



ENVIRONMENTAL IMPACT ASSESSMENT FOR THE NARINA (BLANCO) TO DROËRIVIER 400KV TRANSMISSION LINE AND SUBSTATION UPGRADE

DEA Reference: 14/12/16/3/3/2/995

FINAL ENVIRONMENTAL IMPACT ASSESSMENT REPORT

JULY 2017

**VOLUME 1:
(MAIN REPORT & APPENDICES 1-3)**

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PROJECT DETAILS

DEA Reference No. : 14/12/16/3/3/2/995

Title : The proposed construction of the Blanco-Droërivier 400kV Power line and Substations upgrade.

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Client : Eskom Holdings SOC Ltd (Eskom Transmission)

Status : Final EIA Report

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Reviewed by: Jubilee Bubala

Approved By: Gesan Govender

INVITATION TO COMMENT ON THE DRAFT EIA REPORT

Envirolution Consulting (Pty) Ltd was appointed by Eskom Holdings SOC Limited to conduct the Environmental Impact Assessment (EIA) Process for the proposed construction of the Blanco-Droërvier 400kV Power line and Substations upgrade. The development entails the construction of a 200km long 400kV transmission power line from Blanco Substation to the Droërvier Substation at Beaufort West in the Western Cape Province. The alternative route that is investigated is located in the Eastern Cape Province.

The EIA process for the proposed construction of the Blanco to Droërvier 400kV Power line and Substation commenced in early 2015 under the reference number: 14/12/16/3/3/2/922. This application has lapsed in accordance with Regulation 23 (1) of the EIA Regulations, 2014 and a new EIA process is currently being undertaken. This new process entails (1) the resubmission of a new application to DEA and the project will be assigned a new reference number, (2) the release of a Draft Scoping Report (DSR) and a Draft Environmental Impact Assessment Report (DEIAR) for public review and thereafter (3) resubmission the final reports to DEA for decision-making.

It must be noted that the contents of this Report has not changed significantly from the previous application as the scope of the project and the environment still remains the same. All additional information in this report (mostly relating to the public participation process) has been underlined throughout the report for ease of reference.

Members of the public, local communities and stakeholders were invited to comment on the Draft EIA Report which was made available for public review and comment at the following locations from **12 MAY 2017 – 12 JUNE 2017:**

- The Envirolution website at www.envirolution.co.za
- Dropbox link sent to registered I&APs
- Beaufort West Public Library and George Public Library

Please submit your comments to:

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Comments can be made as written submission via fax, post or e-mail.

I&APs were requested to advise if their comments have remained the same or if they have additional or new comments.

EXECUTIVE SUMMARY

I. INTRODUCTION

Envirolution Consulting (Pty) Ltd was appointed by Eskom Holdings SOC Limited to conduct the Environmental Impact Assessment (EIA) Process for the proposed construction of the Blanco-Droërvier 400kV Power line and Substations upgrade (**DEA Reference: 14/12/16/3/3/2/995**). The development entails the construction of a 200km long 400kV transmission power line from Narina (Blanco) Substation to the Droërvier Substation at Beaufort West in the Western Cape Province. The alternative route that are investigated is located in the Eastern Cape Province.

*Another application will be submitted for the construction of a 50-60km long 400kV Transmission power line from the Gourikwa Substation at Mossel Bay to the Narina (Blanco) Substation at George, and that **impact assessment will be presented in a seperate report (DEA Reference: 14/12/16/3/3/2/994)***

In terms of the NEMA EIA Regulations (2014), published in Government Notice R. 982 in Government Gazette No. 38282 of 4 December 2014, under Section 24(5) of the National Environmental Management Act, 1998 (Act No.107 of 1998), a Scoping & Environmental Impact Assessment are required for the development due to the following listed activities (NEMA EIA Regulations 982, 983, 984, 985):

- The development of infrastructure or structures covering 50 square metres or more, within a watercourse or within 32 metres of a watercourse, measures from the edge of a watercourse: GR 983 Listing Notice 1 (12):
- 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 of more than 5 cubic metres from- a watercourse: GR 983 Listing Notice 1 (19)
- The development of a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres: GR 983 Listing Notice 1 (24).
- The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase :GR 983 Listing Notice 1 (47).The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275kV or more, outside an urban area or industrial complex: GR 984 Listing Notice 2 (9).
- The clearance of an area of 20 hectares or more of indigenous vegetation: GR 984 Listing Notice 2 (15).
- Development of masts or towers for telecommunication or radio transmission - GR 985 Listing Notice 3 Activity (3)
- The clearance of an area of 20 hectares or more of indigenous vegetationoad wider than 4 meters but less than 13,5 meters: GR 985 Listing Notice 3 Activity (4),
- Clearance of an area of 300 sqm or more of indigenous vegetation except - GR 985 Listing Notice 3 Activity (12),
- The development infrastructure or structures with a physical footprint of 10 square metres or more within a watercourse; GR 985 Listing Notice 3 (14):

The National Department Environment Affairs (DEA) will be the relevant decision-making authority as Eskom is a parastatal. The EIA authorisations need to be granted by the DEA for approval and setting of conditions prior to commencement of any construction activities.

The development also triggers activities that require a Water Use License because it crosses several water courses. Therefore, before construction activities may take place, the activity will require a Water Use License as per requirement in the National Water Act (Act No.36 of 1998) (NWA) under Section 21(c) and (i) Water Uses. In terms of the NWA, this development requires a Water Use License as per the following regulations:

- Section 21(c) impeding or diverting the flow of water in a watercourse and;
- Section 21 (i) altering the bed, banks, course or characteristics of a watercourse.

II. NEED FOR THE PROJECT

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 Narina Substation to the Droërivier Substation forms part of Eskom's West Grid and the Southern Cape CLN. The proposed 400kV Transmission power line from the Gourikwa Substation to Narina Substation and from the Narina Substation to the Droërivier Substation forms part of Eskom's West Grid and the Southern Cape CLN.

