigation Measures (WOM) – Following the assignment of the necessary weights to the respective aspects, criteria are summed and multiplied by their assigned weightings, resulting in a value for each impact (prior to the implementation of mitigation measures).

Equation 1: Significance Rating (WOM) = (Extent + Intensity + Duration + Probability) x Weighting Factor

Identifying the Potential Impacts With Mitigation Measures (WM) – In order to gain a comprehensive understanding of the overall significance of the impact, after implementation of the mitigation measures, it will be necessary to re-evaluate the impact.

Mitigation Efficiency (ME) – The most effective means of deriving a quantitative value of mitigated impacts is to assign each significance rating value (WOM) a mitigation effectiveness (ME) rating. The allocation of such a rating is a measure of the efficiency and effectiveness, as identified through professional experience and empirical evidence of how effectively the proposed mitigation measures will manage the impact.

Thus, the lower the assigned value the greater the effectiveness of the proposed mitigation measures and subsequently, the lower the impacts with mitigation.

Equation 2: Significance Rating (WM) = Significance Rating (WOM) x Mitigation Efficiency
Or
WM = WOM x ME

Significance Following Mitigation (SFM) – The significance of the impact after the mitigation measures are taken into consideration. The efficiency of the mitigation measure determines the significance of the impact. The level of impact will, therefore, be seen in its entirety with all considerations taken into account.

F-1.1.2 Integration of Specialist's Input

In order to maintain consistency in the impact assessment, it is suggested that all potential impacts to the environment (or component of the environment under review) should be listed in a table similar to the example shown below (more than one table will be required if impacts require assessment at more than one scale). The assessment parameters used in the table should be applied to all of the impacts and a brief descriptive review of the impacts and their significance will then be provided in the text of the specialist reports and consequently in the EIR. The implications of applying mitigation are reviewed in Section F-1.1.3 below.

Table 10: Example of an Impact Table

Impact source(s)			Status	-
Nature of impact				
Reversibility of impact				
Degree of irreplaceable loss of resource				
Affected stakeholders				
Magnitude	*Extent*			
	Intensity			
	Duration			
	Probability			
Significance	*Without mitigation*			H
	With mitigation			L
Significance Following Mitigation (SFM)				

F-1.1.3 Mitigation Measures

Mitigation measures will be recommended in order to enhance benefits and minimise negative impacts and they will address the following:

- Mitigation objectives: what level of mitigation must be aimed at: For each identified impact, the specialist must provide mitigation objectives (tolerance limits) which would result in a measurable reduction in impact. Where limited knowledge or expertise exists on such tolerance limits, the specialist must make an "educated guess" based on his/ her professional experience;
- Recommended mitigation measures: For each impact the specialist must recommend practicable mitigation actions that can measurably affect the significance rating. The specialist must also identify management actions, which could enhance the condition of the environment. Where no mitigation is considered feasible, this must be stated and reasons provided;
- Effectiveness of mitigation measures: The specialist must provide quantifiable standards (performance criteria) for reviewing or tracking the effectiveness of the proposed mitigation actions, where possible; and
- Recommended monitoring and evaluation programme: The specialist is required to recommend an appropriate monitoring and review programme, which can track the efficacy of the mitigation objectives. Each environmental impact is to be assessed before and after mitigation measures have been implemented. The management objectives, design standards, etc., which, if achieved, can eliminate, minimise or enhance potential impacts or benefits. National standards or criteria are examples, which can be stated as mitigation objectives.

Once the above objectives have been stated, feasible management actions, which can be applied as mitigation, must be provided. A duplicate column on the impact assessment tables described above will indicate how the application of the proposed mitigation or management actions has reduced the impact. If the proposed mitigation is to be of any consequence, it should result in a measurable reduction in impacts (or, where relevant, a measurable benefit).

F-1.2 Approach to the Assessment of Cumulative Impacts

Cumulative impacts can arise from one or more activities. A cumulative impact may result in an additive impact i.e. where it adds to the impact which is caused by other similar impacts or an interactive impact i.e. where a cumulative impact is caused by different impacts that combine to form a new kind of impact. Interactive impacts may be either countervailing (the net adverse cumulative impact is less than the sum of the individual impacts) or synergistic (the net adverse cumulative impact is greater than the sum of the individual impacts).

Possible cumulative impacts of the project will be evaluated in the EIR. In addition, various other cumulative impacts e.g. other external impacts that could arise from the project will be further investigated in the EIR phase of the project.

The assessment of cumulative impacts on a study area is complex; especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated. It is often difficult to determine at which point the accumulation of many small impacts reaches the point of an undesired or unintended cumulative impact that should be avoided or mitigated. There are often factors which are uncertain when potential cumulative impacts are identified.

F-1.2.1 Steps in Assessing Cumulative Impacts

The assessment of cumulative impacts will not be done separately from the assessment of other impacts. Cumulative impacts however, tend to have different time and space dimensions and therefore require specific steps. This may even mean that some of the actions in the assessment process, that preceded general impact

identification, may have to be revisited after potential cumulative impacts have been identified. This will ensure that the scope of the EIR process is adequate to deal with the identified cumulative impacts.

Three (3) general steps, which are discussed below, will be recommended to ensure the proper assessment of cumulative impacts.

F-1.2.2 Determining the Extent of Cumulative Impacts

To initiate the process of assessing cumulative impacts, it is necessary to determine what the extent of potential cumulative impacts will be. This will be done by adopting the following approach:

- Identify potentially significant cumulative impacts associated with the proposed activity;
- Establish the geographic scope of the assessment;
- Identify other activities affecting the environmental resources of the area; and
- Define the goals of the assessment.

F-1.2.3 Describing the Affected Environment

The following approach is suggested for the compilation of a description of the environment:

- Characterise the identified external environmental resources in terms of their response to change and capacity to withstand stress;
- Characterise the stresses affecting these environmental resources and their relation to regulatory thresholds; and
- Define a baseline condition that provides a measuring point for the environmental resources that will be impacted on.

F-1.2.4 Assessment of Cumulative Impacts

The general methodology which is used for the assessment of cumulative impacts should be coherent and should comprise of the following:

- An identification of the important cause-and-impact relationships between proposed activity and the environmental resources;
- A determination of the magnitude and significance of cumulative impacts; and
- The modification, or addition, of alternatives to avoid, minimize or mitigate significant cumulative impacts.

SECTION G: ASSESSMENT OF IMPACTS

G-1 IDENTIFIED IMPACTS

The following issues were identified during the Scoping Phase, and have now been assessed in the EIR phase:

Biophysical Impacts

- Loss/displacement of cultivated land (with high agricultural potential);
- Impact of construction traffic movement on the surrounding farm lands;
- Destruction of indigenous plant species through construction of the power pylons;
- Destruction and fragmentation of faunal habitat;
- Disturbance to avifaunal habitat within an IBA;
- Sedimentation of wetlands;
- Destruction of wetland habitat and associated loss of wetland functionality;
- Changes to the surface and sub-surface flow regimes;
- Potential impacts on ground and surface water quality due to hydrocarbon spillages from vehicles during the construction phase of the development;

Socio-Economic Impacts

- Creation of employment opportunities;
- Presence of construction workers in the area;
- Impacts on farming practices during construction
- Increased dust and noise generation (and impact on the surrounding farmlands) during the construction phase of the project;
- Change in the visual character of the local area in which the project is located;
- Potential impacts on heritage resources affected by the construction of the substation or erection of the proposed power lines;
- Potential loss of viable and high potential agricultural/ grazing land affected by the construction of the substation and erection of the proposed power lines.