The Gourikwa – Blanco 400 kV line and Blanco – Droërivier 2nd 400 kV line – triggered in 2013 by Eskom Peaking Generation due to generation integration requirements

At Gourikwa Power Station, the power output will be increased via the CCGT Conversion Project which will convert 5 x existing OCGT units at each station to CCGT. This will entail the installation of Heat Recovery Steam Generators (HRSG) that will use the heat from the exhausts of the gas turbines to create steam. The steam from the HRSGs will be used to drive two new steam turbines, leading to increased cycle efficiency. The resultant output per CCGT unit will be 225 MW comprising of 150 MW (gas turbine) + 75 MW (steam recovery). Additional Transmission network infrastructure is therefore required to enable an increase in power output in order to ensure compliance in accordance with the Grid Code.

The problematic double contingencies related to Power Station Grid Code compliance at Gourikwa are the loss of the:

- Gourikwa-Proteus 1 and 2 400 kV lines. This results in the islanding of the Gourikwa Power Station.
- Proteus – Bacchus and Droërivier – Blanco 400 kV lines. This results in the islanding of the Gourikwa Power Station together with Blanco and Proteus Transmission Substations.

In order to ensure that Gourikwa is Grid Code compliant, a 3rd line needs to be built out of the facility i.e. Gourikwa – Blanco 400 kV line and Blanco – Droërivier 2nd 400 kV line.

There is also a potential for renewable energy and gas powered IPPs in the area that will require this infrastructure. An added benefit of these lines is that it will reduce the risk of major outages in the broader area during maintenance of the existing Transmission lines.

The need date is dependent on the commitment from the generation project/s.

III. PUBLIC PARTICIPATION PROCESS

Interested and Affected Parties, including surrounding and affected landowners, Provincial, National and Local Governments Departments were involved during the Public Participation Process (PPP). The summary of the PPP that commenced in March 2015, and continued up to date is summarised as follows:

Written notice was given to owner or person in control of land via registered mail or hand delivery, if the applicant is not the owner or person in control of the land the occupiers of the site where the line is planned and to owners and occupiers of land adjacent to the site where the line is to be erected and to any alternative sites where the line is to be erected. The PPP practitioner visited landowners between March 2015 and May 2015. During the Review period of the DEIA Report, focus group meetings will be held at potential risk areas (19-23 September 2016).

Flyers were distributed to I&APs accompanied by a Background Information document (BID). A registration form with map was distributed. (Knock and drop) from March 2015 to end May 2015

A Newspaper advertisement was placed in The Herald (Eastern cape) on 8 April 2015, "Die Courier " (Western Cape) on 2 April 2015 & Sunday Times (National) on 29 March 2015 requesting Interested and Affected Parties (I&APs) to register, and submit their comments.

Site notices were displayed within the boundaries of the study area from 5 March 2015.

A pre-assumed institutional I &APs database was developed. The database was expanded through networking and fieldwork throughout the process. Background Information Document (BID) and registration form were compiled and forwarded to I&APs registered on the database. These documents were also distributed at various venues along the route.

Municipal councillors of the wards in which project alternatives are situated, and the other known organisations that represent the community in the area were informed of the project. This was done by means of invitations to attend the public meetings, where information regarding the project was presented, and opportunity was given for all to raise their concerns. The municipalities with jurisdiction in the project area include the Municipality of Beaufort West, Uniondale, George, and the Eden District Municipality.

Organs of state and other parties that were informed have included Cape Nature, the Eastern Cape DEADP, the Department of Water Affairs and Sanitation, the Western Cape and Eastern Cape Heritage Agencies. The latter departments have received Notifications of Intend to Develop (NIDs).

Members of the Public Participation Team did site visits from March 2015 to end May 2015, and the technical team visited certain areas in August 2016. Focus group meetings were held with the local councillors and various stakeholder groups to discuss the proposed project. These meetings were documented. The PPP and project team will visit the area for focus group meetings again during the public review period for the EIA draft report (September 2016).

Comments/ issues during the registration period, during the Scoping and EIA phases were captured into a Comment and Response Report (CRR). All registered I&APs were afforded an opportunity to scrutinise the draft SR documents for a review period of 30 days plus additional time to incorporate the Public Holidays (April) and December Holidays (2015). Dates and venues of the availability of the report were communicated to registered IAPs by means of e-mail and SMS. I&APs were notified of the comment period and given an update of the process. The link to the

website (and/or Dropbox) was given on which the Draft Scoping Report and Appendices were made available for download. Comments and issues received during the above mentioned commenting period were to the Final Scoping Report (FSR). Issues and comments raised during registration period (from notification of the project), during the public review period of the Draft Scoping Report and to date were included in the DEIA report and will be presented for public review before concluding **findings into a final EIAR**.

NB: previous public participation process is included in the PPP report (Appendix 3.1)

Following the lapsing of the previous application, a new EIA process was initiated, an application form was submitted to DEA along with the Draft Scoping report in February 2017. DEA has acknowledged receipt and acceptance of the application and the project **reference number DEA Reference: 14/12/16/3/3/2/995** was assigned. The final Scoping Report together with the Plan of Study was approved in May 2017. In terms of this acceptance, an EIA was required to be undertaken for the proposed project. The following additional PPP have been conducted to support the new EIA process:

- Release of the Draft Scoping Report for public comments;
- Release of the Draft EIA Report for public comments;
- Notification of the availability of the two draft reports to registered I&AP's on the distribution list;
- New comments received are captured in a Comment and Response Report.

PPP for the new EIA process is included in this Final EIA report Appendix 3.2.

IV. ALTERNATIVES/DEVIATIONS CONSIDERED

A Preferred Alternative 1 (red route) and an Alternative 2 route (blue route) have been proposed for the 400 kV transmission line between Narina and Droërvier, The two alternative alignments are proposed within a corridor of 2 km, as indicated in Figure 1 but the actual servitude required will be 55m wide.

Alternative 1:

Alternative 1 (Red) is estimated at about 178 km and is a relative straight line connection (shortest route) between Blanco and Droërvier. The line passes about 16.8km east of Oudtshoorn and crosses over the Groot Swartberg Nature Reserve approximately 14km north-west of De Rust (the nature reserve is stretching over the Swartberg for over 200 km). It loosely runs in a corridor west of the N12 towards the Droërvier substation.

Alternative 2:

Alternative 2 is estimated at 270 km. It uses the same proposed alignment as for the Red corridor till the intersection with the N9 and N12 roads. It loosely follows the N9 in an easterly direction, about 7.6 km east of the Kammanassie Nature Reserve, and west of Uniondale. It departs the N9 just east of the eastern point of the Swartberg Nature Reserve and heads north and north-west towards the Droërvier substation.

Site alternatives for the Droërvier Substation cannot be assessed since the substation already exist and infrastructure will only be upgraded to accommodate the additional line connection. The location of the new Narina Substation has been authorised by DEA on 1 September 2016, but is yet to be constructed.

In all cases (lines and substations) a **No-Go option** will be assessed. The project is intended to strengthen the network. With a No GO option, this will not be possible and the occurrence and frequency of power interruptions will be an increased risk. Not to construct a line in the area between Droërvier and Blanco will not be in line with the SIPS for the country. This is the main negative impact of a No Go Alternative.

V. SUMMARY OF FINDINGS

The specialist findings of the EIA phase are summarised as follows:

Vegetation Assessment:

A number of vegetation types in the project area are listed as Critical Biodiversity Areas (CBAs) and threatened ecosystems. The reasons why these vegetation types are listed as endangered ecosystems are because they have relatively high plant species diversity but due to human impacts, especially agricultural practices such as ostrich, sheep and goat farming as well as crop production, relatively few natural areas remain in these vegetation types.

Both powerline routes are along sections of existing powerlines which cut through the Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). In terms of the impacts on the plants and vegetation types which could be affected by the proposed power line both these two options will have relatively similar impacts, namely disturbance of natural vegetation (trampling, road construction, bush clearing) creation of disturbed habitats for alien invasives. However in the case of Alternative 1 the distance of affected areas in a particular CBA is relatively short because it crosses the CBAs and ESAs in a perpendicular way. Alternative 1 goes also through an UNESCO-listed World Heritage Site. The implication of this is that the Swartberg Nature Reserve might lose its World Heritage Status if another power line and its associated infrastructure is being constructed through this nature reserve. Furthermore the regular cutting of the fynbos to maintain a low fuel-load under the power line is another impact which could jeopardise the status of this reserve. The absence of fire could also alter plant species composition in the long run because most fynbos species are dependent on frequent fires – something that ESKOM would try to prevent along the power line route. Alternative 2, along the N9 to Uniondale, the proposed power line runs parallel to the Langkloof Shale Renosterveld CBA (Status: Critically Rare) (width of impact zone ±60km). Although this CBA is in a highly transformed state due agricultural practices such as crop production, it is now an important habitat for Red Data birds such as Blue Cranes.

Fauna Assessment:

Consultation of historical records and species distribution data indicates a vast diversity of reptile, amphibian, bird and mammal species are likely to be found in a variety of habitats within the greater project area. Furthermore, all discussed faunal groups contain SCC which is likely to be found within the project area. Some of these species are restricted to isolated patches (most amphibian and reptile SCC), whilst others are widespread throughout the project area (most mammals and birds of SCC).

Alternative 1 extends mostly through arid areas with limited habitats for amphibians, as it avoids major wetlands and SKEP identified Amphibian Hotspots/Priority Areas. The route traverses two Important Bird Areas, namely the Outeniqua Mountains IBA and the Swartberg Mountains IBA. Although the route crosses many perennial rivers south of the Swartberg, these rivers are all large and generally fast flowing. Therefore, it is unlikely that over-head power lines crossing the river will have a significant impact on amphibians. However, the route does cross through a reptile Priority Area identified by SKEP, and is also likely to have habitats suitable to the above mentioned

reptiles of SCC. Furthermore, the route will also pass through habitats suitable for the Critically Endangered Riverine Rabbit (*Bunolagus monticularis*). Alternative 1 also crosses through a Formally Protected Area and several Critical Biodiversity Areas. However, following field observations, many of the areas classified as CBAs are not deemed to be sensitive from a faunal perspective. With careful pylon hardstand and access road planning, the majority of areas defined as highly sensitive can be avoided. (*Please refer to section 8.5 for recommended mitigation measures*).

Alternative 2 extends into the Eastern Cape, navigating around the Formal Protected Areas of the Swartberg region. The majority of the alternative route is likely to have a medium impact on reptiles as there is no existing powerline route along this alternative, and therefore no service roads – all infrastructures would need to be constructed. The Outeniqua range section of the proposed alternative route is likely to provide habitat for a high diversity of reptile species. The route crosses priority areas for amphibians according to SKEP, as well as many pristine wetlands and wetland clusters according to NFEPA, which provide suitable habitat for amphibians. This alternative route also runs through the Vetkuil Amphibian Hotspot to the south east of Beaufort West. The hotspot provides a highly isolated habitat required by numerous amphibian species, including the Near Threatened Giant Bullfrog (*Pyxicephalus adspersus*). This alternative option is likely to have a significant impact on amphibians without mitigation. The alternative avoids crossing any Formally Protected Area but it does cut across several Critical Biodiversity Areas. (*Please refer to section 8.5 for recommended mitigation measures*).

From a faunal perspective it is recommended that the **Blanco-Droerivier Alternative 1** is the preferred route option for the proposed power line. It is noted that Alternative 1 does traverse a UNESCO World Heritage Site (Swartberg Mountains) as well as a reptile hotspot. However, it is (i) the significantly shorter route option, ii) there is existing powerline infrastructure including service roads and therefore the construction footprint will be smaller, and iii) it avoids the Vetkuil Amphibian Hotspot which provides a highly isolated habitat for numerous amphibian species including species of conservation concern.