G-2 IDENTIFIED CUMULATIVE IMPACTS

Cumulative impacts, as illustrated below, occur as a result from the combined effect of incremental changes caused by other activities together with the particular project. In other words, several developments with insignificant impacts individually may, when viewed together, have a significant cumulative adverse impact on the environment (see Figure below).

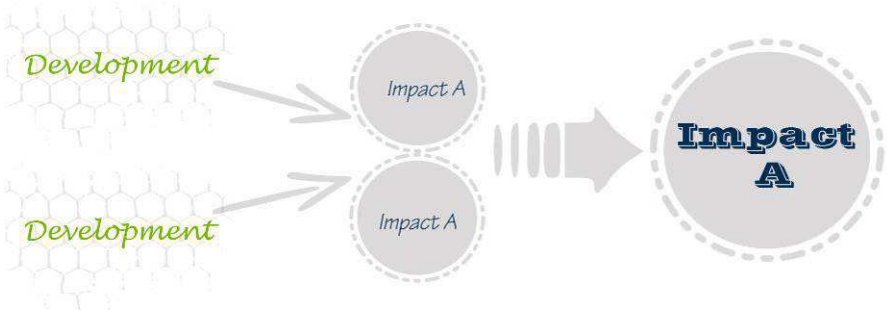

Figure 24: The identification of Cumulative Impacts

The following cumulative impacts have been identified in terms of the proposed development and warrant further investigation during the assessment phase:

- Increased loss of viable and high potential agricultural/ grazing land in the local area; and
- Increased visual impacts associated with additional power lines in the local area.
- Increased demand for additional electrical infrastructure to serve the local area

G-3 IMPACT ASSESSMENT: CONSTRUCTION PHASE

G-3.1 Biophysical Environment

G-3.1.1 Loss/displacement of land with agricultural potential

Source and nature of the impact
The clearance of cultivated lands (with agricultural potential) for the construction of the substation and power line route.

Table 11: Loss/displacement of cultivated land

Impact source(s)	Construction of the substation and power line route.		Status	-
Nature of impact	Clearance of cultivated lands (with agricultural potential).			
Reversibility of impact	The impact is irreversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Land owner			
Magnitude	*Extent*	Footprint - 1		
	Intensity	High – 5		
	Duration	Permanent – 5		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (1+5+5+5) x 4 = 64 Medium-High		M-H
	With mitigation	N/A		N/A

Mitigation measures

- Not applicable, as this impact will entail the irreversible loss of lands with agricultural potential due to the construction footprint of the substation and powerline.

G-3.1.2 Impact of construction traffic movement on the surrounding farm lands;

Source and nature of the impact
Impact of construction vehicular traffic on the surrounding farm lands

Table 12: Impact of construction traffic movement on the surrounding farm lands

Impact source(s)	Construction activities and vehicle movement		Status	-
Nature of impact	Traffic patterns of the surrounding area will be affected			
Reversibility of impact	The impact is irreversible but will be less intrusive if mitigation measures are adopted			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding land owners and road users			
Magnitude	*Extent*	Site -2		
	Intensity	Medium – 3		
	Duration	Short – Medium Term - 2		

	Probability	Definite - 5	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+2+5) x 4 = 48 Medium	**M**
	With mitigation	*WOM x ME = WM* 48 x 0.6 =38 Low -Medium	**L-M**

Mitigation measures

- Restrict movement of construction vehicles to normal working hours 07:00 – 17:00
- All construction vehicles must remain within the designated access road to the construction site and not venture outside this road boundary

Significance of the impact

The impact that construction related traffic would have on this the current traffic patterns is predicted to be of a medium to high significance without mitigation measures, however, this impact can be reduced to a medium significance if appropriate measures are adopted.

G-3.1.3 Destruction of indigenous plant species through construction of power pylons

Source and nature of the impact

Powerlines associated with some of the alternatives will traverse pass in close proximity to drainage lines and rivers (such as the Koesterbos River) which still support some indigenous plant species. If the power pylons are constructed within these areas, these indigenous species will be destroyed.

Table 13: Destruction of indigenous plant species

Impact source(s)	Vegetation clearance for construction activities and the development footprint of the substation and powerline		Status	-
Nature of impact	Floral species may be lost and fauna may be displaced due to the removal of vegetation.			
Reversibility of impact	The impact is irreversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	NA			
Magnitude	*Extent*	Footprint - 1		
	Intensity	Medium – 2		
	Duration	Permanent - 6		
	Probability	Medium – 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (1+2+6+3) x 4 = 48 Medium		**M**
	With mitigation	*WOM x ME = WM* 48 x 0.6 =28.80 Low		**L**

Mitigation measures

- Substation site **alternatives 3 and 4** and the associated powerlines will offer the least impact from a **floral perspective**, and either should be considered as the preferred site and route;
- Power pylons should be constructed outside the buffer specified by the wetland specialist.

G-3.1.4 Destruction and fragmentation of faunal habitat

Source and nature of the impact

Depending on the substation and powerline route alternative, construction of new electrical infrastructure including the construction of access roads, clearing and maintenance of servitudes, construction of sub-station

yards etc., may destroy, alter or degrade faunal habitat to varying degrees. Disturbance and destruction of natural habitat will lead to the displacement and/or exclusion of faunal species from the area.

Natural faunal habitat within the study area includes the Koesterbos River and associated riparian vegetation, which powerline alternative 2 and alternative 4, will impact on; and the secondary shrubland and stands of exotic trees, which substation alternative site 1 and alternative 5 will impact on.

Table 14: Destruction and fragmentation of faunal habitat

Impact source(s)	Construction of substation and powerlines		Status	-
Nature of impact	Fauba species may be lost and displaced due to the removal of vegetation.			
Reversibility of impact	The impact is irreversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	NA			
Magnitude	*Extent*	Footprint - 1		
	Intensity	Medium – 2		
	Duration	Permanent - 6		
	Probability	Definite– 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (1+2+6+5) x 4 = 56 Medium		M
	With mitigation	*WOM x ME = WM* 56 x 0.6 =33.60 Low		L

Mitigation Measures

- In terms of the specific impact in discussion, substation alternative 3 and associated powerline alternative will offer the least impact from a **faunal** perspective and should be considered as a preferred site and route;
- If this alternative is chosen, the substation must be positioned to avoid the farm dam in the north-eastern corner of the proposed site;
- Construction and associated activities must remain outside of any buffer specified by the wetland specialist;
- Construction crew camps should not be located adjacent to the river;
- Clearing of large trees should be avoided where possible;
- Construction should commence in the early winter months in order to minimise the impacts on the breeding activities of faunal species especially birds nesting in stands of exotic trees; and
- A rubble clean-up plan must be implemented throughout the duration of the construction phase.

G-3.1.5 Disturbance of avifaunal habitat within IBA

Source and nature of the impact

Proposed alternative substation site 5 is positioned slightly within the southern border of the global Important Bird Area (IBA) ZA091 Outeniqua Mountains (SA112). Should this site be chosen for development, construction activities may destroy, alter or degrade faunal habitat found to the north of the proposed site. Disturbance and destruction of natural habitat will lead to the displacement and/or exclusion of faunal species from the area.