Avifaunal Assessment:

Alternative 1: The power line route runs 178km between Blanco and Droerivier (following an existing power line). The route traverses two Important Bird Areas, namely the Outeniqua Mountains IBA and the Swartberg Mountains IBA. The Swartberg Mountains are classified as a UNESCO World Heritage Site. As the power line route follows an existing power line, access and barrier impacts are mitigated. (*Please refer to Avifauna Report – **appendix 4.3** for recommended mitigation measures.*)

Alternative 2: This power line route is longer than Alternative 1 and runs for 270km initially east towards Uniondale before heading north at the eastern end of the Swartberg Nature Reserve. The route runs in between the Swartberg and Outeniqua IBAs, with the buffer intersecting the Kouga-Baviaanskloof Complex IBA and the most easterly section of the Swartberg IBA. Part of this route falls within the Eastern Cape Province. Large flocks of Blue Crane, numerous Bustards, and generally high diversity of birdlife was observed along this section of the powerline. As no existing large scale powerline infrastructure is found along most sections of this route it is likely that the impact on avifauna will be significant. (*Please refer to Avifauna Report – **appendix 4.3** for recommended mitigation measures*).

Based on the above, it is the specialist's opinion that the Blanco-Droerivier Alternative 1 would have less of an impact on avifauna than Alternative 2, providing the recommended mitigation measures are implemented. Although the preferred route bisects the Swartberg Mountains and Outeniqua Mountains IBAs, it is the significantly shorter of the two options, and there is existing powerline infrastructures which mitigates many of the impacts associated with birds and powerlines. The existing service roads (and shorter route option) will result in less bird habitat being destroyed or fragmented during the construction phase of the project. Furthermore, Alternative 2 separates three IBAs. There is likely to be regular migration of bird SCC (particularly raptors) between these mountainous areas. As there is no existing power line through these areas, birds are less likely to be cautious of large infrastructures in this area, which could lead to higher mortalities of SCC and powerline priority species due to collisions/electrocutions with powerline infrastructures.

Freshwater Resources Assessment:

The wetland areas are predominantly valley bottom wetlands that are linked to the rivers with their ecological condition and importance directly linked to that of the rivers. Some smaller seeps are also located on the mountain slopes of the Outeniqua Mountains that are still in a natural condition. The pans along the Alternative 2 corridor near Beaufort West are considered to be in a largely natural ecological state.

The ecological importance and sensitivity of the rivers within the study area range from being of a medium to very high importance. The Olifants River in particular has been identified as FEPA river and a Fish Sanctuary Area as the river contains populations of an endangered fish species (Small-scale redbfin *P. asper*).

With the potential impacts of the proposed activities, it is often the access roads associated with the transmission lines that are likely to have a greater impact on the freshwater features than the power lines themselves as the lines can usually span the freshwater features such that the pylons can be constructed outside of the rivers and wetland areas as well as their recommended buffer areas, whereas the roads need to be constructed through the freshwater features. It is thus often best if the new power lines are placed adjacent to existing lines or roads where new roads do not need to be constructed as part of the project.

In terms of the selection of the route selection for the transmission lines, it is recommended that a buffer of 50 from the top of the river banks; approximately 100m from the edge of the wetland areas and 500m from the pans be allowed for as a development setback for the construction of the pylons.

The **alternative corridor with the least potential** impact on the freshwater features in the area is likely to be the more direct route (**Alternative 1**) as it would need to cross fewer rivers than the Alternative 2 route. In addition, it would avoid more sensitive areas crossed by the Alternative 2 corridor such as the many smaller tributaries and associated wetlands of the Kammanassie River in the Little Karoo as well as the large area of pans near Beaufort West. The alignment of the route within the corridor could also be determined to minimise the potential impact on the freshwater features within the study area. With mitigation, Alternative 1 is likely to have an impact of a very low significance on the freshwater features while Alternative 2 is likely to have an impact of a low impact.

Heritage Assessment:

With respect the potential impacts to **palaeontological resources**, the Baseline assessment produced by Almond (2015) notes: "A substantial proportion of proposed power-line sectors will

cross formations that are conservatively regarded as moderate to high sensitivity". "In practice, however, the likelihood of significant negative impacts on fossil heritage on the ground is low over most sectors of these routes because the bedrocks here are often highly weathered, tectonically-deformed or covered by a substantial thickness of fossil-poor superficial deposits (scree, alluvium, soils, etc)".

Overall, the **heritage studies** have found **no anticipated fatal flaws** with regard the construction of the powerline for either of the alternatives; however Alternative 2 covers a longer distance and has the potential to impact on more artefacts. From an Archaeological and Cultural Landscape perspective, Alternative 1 is preferred because it is much shorter, and therefore the impacts are potentially less to heritage sites. From a visual impact assessment, the preferred route is also Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on cultural landscapes that are free of transmission lines, thereby spreading the impact.

Soil, Land use & Agricultural Potential Assessment:

During the EIA phase, the **agricultural** specialist (Terrasoil 2016) has found that the area north of the Outeniqua Mountains is characterised by low rainfall and agriculture is consequently practiced within drainage features or in areas where surface or borehole water is available. In general the agricultural potential is low except for the areas where water is available. All the corridors to the south and immediately within the Outeniqua Mountain area suffer the same limitation in the eastern section in that it traverses an area of high intensity agriculture. The impacts of power line construction are high and pylon placement will have to be negotiated with landowners on a site-specific basis. In this regard there is no preference for any alignment as the specific alignment to be accepted will depend on the degree and success of negotiation with landowners and users. In general the corridors to the north of the Outeniqua Mountains have lower impacts. Alternative 1 is preferred as it is shorter and has fewer agricultural impact areas immediately north of the N9/N12 intersection. In all cases existing power line alignments are preferred as the road infrastructure and access issues are established. In the case of new alignments new access points will have to be established and new vehicle impacts will be experienced.

Visual Assessment:

Both routes are proposed through areas that are considered highly scenic, either for its pristine natural character or for its unique agricultural activities. In most cases, the transmission line will impact on the visual quality of the visual resource by blemishing the natural character of the study area or interfering with unique and visually interesting land uses. Areas of high scenic value and visual quality have been identified as:

- The Groot Karoo that is valued for its desolate sense of place and uninterrupted panoramic views;
- The mountainous areas of the Swartberg and Outeniqua Mountains that are valued for exceptional scenic views and pristine natural environments;
- The Klein Karoo Mountains that offer scenic views of a mountainous landscape and visually pleasing farming practices in the valleys. Within this LT, the N9 is considered a scenic route, particularly in the area through Potjiesberg Pass;
- The Langkloof with visually pleasing views of the farming practices in the Langkloof valley; and

- Waboomskraal with the unique hops agricultural practices and highly scenic surroundings of the Outeniqua Mountains.

The study area is predominantly a rural area, with the exception of a few relatively small towns. The viewers that are mostly affected are motorists, tourists and farming communities. Overall, a relatively low to medium viewer incidence is expected apart from the areas where major transport routes are crossed or are running parallel to the proposed routes. Highly sensitive viewers and viewer groups occur all along the proposed routes. Concentrations of highly sensitive viewers have been identified as:

- Residents of Dysseldorp and Uniondale;
- Motorists on the scenic routes such as the N9 through Langkloof to Willowmore and on the N12 section through Waboomskraal; and
- Tourists visiting the tourist attractions and overnight facilities that are within the ZMVE;

This assessment has highlighted that **highly significant impacts** are expected in the Groot Karoo, Swartberg Mountains, Klein Karoo Mountains and Outeniqua Mountains LTs, and require major interventions to reduce the direct and cumulative impacts in particular. Authorisation of this project will result in significant losses in aesthetic value that will cause high levels of visual intrusion in some areas. The impact is only reversible with human intervention and stands a moderate risk of causing an irreplaceable loss in resources.

Social Impact Assessment

The social study has found that **Alternative 1** has been assessed to have the **least social impact**, as a smaller proportion of the line passes through agricultural activities. There is, however, intensive farming and large scale farming on this alignment and Eskom will have to negotiate careful placement of the line with farmers to ensure least disruption and economic loss. As there is a flexibility of 2km, it is assumed that structures on the farms such as dwellings can be avoided to prevent any physical displacement. If resident workers on these farms lose their jobs and have to leave the premises because of the loss of land under intensive agriculture, they will be both economically and physically displaced. Alternative 2 has more farms, including some with pivot irrigation systems that Eskom must negotiate to avoid. There is also a game farm on the alignment that is planning to extend its tourism attractions. The landowner has expressed concern that the visual and physical presence of the towers and line will reduce the tourist value on his game farm. Further, game on the farm is managed by a helicopter. The towers and line will therefore pose a safety hazard for flying a helicopter.

Cumulative impacts are a concern on **both alignments** as the proposed transmission line will add to existing lines on some properties.

Socio-Economic & Tourism Impact Assessment

The George municipal area is part of the Garden Route with scenic mountains, farms, forests and valleys. Tourists also visit the Groot and Klein Karoo area to experience the “wide open horizons” and “rural lifestyle” without the visual interference of transmission lines. The impact of the proposed transmission lines on the tourism industry will mainly affect lodges as well as the Witfontein Nature Reserve and will unfortunately have a visual impact in the context of the “sense of place”. Results from the visual impact study can also be used to limit the impacts of the

transmission lines. One of the ways can be to let the major section of the transmission line (Alternative 1) run parallel to N12; this is also the shortest.

Both alternatives will have an impact on agriculture but this will be limited in grazing areas where farming can continue under the transmission lines.

The impact of the construction of the transmission lines on the **economy** includes the impact of the construction cost, the operational expenditure and the impact on the broader economy by allowing the power to strengthen the existing grid and limit the impact of power outages in the area. Capital expenditure data could not be obtained to quantify any impacts, but a number of expenditure categories are discussed. A number of components will have to be imported from other provinces into this region, like steel structures, cables, hardware, insulators and cement. This will generate economic activity and employment opportunities in those provinces. A local procurement policy can also be considered by Eskom (where possible and if not already standard practice) on activities like site clearance, road building and assembling to maximize the economic and job creation impact on the local municipalities. The operational expenditure will have limited opportunity for employment creation. From a pure economic point of view, with cost savings in mind Alternative 1 can be recommended given that this is the option that is marginally shorter with the least number of bends. However, there is only a small marginal difference in cost given. The 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. A No GO Alternative would not bring about any of the socio-economic benefits that are likely to result from the proposed project.

Traffic Impact Assessment

It can therefore be stated that the construction traffic and the post construction traffic would be low without any significant impact on the existing traffic flows on the N2 or provincial roads. It will also have a negligible impact on the pavement structures. Furthermore, the impact of the traffic on the provincial gravel access roads will also be negligible with respect to service levels. When looking at the impact significance of the various phases, it can be concluded that all impacts will have a "Low" significance. According to the significance rating scale, a low significance can be defined as: "where this (low) impact would not have a direct influence on the decision to develop in the area" Other impacts having an effect on the possibility of the proposed development were identified and as:

- Road damage
- Social implications
- Energy consumption
- Vehicle Pollution and noise

These were considered to have little to no impact associated with them and were therefore not evaluated by means of an impact table.

Cumulative Impact Assessment:

Significant cumulative impacts that could result from the proposed line and other power line in the area include:

- **Avifauna:** The erection of addition power lines will further fragment natural habitats along the route option; including IBAs and the Swartberg Mountains (UNESCO World Heritage Site). In

addition, there will be a cumulative disturbance due to the additional anthropogenic activities associated with constructing and maintaining an additional powerline along the route. There will be an additional barrier for birds in flight/migratory species.