Table 15: Disturbance of avifaunal habitat within IBA

Impact source(s)	Construction of substation and powerlines	Status	-
Nature of impact	Avifaunal species habitat may be altered and degraded.		
Reversibility of impact	The impact is irreversible		
Degree of irreplaceable loss of resource	High		

Affected stakeholders	NA		
Magnitude	*Extent*	Local - 2	
	Intensity	Medium – 2	
	Duration	Medium - term - 3	
	Probability	Medium – 3	
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+2+3+3) x 3 = 30 Medium	**M**
	With mitigation	*WOM x ME = WM* 30 x 0.4 =12 Low	**L**

Mitigation Measures

- Alternative site 5 is not preferred from a faunal perspective in its current location of the proposed powerline, and should be avoided. Therefore, the avifaunal specialist suggests that if Alternative 5 cannot be avoided, then the proposed powerline must be shifted to immediately **south** of the existing powerline. This will ensure that the proposed powerline will be located outside of the Important Bird Area (IBA) boundary (immediately north of the existing powerline), and will not place additional impacts on the area as a powerline already exists at that point in the landscape.
- Construction of the substation must remain outside of the IBA boundary;
- Construction crew camps should **not** be located on the **north** side of the current powerline servitude or the proposed site;
- No wild animal (including birds) may under any circumstance be handled, removed or be interfered with by construction workers;
- No wild animal may under any circumstance be hunted, snared, captured, injured or killed;
- No wild animal may be fed on site;
- No domesticated animals must be allowed on site;
- Construction should commence in the early winter months in order to minimise the impacts on the breeding activities of faunal species; and
- All fires must be prohibited.

G-3.1.6 Sedimentation of wetlands

Source and description of the impact

The clearing of natural vegetation and the stripping of topsoil and sub-soils for placing pylons and substations will potentially result in increased runoff of sediment from the site into watercourses associated with the study area.

Table 16: Sedimentation of wetlands

Impact source(s)	Construction activities within and in close proximity to natural water resources (i.e. wetlands, rivers and streams)		Status	-
Nature of impact	Sedimentation of wetlands			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding land owners			
Magnitude	*Extent*	Regional -3		
	Intensity	High – 5		
	Duration	Permanent – 5		
	Probability	Definite – 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+2+3) x 4 = 40 Medium		**M**

	With mitigation	*WOM x ME = WM* 40 x 0.6 = 24 Low to Medium	**L - M**

Mitigation measures

- The layout and placement of substations and pylons should take cognisance of the delineated wetland boundaries. All of the proposed alternative sites have a potential slight encroachment on wetland habitat. However, it is assumed that only a portion of any given proposed site is required for the development footprint. The layout design should therefore place infrastructure as far from wetland boundaries as possible.

- From a wetland perspective, Alternative 3 was regarded as the preferred option as it is associated with the shortest route option and is therefore likely to have the least amount of impact and or proximity to wetlands within the study area (the development footprint should be shifted as far south within the site as to avoid impact on HGM 5 and HGM 9). The Alternative 4 site potentially encroaches on HGM 1 and HGM 2 and although the route option does not cross any wetlands, it is the longest option and runs parallel to HGM 2 (which was deemed a sensitive wetland unit) and depending on final layouts, pylons could potentially infringe on wetland habitat. Both Alternative 1 and Alternative 2 route options run parallel to HGM 2 which is not preferred, although from a site selection point of view, Alternative 1 is more preferred than Alternative 2. The most sensitive wetland environment was assessed towards the northern side of Alternative 5 route alignment. In case Alternative 5 is chosen as the preferred route, powerlines should be constructed on the southern side of the existing powerlines. It is essential to note that whichever route option is chosen, none of the powerline pylons should be constructed within delineated wetland habitat.

- Develop soil management measures for the route and substation construction sites which will prevent runoff of sediment into the associated watercourses, e.g. scheduling the construction phase during low rainfall periods, installing soil curtains and use of swales to capture run-off water and settle suspended materials etc.

- Usually substations and associated infrastructure are bedded with gravel which is a good medium to curtail excessive precipitation run-off. However, if the proposed development is to include several hardened surfaces which could increase peak flows received by wetlands, attenuation facilities should be designed which diffusely releases water. Further, wetland rehabilitation in the vicinity of such infrastructure is then also highly recommended.

- A wetland monitoring program must be in place to pro-actively detect threats to wetlands before it can cause damage through an adaptive management approach, e.g. the initiation of new concentrated drainage pathways and erosion processes as a result of new access roads etc. It is recommended that a wetland specialist (preferential) or ecologist have at least one visit during the construction process and one visit after construction is completed. The wetland specialist needs to ensure that no negative impacts on wetlands have occurred or that processes have been initiated that could harm wetlands in the future, e.g. preferential flow paths or erosion.

G-3.1.7 Destruction of wetland habitat and associated loss of wetland functionality

Source and description of the impact

The footprint of new infrastructure and construction activities could infringe or destroy wetland habitat and associated biota through removal of hydrophytic vegetation and or hydric soils. Activities are also likely to negatively affect supporting hydrological sources of wetlands.

Table 17: Destruction of wetland habitat and associated loss of wetland functionality

Impact source(s)	Construction activities within and in close proximity to natural water resources (i.e. wetlands, rivers and streams)		Status	-
Nature of impact	Destruction of wetland habitat			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	-			
Magnitude	*Extent*	Local - 1		
	Intensity	Medium – 3		
	Duration	Short – 1		
	Probability	Medium – 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (1+3+1+3) x 3 = 24 Medium		M
	With mitigation	*WOM x ME = WM* 24 x 0.6 = 14.40 Low		L

Mitigation measures

- Avoid construction activities in wetlands as far as possible through proper planning, demarcation and appropriate environmental awareness training. Appropriate wetland buffer zones (minimum of 32m from the outer edge of wetlands) and no-go areas must be assigned in particular to valley-bottom wetlands.

- All construction staff must be informed of the need to be vigilant against any practice that will have a harmful effect on wetlands e.g. Do not take short-cuts through valley bottoms (wetlands) but use existing road infrastructure.

- Any proclaimed weed or alien species that germinate during the construction period shall be cleared as per the recommendation of the vegetation assessment (SEF, 2013).

- Caution must be taken to ensure building materials are not dumped or stored within the delineated wetland zones

- Emergency plans must be in place in case of spillages into wetland systems.

- Littering and contamination of water sources during construction must be mitigated by effective construction camp management.

- All construction materials including fuels and oil should be stored in a demarcated area that is contained within a bunded impermeable surface to avoid spread of any contamination (outside of wetlands or wetland buffer zones).

- Cement and plaster should only be mixed within mixing trays. Washing and cleaning of equipment should also be done within a bermed area, in order to trap any cement or plaster and avoid excessive soil erosion. These sites must be rehabilitated prior to commencing the operational phase.

G-3.1.8 Changes to surface and sub-surface flow regimes of wetlands

Source and nature of the impact

Linear construction activities, excavations, removal and disturbances to vegetation could create preferential flow paths and/or cut off existing flow paths on the surface as well as sub-surface. Hydrology is an important driver of wetlands and changes thereto could have various negative impacts on wetlands and their associated functionality.

Table 18: Changes to surface and sub-surface flow regimes of wetlands

Impact source(s)	Construction activities within and in close proximity to natural water resources (i.e. wetlands, rivers and streams)		Status	-
Nature of impact	Destruction of wetland habitat			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	-			
Magnitude	*Extent*	Local - 1		
	Intensity	Medium – 3		
	Duration	Short – 1		
	Probability	High – 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (1+3+1+5) x 5 = 50 Medium		M
	With mitigation	*WOM x ME = WM* 50 x 0.6 = 30 Low		L

Mitigation Measures

- Avoid construction activities in wetlands or preferential hydrological pathways supporting wetlands through proper planning, appropriate design and minimising the construction footprint as per previous impacts discussed. Site selection should be sensitive towards preferential flow paths supporting wetlands. Especially stormwater design should ensure that wetlands do not received concentrated flows, but should be spread diffusely well outside the wetland boundaries. If needed, stormwater attenuation should also be implemented to mimic natural catchment run-off received by wetlands if an impact is anticipated (substantial use of hardened surfaces in design etc.)

- Soils should be replaced in the same order as removed.

- Where it is absolutely necessary for the use of machinery, limit the footprint of impact to a minimum through appropriate planning, e.g. keeping turning circles outside of the wetland. Where vehicle tracks have formed rehabilitate immediately by levelling (where possible by hand)

- Re-vegetation of the affected areas should be done as priority.

G-3.1.9 Impacts on ground and surface water quality due to hydrocarbon spillages

Source and nature of the impact

Hydrocarbons (oil, petrol and diesel) and other chemicals/ liquids will be required during the construction phase of the substation and power line project. Spills and/or leakages could occur from construction vehicles and/or equipment. These spills could contaminate the surface and ground water should they occur simultaneously with a heavy rainfall event.

Table 19: Surface and ground water contamination

Impact source(s)	Hydrocarbon and other chemical spillages		Status	-
Nature of impact	Contamination of surface and ground water during heavy rainfall events			
Reversibility of impact	The impact is reversible by containing and clearing spills as and when they occur by means of an appropriate spill kit.			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding and downstream land owners			
Magnitude	*Extent*	Footprint -1		
	Intensity	Low – 1		
	Duration	Short – Medium Term - 2		
	Probability	Likely – 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* *(1+1+2+3) x 4 = 28* Low-Medium		L-M
	With mitigation	*WOM x ME = WM* 28 x 0.6 =16.8 Low		L

Mitigation measures

- Construction should preferably take place during the dry season.
- All construction vehicles should be kept in good working condition.
- All construction vehicles should be parked in demarcated areas when not in use and drip trays should be placed under vehicles to collect any spillages/ leaks.
- If hydrocarbon spills occur these should be cleaned using SUNSORB (or similar product) and the contaminated soils removed from site and dispose of at an appropriate registered landfill site.

G-3.1.10 Soil contamination

Source and nature of the impact

Table 20: Soil contamination

Impact source(s)	Hydrocarbon and other chemical spillages		Status	-
Nature of impact	Contamination of the soil			
Reversibility of impact	The impact is reversible by containing and clearing spills as and when they occur by means of an appropriate spill kit.			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	NA			
Magnitude	*Extent*	Footprint - 1		
	Intensity	Low – 1		
	Duration	Short – Medium Term - 2		
	Probability	Likely – 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (1+1+2+3) x 4 = 28 Low-Medium		L-M

	With mitigation	*WOM x ME = WM* 28 x 0.6 = 16.8 Low	**L**

G-3.2 Socio-economic Environment

G-3.2.1 Creation of employment opportunities

Source and nature of the impact

The construction related activities will create temporary employment opportunities which, in turn will create an opportunity for the local George economy. The construction will be undertaken by contractors and the majority of the employment opportunities will be associated with the establishment of the substation component of the project.

Table 21: Assessment of employment and business creation opportunities during the construction phase

Impact source(s)	Construction phase		Status	-
Nature of impact	Creating of employment and business opportunities during the construction phase			
Reversibility of impact	N/A			
Degree of irreplaceable loss of resource	N/A			
Affected stakeholders	Surrounding communities			
Magnitude	*Extent*	Regional -3		
	Intensity	Low – 1		
	Duration	Short Term – 2		
	Probability	Highly probable – 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+1+2+4) x 3 = 30 Medium		**M**
	With mitigation	*WOM x ME = WM* 30 x 0.6 =18 Medium		**M**

Recommended enhancement measures:

- Where reasonable and practical the contractors appointed by the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.
- Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria;
- Before the construction phase commences the proponent and its contractors should meet with representatives from the GLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.
- The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase.
- Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.
- The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.

Business

- The proponent should seek to develop a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work;
- The GLM, in conjunction with the local Chamber of Commerce and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project.

Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.

G-3.2.2 Presence of construction workers in the area

Source and nature of the impact

The presence of construction workers poses a potential risk to family structures and social networks in the area, specifically local farm workers. This risk applies to each of the seven alternatives. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can affect the local community. In this regard the most significant negative impact is associated with the disruption of existing family structures and social networks.

Table 22: Assessment of impact of construction workers on local communities (Alternatives 1-5)

Impact source(s)	Construction workers moving into the area		Status	-
Nature of impact	Potential impacts on family structures and social networks associated with the presence of construction workers			
Reversibility of impact	No in case of HIV and AIDS			
Degree of irreplaceable loss of resource	Yes, if people contract HIV/AIDS. Human capital plays a critical role in communities that rely on farming for their livelihoods			
Affected stakeholders				
Magnitude	*Extent*	Local -2		
	Intensity	Low – 4 (community) High – Very high 10 (specific individuals)		
	Duration	Medium -3 (community) Long-term – 5 (individuals)		
	Probability	Probable - 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+4+3+3) x 5 = 60 Medium to High		M - H
	With mitigation	*WOM x ME = WM* 48 x 0.6 =36 Low to Medium		M- H

Recommended mitigation measures:

The potential risks associated with construction workers can be mitigated. The aspects that should be covered include:

- Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically semi and low skilled job categories. This will reduce the potential impact that this category of worker could have on local family and social networks;

- The proponent should consider the establishment of a Monitoring Forum (MF) for the construction phase. The MF should be established before the construction phase commences and should include key stakeholders, including representatives from the local community, local councillors and the contractor. The role of the MF would be to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should also be briefed on the potential risks to the local community associated with construction workers;
- The proponent and the contractors should, in consultation with representatives from the MF, develop a Code of Conduct for the construction phase. The code should identify what types of behaviour and activities by construction workers are not permitted. Construction workers that breach the code of good conduct should be dismissed. All dismissals must comply with the South African labour legislation;
- The proponent and the contractor should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase;
- The movement of construction workers on and off the site should be closely managed and monitored by the contractors. In this regard the contractors should be responsible for making the necessary arrangements for transporting workers to and from site on a daily basis;
- With the exception of security personnel, no construction workers should be permitted to stay overnight on the site.

G-3.2.3 Impact on farming operations during construction

Source and nature of the impact

The most significant negative social issue during the construction phase is linked to the loss of productive farmland and the disturbance to farming activities by construction related activities, specifically activities associated with the establishment of the power line routes. The establishment of the substations would result in a permanent loss of 36 ha of land.