- **Vegetation:** The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. The area is not included within a National Protected Areas Expansion Strategy focus area, and falls outside any threatened and or endangered ecosystem type / vegetation type. Although the vegetation type in the study area is classified as Least Threatened, it is poorly protected and certain habitats or communities may be subsequently affected. visual intrusion and change of character of the area; and destruction of heritage artefacts.

The proposed line is in general proposed along routes where there are already power lines in place. Provided the new lines are constructed close to these lines such that the associated access roads can be shared, the cumulative impacts are likely to be low. Considering the findings of the specialist assessments undertaken for the project, **cumulative impacts** range from a **low to moderate significance** (on a landscape level in this region of the Beaufort West to George areas). The use of the EMPr and mitigation measures would assist in mitigating these negative impacts to an acceptable level.

VI. IDENTIFICATION OF KEY POTENTIAL IMPACTS

Potential risks and key issues identified during the Scoping Phase of the project were based on consultation with Interested and Affected Parties (I&AP's), experience with similar developments, desktop studies and current state of the environment of the site. The main issues identified through this study associated with the proposed powerline are summarised in **Table 1** below.

Table 1: Summary of significance of the potential impacts associated with the proposed Blanco-Droerivier powerline without Mitigation and with mitigation.

Impact	Significance	
	Without Mitigation	With Mitigation
CONSTRUCTION		
Construction of a power line and access road in a World Heritage Site (Groot Swartberg Nature Reserve) (Alternative 1 only)	High	High
Construction of power line in Critical Biodiversity Areas (CBAs), Ecological support areas (ESAs) and protected areas (PAs)	High	Medium
Destruction & Fragmentation of natural habitat	Medium	Medium
Impacts on ephemeral streams and drainage lines	Medium	Low
Impacts on natural vegetation and ecosystems by invasive alien species.	Medium	Low
Habitat loss and fragmentation	High (alt1) Medium (alt2)	Medium
Loss of Reptile Diversity.	Low	Low
Loss of Amphibian Diversity.	Low (alt1) Medium (alt2)	Low
Loss of Mammal Diversity.	Low	Low

Impact of Dust and Noise.	Medium	Low
Loss of Bird Habitat	Medium	Medium
Disturbance and Displacement of Birds	Medium	Low
Loss of Bird Diversity and Species of Conservation concern.	Low	Low
Modification of freshwater habitat, water quality impacts and possibly impedance of flow at river crossings	Low	Low
Impact on Pre-Colonial Archaeology	Low(alt1) Medium (alt2)	Low
Impact on Colonial Period	Low	Low
Impact on Graves	Low	Low
Loss of agricultural land in areas of low intensity agriculture or land use pylon footprint	Low	Low
Loss of agricultural land in areas of high intensity agriculture or land use pylon footprint	High	High
Visual impacts on GROOT KAROO landscape type - Observers	Medium (alt 1) Low (alt 2)	Low
Visual impacts on GROOT KAROO landscape type – Visual resource	Low	Low
Visual impacts on SWARTBERG MOUNTAINS landscape type - Observers	Low	Low
Visual impacts on SWARTBERG MOUNTAINS landscape type – Visual Resource	Low	Low
Visual impacts on KLEIN KAROO MOUNTAINS landscape type - Observers	Low(alt1) Medium (alt2)	Low
Visual impacts on OUTENIQUA MOUNTAINS landscape type - Observers	Low(alt1) Medium (alt2)	Low
Improved quality of life, through creation of jobs (positive)	Low	High
Increased pressure on local services	Medium	Low
Increased community health risks from possible increased exposure to HIV/AIDS	High	Low
Impact on agriculture (Socio-economic impact)	Medium	Low
Contribution to local economy (employment, use of contractors and purchases of local goods and servitudes) (Economic impact)	Low	Low
Tourism impact	Low	Low
Traffic Impact of Access to site	Low	Low
OPERATION		
Operation of power line in Critical Biodiversity Areas (CBAs), Ecological support areas (ESAs) and protected areas (PAs)	High	Medium
Destruction & Fragmentation of natural habitat	Medium	Low
Impacts on ephemeral streams and drainage lines	Medium	Low
Impacts on natural vegetation and ecosystems by invasive alien species.	Medium	Low
Habitat loss and fragmentation	Low	Low
Loss of Reptile Diversity.	Low	Low
Loss of Amphibian Diversity.	Low	Low

Loss of Mammal Diversity.	Low	Low
Impact of Dust and Noise.	Medium	Low
Loss of Bird Habitat	Low	Low
Disturbance and Displacement of Birds	Medium	Low (alternative 1 Medium (alternative 2))
Loss of Bird Diversity and Species of Conservation concern.	High	Medium
Modification of freshwater habitat, water quality impacts and possibly impedance of flow at river crossings	Low(alt1) Medium (alt2)	Low
Impact on Pre-Colonial Archaeology	Low Medium	Low
Impact on Colonial Period	Low	Low
Impact on Graves	Low	Low
Loss of agricultural land in areas of high intensity agriculture or land use pylon footprint	High	High
Visual impacts on GROOT KAROO landscape type - Observers	Medium	Low
Visual impacts on GROOT KAROO landscape type – Visual resource	Medium (alt1) High (alt2)	Medium (alt2) High (alt2)
Visual impacts on SWARTBERG MOUNTAINS landscape type - Observers	Low(alt1) Medium (alt2)	Low
Visual impacts on SWARTBERG MOUNTAINS landscape type – Visual Resource	Low	Low
Visual impacts on KLEIN KAROO MOUNTAINS landscape type - Observers	Medium (alt1) High (alt2)	Medium (alt2) High (alt2)
Visual impacts on OUTENIQUA MOUNTAINS landscape type - Observers	High	High
Improved quality of life from increased reliability of energy services(positive)	Medium	High
Increased community safety risks from increased direct exposure to electrical hazards	Medium	Low
Impact on agriculture (Socio-economic impact)	High	Medium
Provision of up to 225MW mid-merit electricity from Gourikwa (Economic impact) (positive)	Medium	Medium
Contribution to local economy (employment, use of contractors and purchases of local goods and servitudes) (Economic impact)	Low	Low
Tourism impact	Medium	Low
Traffic Impact of Access to site	Low	Low

VII. CONCLUSION (IMPACT STATEMENT)

The project is needed to strengthen the existing transmission network so that it can evacuate the additional power generated at the Gourikwa power stations when they come on line. This will promote continuous power supply for the Western Cape region, particularly when there is a unit outage at Koeberg Nuclear Power Station. The positive impacts, however, must not be undone by the negative impacts associated with establishing and operating the transmission line. The project is intended to strengthen the network. With a No GO option, this will not be possible and the occurrence and frequency of power interruptions will be an increased risk. Not to construct a line in the area between Droërvier and Blanco will not be in line with the SIPS for the country. This is the main negative impact of a No Go Alternative. A No-Go alternative will have no change to the visual environment and will therefore not cause any negative impacts.

This Final EIA Report has been prepared to allow public review and so that comments (and responses thereon) can be included in the Final EIAR, to subsequently allow for informed decision making by the authorities regarding the approval or rejection of the project. It is the **opinion EAP** that **the project should be authorised**. The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are **no environmental fatal flaws** that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented. The significance levels of the majority of identified negative impacts have been reduced by implementing the mitigation measures recommended by the specialist team during the EIA process, and this specifically included the consideration of the facility layout in relation to sensitivities identified. The project has considered constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) for the Blanco-Droerivier 400kV powerline included within **Appendix 7**.

From the EIA phase findings, it is clear that the **Alternative 1** would be preferable by most specialists. Technical challenges (e.g. mountains and water resources) can be overcome in the detail design phase and careful placement of tower structures. As was found in the Scoping phase, the EIA phase specialist studies have confirmed that Alternative 1 is the preferred option as shown in the comparison assessment table in section 8.2.1. **However CapeNature strongly object to Alternative 1 due to its crossing of the Swartberg Mountains (Unesco site) by Alternative 1 which would not be ideal due to increased risk of fires, Cape Nature therefore recommends Alternative 2 to avoid the Swartberg area. This issue was also taken into consideration, in particular since the longer line (i.e. Alternative 2) will have serious environmental, economic and practical consequences in terms of technical constraints discussed in section 8.2.2. In this regard, it was therefore recommended that Eskom (in consultation with Cape Nature) use every measure possible in the planning and detail design of the line to reduce the impacts of increased risk of fires along the preferred alternative route within the Swartberg area. The Vegetation report has taken the above comments from CapeNature into considerations, in agreement with Capenate, the report has concluded that Alternative 1 will have higher impacts on the flora in the region as it goes through an UNESCO-listed World Heritage Site. The implication of this is that the Swartberg Nature Reserve might lose its World Heritage Status if another power line and its associated infrastructure is being constructed through this nature reserve. Furthermore the regular cutting of the fynbos to maintain a low fuel-load under the power line is another impact which could jeopardise the international status of this reserve.**

CapeNature objection of Alternative 1 has been noted and taken into consideration by all biodiversity specialist and Eskom technical team alike. It must be noted that the EIA study has been undertaken from an integrated approach whereby it considers the implication of the line on the biodiversity, water resources, social, visual and heritage perspective. And in this case, nine out of the 10 specialist studies that have been undertaken have recommended Alternative 1; this recommendation is also supported from a technical point of view. It is noted that Alternative 1 does traverse a UNESCO World Heritage Site (Swartberg Mountains), however, it is (i) the significantly shorter route option, ii) there is existing powerline infrastructure including service roads and therefore the construction footprint will be smaller. Ideally, the types of impacts that should be avoided would be those that cannot be mitigated with good result. Usually this would be the visual impacts and the heritage. Sensitive ecological features such as vegetation and fauna habitats could often be avoided during the detail design phase of the project, by careful placing of tower footprints. Proper implementation of mitigation measures can minimise some of the negative impacts of Alternative 1 as recommended by the specialists in the examples below:

- **Vegetation:** There should be a preconstruction walk-through of the development footprint/project site in order to assess the pylon footprint areas for Red Data species as well as sensitive ecosystems such as streams, wetlands, etc. In addition, a search and rescue operation should be done to remove plant species which can be successfully transplanted.
- **Landowners:** Careful planning and negotiations with land owners will be of crucial importance before finalising the exact placement of the pylons and 55m servitude within the 2 km corridor that was evaluated for this alternative. This will minimise the direct (mostly visual) impacts by investigating slight deviations in the route (within the approved corridor) as well as either avoiding impacts on production land or only causing temporary disturbance (during construction). An impact that should be limited is the necessity of creating new access routes (limiting additional bush cutting and clearance of potentially sensitive vegetation). By avoiding the identified sensitive areas, the future maintenance on the chosen route will be easier and create fewer impacts of significance, particularly on those features that have been identified during the Public Participation Process.

Thus, after assessing all alternatives on EIA phase level, it was concluded that Alternative 1 would be the option through which better avoidance and minimisation of most impacts can be achieved and is also the **technically preferred** alternative as explained in section 8.2.2, therefore **Alternative 1** is recommended as the **preferred alternative**.

VIII. RECOMMENDATIONS

Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the powerline and its associated substation upgrades, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the impacts associated with the project can be mitigated to an acceptable level, in this regard **Alternative 1** is therefore recommended for Environmental Authorisation as the preferred route for the Blanco-Droerivier 400kV powerline subject to certain conditions. The following conditions would be required to be included within an authorisation issued for the project:

- Upon approval of the project, an important component of the project would be to fine-tune the 55m servitude design (placement of the footprints) in terms of the receiving environment in the approved corridor of 2km wide. This would require a walk-down of the line and subsequent negotiations with all land owners to ascertain how the impacts on their properties can be

mitigated, e.g through relocation of infrastructure, compensation or other acceptable measures. Construction will not be possible before agreements have been reached with all land owners along the entire route.