Table 23: Assessment of impact on farming activities (Alternatives 1-4)

Impact source(s)	Loss of productive farmland caused by the proposed development		Status	-
Nature of impact	Impact of the substation and powerlines on productive farmland and farming operations during construction			
Reversibility of impact	Yes, compensation paid for production losses, etc			
Degree of irreplaceable loss of resource	No			
Affected stakeholders	Affected landowner			
Magnitude	*Extent*	Local - 4		
	Intensity	High - 8		
	Duration	Long term - 4		
	Probability	Definite - 5		
Significance	*Without mitigation*	High - 80		H
	With mitigation	Low - 28		L

Recommended mitigation measures:

- Eskom should enter into an agreement with the local farm owners in the area whereby Eskom will compensate for damages to farm property and disruptions to farming activities. This includes losses associated with stock theft and damage to property etc. This agreement should be finalised before the commencement of the construction phase;
- Eskom should investigate the option of establishing a MF that includes local farmers and develop a Code of Conduct for construction workers. Should such a MF be required it should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent, the neighbouring landowners and the contractors before the contractors move onto site;
- Eskom should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be

contained in tender documents for contractors and the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities;

- The EMPr must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested;
- Contractors appointed by Eskom should ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.
- Contractors appointed by Eskom should ensure that construction workers who are found guilty of stealing livestock, poaching and/or damaging farm infrastructure should be charged as per the conditions contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation;
- The housing of construction workers on the site should be limited to security personnel.

G-3.2.4 Increase in ambient dust levels

Source and nature of the impact

Construction activities, such as transportation vehicles travelling on exposed surfaces, earthworks as well as wind, will result in elevated ambient dust levels within the area. Increased dust levels may adversely affect persons working and/or residing in the nearby area.

Table 24: Increase in ambient dust levels and impact on the surrounding farmlands

Impact source(s)	Construction vehicles travelling over exposed surfaces, earthworks and the wind		Status	-
Nature of impact	Increased levels of ambient dust			
Reversibility of impact	The impact is irreversible but can be mitigated to a large extent			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding land owners			
Magnitude	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Medium Term – 3		
	Probability	Highly likely – 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+3+4) x 4 = 52 Medium		M
	With mitigation	*WOM x ME = WM* 52 x 0.6 =31.2 Low to Medium		L - M

Mitigation Measures

- Appropriate dust suppression methods must be applied.
- Exposed soil stockpiles shall be covered, kept damp or protected using organic binding agents or alternative techniques that are not water intensive.
- The clearing of vegetation must be kept to a minimum and only where required.
- Avoid unnecessary movement of construction vehicles.
- Vehicles travelling on unsurfaced roads must travel at a speed that creates minimal dust entrainment.

G-3.2.5 Increase in ambient noise levels

Source and nature of the impact

Construction activities and movement of construction vehicles will increase the ambient noise levels within the area during the construction phase. This may impact on adjacent landowners as well as sensitive faunal species within the study area.

Table 25: Increase in ambient noise levels

Impact source(s)	Construction activities		Status	-
Nature of impact	Increased level of ambient noise			
Reversibility of impact	The impact is irreversible but can be mitigated to a large extent			
Degree of irreplaceable loss of resource	Low			
Affected stakeholders	Surrounding land owners			
Magnitude	*Extent*	Regional -3		
	Intensity	Low – 1		
	Duration	Medium term – 3		
	Probability	Highly likely – 4		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+1+3+4) x 3 = 33 Low to Medium		L-M
	With mitigation	*WOM x ME = WM* 33 x 0.6 =19.8 Low		L

Mitigation measures

- Construction times must be restricted to working hours (06:00 – 18:00).
- All construction equipment or machinery should be switched off when not in use.
- Construction equipment must be kept in good working condition.

G-3.2.6 Visual Impact of construction activities

Source and nature of the impact

Ground level views of the construction camp, material lay-down areas, construction vehicle movement related to the substation and power line project may cause a negative visual impact on the surrounding farm lands situated within the Blanco area.

Table 26: Change of visual character of the area

Impact source(s)	Construction related activities		Status	-
Nature of impact	Ground level views of the above mentioned construction activities which are out of character with the surrounding landscape and which will progressively increase in intensity as the development and the ancillary components increase in scale. Sense of place will be affected negatively.			
Reversibility of impact	The impact is partially reversible through the implementation of adequate visual mitigation measure during the construction phase.			
Degree of irreplaceable loss of resource	High			
Affected stakeholders	Surrounding farm lands situated within the Blanco area.			
Magnitude	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Short to Medium term – 2		
	Probability	Highly likely – 4		

Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+2+4) x 4 = 48 Medium	**M**
	With mitigation	*WOM x ME = WM* 48 x 0.6 =28.80 Medium to low	**M - L**

Mitigation measures

The primary visual impact, namely the presence of the proposed substation and out powerline project, is not possible to mitigate. The following is, however possible:

- Mitigation of visual impacts associated with the construction of access roads is possible through the use of existing roads wherever possible. Where new roads are required to be constructed, these should be planned carefully, taking due cognisance of the local topography. Roads should be laid out along the contour wherever possible, and should never traverse slopes at 90 degrees. Construction of roads should be undertaken properly, with adequate drainage structures in place to forego potential erosion problems.
- Access roads, which are not required post-construction, should be ripped and rehabilitated.
- Consolidate infrastructure and make use of already disturbed sites rather than pristine areas wherever possible.
- Mitigation of visual impacts associated with the construction phase, albeit temporary, entails proper planning, management and rehabilitation of all construction sites. Construction should be managed according to the following principles:
  - Ensure that vegetation is not unnecessarily cleared or removed during the construction period.
  - Reduce the construction period through careful logistical planning and productive implementation of resources.
  - Plan the placement of lay-down areas and any potential temporary construction camps along the corridor in order to minimise vegetation clearing.
  - Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.
  - Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.
  - Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).
  - Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting.
  - Ensure that all infrastructure and the site and general surrounds are maintained and kept neat.
  - Rehabilitate all disturbed areas, construction areas, roads, slopes etc. immediately after the completion of construction works. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
  - Monitor all rehabilitated areas for at least a year for rehabilitation failure and implement remedial action as required. If necessary, an ecologist should be consulted to assist or give input into rehabilitation specifications.
- Mitigation of other lighting impacts includes the pro-active design, planning and specification lighting for the substation. The correct specification and placement of lighting and light fixtures will go far to contain rather than spread the light. Additional measures include the following:
  - Shielding the sources of light by physical barriers (walls, vegetation, or the structure itself);
  - Limiting mounting heights of lighting fixtures, or alternatively using foot-lights or bollard level lights;
  - Making use of minimum lumen or wattage in fixtures;
  - Making use of down-lighters, or shielded fixtures;
  - Making use of Low Pressure Sodium lighting or other types of low impact lighting.

- Making use of motion detectors on security lighting. This will allow the site to remain in relative darkness, until lighting is required for security or maintenance purposes.

- Secondary impacts anticipated as a result of the proposed infrastructure (i.e. impacts on landscape character, sense of place, tourist access routes and tourist destinations) are not possible to mitigate.
- After decommissioning, all infrastructure should be removed and all disturbed areas appropriately rehabilitated.

The possible mitigation of both primary and secondary visual impacts as listed above should be implemented and maintained on an on-going basis.

G-3.2.7 Impacts on heritage resources

Source and nature of the impact

Potential loss of heritage resources affected by the construction of the substation or erection of the proposed power lines.

Table 27: Impacts on potential heritage resources

Impact source(s)	Construction footprint of substation site and powerline route		Status	-
Nature of impact	Impacts on heritage resources			
Reversibility of impact	The impact is irreversible			
Degree of irreplaceable loss of resource	Low. The HIA has identified that no impact on heritage or archaeological resources are expected.			
Affected stakeholders	Families of ancestral graves,			
Magnitude	*Extent*	Site – 2		
	Intensity	Low – 1		
	Duration	Permanent – 5		
	Probability	Probable – 1		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+1+5+1) x 4 = 36 Low -Medium		**L-M**
	With mitigation	*N/A*		**N/A**

Mitigation measures

If something of heritage or archaeological significance is encountered during the construction process (i.e. during excavation activity) of the substation and power line project, then the area must be demarcated as a "no-go area" and a representative from the South African Heritage Agency (SAHRA) contacted to evaluate the potential resource.

Recommendations stemming from the archaeological study are the following:

- The **positions of all identified cemeteries are to be noted** when selecting the final sub-station site and powerline route;

- Due to constraints experienced in surveying the entire area of the broader infrastructure corridors, the archaeologist must be informed of the selected substation site and powerline route in order to determine if a walk down must be undertaken; and

- If any **unmarked graves containing human remains are recognised** during the construction phase, the **site should be cordoned off** and an archaeologist must be contacted to undertake an investigation.

G-4 IMPACT ASSESSMENT: OPERATIONAL PHASE

G-4.1.1 Destruction of wetland habitat and associated loss of wetland functionality

Source and nature of impact

Maintenance activities are likely to have a lower impact than construction activities, except for worst case scenarios where sections of the powerline might have to be reconstructed. Wetland habitat could be impacted on or be destroyed through maintenance operations e.g. through removal of hydrophytic vegetation and or hydric soils.

Table 28: Impacts on wetland habitats during maintenance

Impact source(s)	Maintenance crews working in wetlands		Status	-
Nature of impact	Destruction of wetland habitat and associated loss of wetland functionality			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	medium			
Affected stakeholders	-			
Magnitude	*Extent*	Local -2		
	Intensity	Medium – 3		
	Duration	Short – 1		
	Probability	Low – 1		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+1+1) x 4 = 28 Low to medium		L-M
	With mitigation	*WOM x ME = WM* 28 x 0.6 = Low		L

Mitigation Measures

- Mitigation measures for worst case scenarios would be the same as for the construction phase.

G-4.1.2 Electrocution of birds and large bat species

Source and nature of impact

Birds are more susceptible to electrocutions than bats generally due to their larger body size or long feathers. The impact of electrocution in bats is poorly documented however it is believed bats are less affected due to their small size and navigational ability through echolocation. Larger bat species such as the fruit bats are however at a higher risk due to their larger body size and lack of echolocation as these species rely on eyesight to locate their fruit diet. Bird species that are prone to electrocution are larger perching species such as birds of prey (including vultures, medium and large bodied raptors, and smaller raptors such as falcon), storks and herons. A number of these species may occur in the study area.

Table 29: Electrocution of birds and large bat species

Impact source(s)	Live conductors		Status	-
Nature of impact	Electrocution of birds and large bat species			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	Medium			
Affected stakeholders	-			
Magnitude	*Extent*	Local -2		
	Intensity	Medium – 3		
	Duration	Long-term– 4		
	Probability	medium– 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+4+3) x 4 = 48 Medium		**M**
	With mitigation	*WOM x ME = WM* 48 x 0.6 =28.80 Low		**L**

Mitigation Measures

- Powerlines should be routed alongside existing infrastructure such as existing powerlines, roads, buildings, and railway lines where possible;
- Streams and drainage lines should not be crossed perpendicularly with powerlines where possible
- In terms of the impact in discussion, substation alternative 3 and associated powerline alternative will offer the least impact from an avifaunal perspective and should be considered as a preferred site and route;
- All jumpers at transformers, T-offs and strain structures should be insulated;
- Only pole structures that are approved as “bird friendly” by Eskom’s ENVIROTECH Forum should be used; and
- Lines traversing open areas must be marked with anti-collision devices. Bird Flight Diverters on the earth wires must be installed as per specifications devised by the EWT.

G-4.1.3 Collisions by birds and bats with structures

Source and nature of impact

Collisions are the leading threat to birds caused by electrical infrastructure both globally and in southern Africa (Bevanger, 1994; van Rooyen, 2004). The likelihood of collisions with powerlines is determined by factors such as bird flight path/height, bird ocular structure and acuity, bird morphology, acquired knowledge of existing structures, bird behaviours, landscape topography, vegetation and weather conditions (APLIC, 1994; Bevanger, 1994; Hunting 2002; Jenkins et al., 2010).

Generally, bird species that are at risk include: large flocking species that commute at low altitudes; large, heavy bodied, less manoeuvrable species with low ocular acuity; individuals that have no acquired knowledge of existing infrastructure such as juveniles of migratory species, and individuals engaging in behaviours such as aerial displays, hunting chases, and flight at night, dusk or dawn. Such species which may occur in the study area include waterfowl such as ducks, geese, herons and waders; pigeons; various smaller bodied passerines, and high-speed predators such as falcons.

Table 30: Collisions by birds and bats with structures

Impact source(s)	Construction activity and construction vehicles		Status	-
Nature of impact	Collisions with structures			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	medium			
Affected stakeholders	-			
Magnitude	*Extent*	Local -2		
	Intensity	Medium - 3		
	Duration	Long-term – 4		
	Probability	Medium– 3		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+4+3) x 4 = 48 Medium		**M**
	With mitigation	*WOM x ME = WM* 48 x 0.6 =28.80 Low to Medium		**L -M**

Mitigation measures

- Powerlines should be routed alongside existing infrastructure such as existing powerlines, roads, buildings, and railway lines where possible;
- Streams and drainage lines should not be crossed perpendicularly with powerlines where possible;
- In terms of the impact in discussion, powerline route alternative 3 will offer the least impact from an avifaunal perspective and should be considered as a preferred route;
- Lines traversing open areas must be marked with anti-collision devices. Bird Flight Diverters on the earth wires must be installed as per specifications devised by the Endangered Wildlife Trust (EWT); and
- Only pole structures that are approved as "bird friendly" by Eskom's ENVIROTECH Forum should be used.

G-4.1.4 Loss and fragmentation of natural habitat

Source and nature of impact

Albeit a small footprint, removal of natural vegetation for pylons and servitudes will have a negative impact on the faunal communities through destruction of habitat. Generally, permanent habitat destruction may lead the surrounding natural areas becoming degraded with the inevitable establishment of alien invasive plant species. This creates a domino effect and would ultimately lead to a break-down in community structure within the ecosystem and an eventual loss of biodiversity. Bird species with specific habitat requirements and restricted ranges are the most at risk with respect to habitat destruction.

Table 31: Loss and fragmentation of habitat

Impact source(s)	Construction workers, construction activity, construction vehicles		Status	-
Nature of impact	Loss of habitat			
Reversibility of impact	The impact is not reversible			
Degree of irreplaceable loss of resource	medium			
Affected stakeholders	-			
Magnitude	*Extent*	Site -2		
	Intensity	Medium – 3		
	Duration	Long-term – 4		
	Probability	medium – 3		

Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (2+3+4+3) x 4 = 48 Medium	**M**
	With mitigation	*WOM x ME = WM* 48 x 0.6 = 28.80 Low	**L**

Mitigation Measures

- Substation alternative 3 and the associated powerline will offer the least impact from an ecological perspective and is considered as a preferred site and route;
- Maintenance activities should be located outside the catchments of existing watercourses to prevent possible impact from runoff water and other detrimental impacts; and
- Powerline servitudes should not be cleared of vegetation to ensure that indigenous species still occurring within these areas are maintained.

G-5 CUMULATIVE IMPACTS

Cumulative impacts are those impacts that are created as a result of the combination of the impacts of the proposed project, with impacts of other projects or operations, to cause related impacts. These impacts occur when the incremental impact of the project, combined with the effects of other past, present and reasonably foreseeable future projects, are cumulatively considerable. The assessment of cumulative impacts on a site-specific basis is however complex – especially if many of the impacts occur on a much wider scale than the site being assessed and evaluated.

G-5.1.1 Increased loss of land with agri-potential in the region

Source and nature of the impact

Considering the future regional electrical network for the current S&EIR projects i.e. proposed Blanco (Narina) to Droërivier 400kV transmission line, and substation upgrade **and** the proposed Gourikwa to Blanco 400kV transmission line, and substation upgrade and the project referred to herein, the impact listed below is highly likely.

There will be loss of viable and high potential agricultural/ grazing land affected by the construction of electrical substations and power lines within the region, including the Blanco project area, Waboomskraal, Dysselsdorp, Kammanassie and Klaarstroom, areas along Hartenbos and Little Brak Rivers.

Table 32: Increased loss of land with high agri-potential

Impact source(s)	Increase of electrical infrastructure within the project area.		Status	-
Nature of impact	Increase loss of agricultural/ grazing land			
Reversibility of impact	The impact is irreversible			
Degree of irreplaceable loss of resource	N/A			
Affected stakeholders	Land owners (who are dependent on agricultural practise as a livelihood)			
Magnitude	*Extent*	Region -3		
	Intensity	Medium – 3		
	Duration	Permanent - 5		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+5) x 4 = 64 Medium -High		M-H
	With mitigation	*N/A*		N/A

Mitigation measures

No mitigation measures are proposed as the cumulative loss of viable agricultural/ grazing land due to the increase in electrical infrastructure (to cater for the ever-increasing demand for electricity in the region is irreversible.

G-5.1.2 Increased visual impacts associated with additional electrical infrastructure in the region

Source and nature of the impact

There will be increased visual impacts associated with additional electrical infrastructure within the project areas associated with the proposed Blanco (Narina) to Droërivier 400kV transmission line, and substation upgrade **and** the proposed Gourikwa to Blanco 400kV transmission line, as well as the study area for the project referred to in this report. The additional electrical infrastructure in the region may affect existing tourist operations such as guest lodges, game reserves, hiking trails, Outeniqua Mountains, Swartberg Mountain Range, farmsteads, residential suburbs and so on.

Table 33: Increased visual impacts associated with additional electrical infrastructure

Impact source(s)	Increased electrical infrastructure within the local area		Status	-
Nature of impact	Increased visual impacts associated with construction of additional electrical infrastructure			
Reversibility of impact	This cumulative impact is irreversible			
Degree of irreplaceable loss of resource	Medium - High			
Affected stakeholders	Blanco project area			
Magnitude	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Permanent - 5		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+5) x 4 = 64 Medium		M-H
	With mitigation	64 X 0.6 = 38.4 Medium to Low		M - L

Mitigation measures

The primary visual impact, namely the presence of increased electrical infrastructure within the Blanco project area is not possible to mitigate.

Significance of the impact

The cumulative impact of an increase of electrical infrastructure the in the local area, would be of **medium-high** significance.

G-5.1.3 Increased loss of indigenous vegetation in the region

Source and nature of the impact

There could be increased loss of indigenous vegetation as a result of the footprint area for the proposed substation and pylons being cleared. This could result in the loss of indigenous species, disturbance of species of conservation concern and the fragmentation of vegetation communities. The removal of vegetation could also expose the soil increasing the risk of erosion.

Table 34: Increased loss of indigenous vegetation in the region

Impact source(s)	Increased electrical infrastructure within the local area		Status	-
Nature of impact	Increased loss of indigenous vegetation associated with construction of additional electrical infrastructure			
Reversibility of impact	This cumulative impact is irreversible			
Degree of irreplaceable loss of resource	Medium - High			
Affected stakeholders	Blanco project area			
Magnitude	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Permanent - 5		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+5) x 4 = 64 Medium		M-H
	With mitigation	*N/A*		N/A

Mitigation measures

- All pylons and access routes should be located outside remnant natural vegetation along the entire route.
- Once exact pylon and access routes have been established, prepare a construction and maintenance management plan for all the sites where natural vegetation will be affected. Once pegged, the site must be inspected during the summer season by a botanist to identify all species of conservation concern along the power line route. These species must be trans-located prior to any construction activities;
- Ensure that the establishment of pylons and of access route within the sections indicated as sensitive will not have a negative impact on the populations of threatened species.
- The clearing of vegetation must be kept to a minimum and within the power line servitude.
- Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species;
- During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled;
- Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas.
- Demarcate indigenous trees and plants and other conservation worthy features such as fungi.
- Impact on highly sensitive habitat should be avoided. If avoidance is impossible, the re-planting (or replacement) of large trees will be required.

Significance of the impact

The cumulative impact of increased loss of indigenous vegetation as a result of additional electrical infrastructure the in the regional area, would be of **medium-high** significance without mitigation. However, with mitigation measures the impact could be reduced to medium to low.

G-5.1.4 Increased in demand for additional electrical infrastructure to serve the local area

Table 35: Increase in demand for additional electrical infrastructure to serve the local area

Impact source(s)	Increased in demand for electrical infrastructure within the local area		Status	**+**
Nature of impact	Provision of additional electrical infrastructure to meet demand			
Reversibility of impact	*N/A*			
Degree of irreplaceable loss of resource	Medium - High			
Affected stakeholders	Blanco project area			
Magnitude	*Extent*	Regional -3		
	Intensity	Medium – 3		
	Duration	Permanent - 5		
	Probability	Definite - 5		
Significance	*Without mitigation*	*(Extent + Intensity + Duration + Probability) x WF* (3+3+5+5) x 4 = 64 Medium		**M-H**
	With mitigation	*N/A*		**N/A**

G-6 IMPACT ASSESSMENT: DECOMMISSIONING PHASE

Decommissioning of the infrastructure (once constructed) associated with the Narina (Blanco) powerline and substation project is not included as part of the scope of work.

SECTION H: CONCLUSIONS AND RECOMMENDATIONS

In accordance with the EIA Regulations (GN No. 543), this section provides a summary of the key findings of the EIA and a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives. This section also provides a reasoned opinion as to whether the activity should or should not be authorised and conditions that should be made in respect of that authorisation, as necessary.

H-1 SUMMARY OF THE KEY FINDINGS OF THE EIA

Five (5) alternative sites were investigated for the proposed location of the Narina substation and the loop in and out powerlines. A comparative assessment of the advantages and disadvantages of the five alternative sites are described in Section D-1.3.

Alternatives 1 to 4 are not supported as these sites affects productive agricultural practises and loss of established farm land as a result of the proposed substation and power lines. This will impact negatively on the landowners in terms of food production, loss of jobs, income and livelihoods.

Based on the Narina integration report compiled by Eskom in September 2015, alternative 1 is preferred due to the ease of integration, followed by Alternative 3. Alternative 5 is however supported as the proposed development will have the least impact on production of agricultural crops, as the site consists mainly of unmanaged Eucalyptus and Black Wattle thickets (forestry). There was no evidence of farm infrastructure on the site. The Environmental Assessment Practitioner (EAP) recommends that the proposed power line be shifted as close as possible to the existing 132kV power line, as impacts exist already. The shifting of the proposed powerline to immediately south of the existing powerline would not place additional impacts on the Important Bird Area (IBA) to the north.

Bird Flight Diverters on the earth wires must be installed as per specifications devised by the EWT. Bird flappers and anti-collision devices must be installed on the power lines as there are various wetlands and watercourses in this area. The exact location of the pylons must be determined in consultation with the terrestrial and wetland ecologist by means of a walk-through of the site at the detailed design stage. i.e. post receipt of the Environmental Authorisation (EA). As far as possible, pylons must not be located in or within 32m of a wetland and watercourse. There is no natural vegetation remaining at the proposed substation site.

This alternative is the furthest away from the existing Blanco substation and therefore would require the longest integration line to the existing 132kV network. Although the most costly to construct, based on the socio-economic and biophysical impact on the receiving environment, Alternative 5 is the most preferred alternative and the EAP recommends that the DEA approve this alternative.

It is the opinion of the EAPs that should the project proceed, impacts on the surrounding natural areas can be minimised through the careful adherence to suggested mitigation measures.

The findings of the specialist studies undertaken together with the broader environmental assessment conclude that there are no fatal flaws associated with Alternative 5 that should prevent the project from proceeding.

The negative impacts identified are not considered highly significant and with appropriate mitigation can be reduced to low or medium-low significance. The positive impacts are considerable in that the proposed development will stimulate the local economy and provide additional employment opportunities.

Table 36: Summary of the significance of identified impacts without and with mitigation measures

Impact	Significance	
	Without Mitigation	With Mitigation
Construction Phase		
Biophysical Environment		
Loss/displacement of land with agricultural potential	Medium-High	N/A
Destruction of indigenous plant species	Medium	Low
Destruction and fragmentation of habitat	Medium	Low
Disturbance to avifaunal habitat	Medium	Low
Sedimentation of wetlands	Medium	Low-Medium
Destruction of wetland habitat	Medium	Low
Changes to the surface and sub-surface flow regimes	Medium	Low
Surface and ground water contamination	Low to Medium	Low
Soil contamination	Low to Medium	Low
Socio Economic Environment		
Creation of employment opportunities	Medium	Medium
Presence of construction workers in the area	Medium-High	Medium-high
Impacts on farming practices (Alt 1-4)	High	Low
Impact of construction traffic on surrounding farm lands	Medium	Medium - Low
Increase in ambient dust levels	Medium	Medium - Low
Increase in ambient noise levels	Low to Medium	Low
Visual impact disturbance	Medium	Medium - Low
Impacts on heritage resources	Low to Medium	N/A
Operational Phase		
Destruction of wetland habitat and associated loss of wetland functionality	Low Medium	Low
Electrocution of birds and large bat species	Medium	Low
Collision by birds and bats with structures	Medium	Low-Medium
Loss and fragmentation of habitat	Medium	Low
Cumulative Impacts		
Increased loss of land with agri-potential in the local area	High	Low - Medium
Increased visual impacts associated with additional electrical infrastructure in the local area.	Medium-High	N/A
Increased loss of indigenous vegetation in the region	Medium-High	Medium - Low
Increased demand for additional electrical infrastructure to serve the local area	Medium-High Positive	

The project falls within Strategic Infrastructure Plan (SIP) 10, namely *"Electricity transmission and distribution for all"*. The project serves to *"expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development".* The proposed Narina (Blanco) 400/132kV MTS substation and Droerivier Proteus Loop-in Loop-out powerline project – will enable the transmission of generated electricity to the national grid. The project is therefore part of the national programme to address an issue of national concern and importance.

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SECTION I: APPENDICES

Appendix 1: Locality Maps

Appendix 2: Photographs

Appendix 3: Authority Correspondence

Appendix 4: Alternatives considered

Appendix 5: Public Participation

Appendix 5A Public Participation Report at Scoping Phase

Appendix 5.1 Proof of publication of newspaper advertisements

Appendix 5.2 Site Notice Text and proof of placement

Appendix 5.3 I&AP Notifications
Appendix 5.3a Preliminary Interested and Affected Party (I&AP) Database
Appendix 5.3b Notification email sent
Appendix 5.3c Proof of registered mail
Appendix 5.3d Notification letter (BID with map)
Appendix 5.3e Email to IA&Ps with updated information
Appendix 5.3f Registered mail with updated landowner information
Appendix 5.3g Updated landowner information summary

Appendix 5.4 Stakeholder database at the Scoping Phase

Appendix 5.5 Meetings
Appendix 5.5a Public Open House
Appendix 5.5b Authority Meeting
Appendix 5.5c Landowner meeting on 19 February 2013
Appendix 5.5d Landowner's follow up meeting on 8 May 2013

Appendix 5.6: Actual Comments at Scoping Phase
Appendix 5.6a State Department's Comments
Appendix 5.6b Landowners Comments

Appendix 5.7: Comments and Responses Report at Scoping Phase
Appendix 5.7a Comments and Responses Report addressing State Department's comments
Appendix 5.7b Comments and Responses Report addressing Landowner's comments

Appendix 5.8: Notification Letters during public review of the DEIR
Appendix 5.9: Registered I&APs Database at the EIR Phase

Appendix 5.10: Actual Comments at the EIR Phase

Appendix 5.11: Comments and Responses Report at the EIR Phase

Appendix 5.12: Focus Group Meeting at the EIR Phase

Appendix 5.13: Notification Letter during public review of the FEIR

Appendix 6: Specialist Studies and team member CVs

Appendix 6.1: Agricultural Potential Assessment (April 2015)

Appendix 6.1: Agricultural Potential Addendum (August 2015)

Appendix 6.2: Agricultural-economic Assessment

Appendix 6.3: Ecological Assessment

Appendix 6.4: Archaeological Assessment (January 2014)

Appendix 6.4: Archaeological Assessment Addendum (July 2015)

Appendix 6.4: Heritage Impact Assessment

Appendix 6.5: Social Impact Assessment

Appendix 6.6: Town Planning Report

Appendix 6.7: Traffic Impact Statement

Appendix 6.8: Visual Impact Assessment

Appendix 6.9: Wetland Assessment

Appendix 7: Environmental Management Programme

Appendix 8: Additional Information