- Refinement of the preferred option should be done during design phase of the project, in particular once placement of the tower structures is planned. Avoidance of sensitive areas remains the best mitigation, followed by, minimisation, management and mitigation to maximum affect. Main features that need to be taken into consideration during detail design phase (and ultimately deciding where to place the tower structures) are to in as far as possible:
 - Follow the alignment of infrastructure such as roads and existing power lines
 - Avoid the dams and wetland areas to avoid the impact thereon and mitigate the potential for water birds that concentrate around water bodies from flying into the lines
 - Avoid housing developments and intensive farming areas (in particular where pivot points and shade netting are used)
 - Avoid impacting on tourist facilities such as guesthouse, holiday resorts and eco-tourism areas, in particular regarding visual disturbances.
- All mitigation measures detailed within this report and the specialist reports contained within **Appendix 4** to be implemented.
- The draft Environmental Management Programme (EMPr) as contained within **Appendix 7** of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed powerline and substation upgrades and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed for this project.
- Eskom must measure the EMFs where stakeholders have requested it, particularly to address concerns about cumulative impacts of EMFs and impacts on vulnerable populations such as children.
- The relevant Water Use License for water uses to be obtained from DWS.
- Applications for all other relevant and required permits required to be obtained by Eskom must be submitted to the relevant regulating authorities. This includes permits for the transporting of all components (abnormal loads) to site, disturbance to any heritage sites, and disturbance of protected vegetation.
- **Vegetation: Southern slopes of the Outeniqua Mountains** to be treated as **No-Go areas**, Figure 8 in section 6.4.1 indicates suggested line routes options which aim to avoid as much of the natural forest as possible for consideration during the finalising of the design. There should be a **preconstruction walk-through** of the development footprint/project site in order to assess the pylon footprint areas for protected and Red Data species as well as sensitive ecosystems. Where these cannot be totally avoided, a permit to be obtained for removal of protected trees (DAFF) and provincially protected flora that are affected.
- **Fauna:** Riparian areas between the Swartberg and Beaufort West where the Critically Endangered **Riverine Rabbit** (*Bunolagus monticularis*) may be found should be treated as **“No-Go” areas** for any pylon hardstands or the construction of access roads. Should construction activities be required in any of these riparian areas, a Riverine Rabbit ecological specialist must be appointed to conduct thorough ground-truthing prior to any construction to determine the presence or absence of Riverine Rabbits in the areas and then there must be a **50m (minimum) buffer** from all riparian habitats where rabbits exist.
- **Avifauna:** Where access roads and/or pylon bases need to be located within any areas defined as ‘highly sensitive’, further ground-truthing by an avifaunal specialist is required to determine exact road routes and pylon base locations so to, where possible, avoid nests and roosts of SCC. All bird nest/roost sites encountered must be considered **“No-Go” areas** for

any pylon hardstands or the construction of access roads. No construction works must take place within 500m of nests of large raptors and other SCC. Bird flight diverters must be attached to power lines in areas where they pass through IBAs and highly sensitive areas which include the Swartberg Mountains and Outeniqua Mountains – the spacing intervals must be a **minimum of 5m** apart in these areas. All areas defined as having a medium avifaunal sensitivity must have bird diverters installed (spacing to be determined following ground-truthing). These areas include suitable habitat for numerous powerline priority species (e.g. cranes, bustards, and storks). Bird diverters should also be considered for perianal river/stream crossings as these watercourses provide isolated refuge for numerous bird species, especially in arid areas of the Karroo and Little Karroo.

- **Freshwater Resources:** It is recommended that a **buffer of 50m from the top of the river banks and/or approximately 100m from the edge of the wetland areas** be allowed for as a development setback for the construction of the pylons.
- **Heritage:** A survey should be conducted during the walk-down phase around farmsteads in order to ensure that graves area avoided; **a buffer of at least 15 m** should be maintained around the perimeter of any **farm graveyards** to ensure that they are not damaged during construction.
- **Agriculture:** The placement of power line pylon on **high intensity agriculture** will have to be **negotiated with landowners** on a site-specific basis.

COMPLIANCE CHECKLIST

1. LEGAL REQUIREMENTS IN TERMS OF THE EIA REGULATIONS

Table 2 below details how the legal requirements of **Appendix 3** of the 2014 EIA Regulations have been addressed within this report.

Table 2: Legal requirements in terms of the 2014 EIA regulations

REGULATIONS 2014 GNR 982: Appendix 3: CONTENT OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS.	Cross-reference in this EIA report
<p>1. Environmental impact assessment process</p> <p>(1) The environmental impact assessment process must be undertaken in line with the approved plan of study for environmental impact assessment.</p> <p>(2) The environmental impacts, mitigation and closure outcomes as well as the residual risks of the proposed activity must be set out in the environmental impact assessment report.</p>	<p>(1) The EIA process has been undertaken according to the approved plan of study</p> <p>(2) Chapter 7</p>
<p>2. The objective of the environmental impact assessment process is to, through a consultative process—</p> <p>(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;</p> <p>(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;</p> <p>(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;</p> <p>(d) determine the—</p> <p>(i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and</p> <p>(ii) degree to which these impacts—</p> <p>(aa) can be reversed;</p> <p>(bb) may cause irreplaceable loss of resources, and</p> <p>(cc) can be avoided, managed or mitigated;</p> <p>(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;</p> <p>(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;</p> <p>(g) identify suitable measures to avoid, manage or mitigate identified impacts; and</p> <p>(h) identify residual risks that need to be managed and monitored.</p>	<p>(a) Chapter 3</p> <p>(b) Section 2.2</p> <p>(c) Chapter 7&8</p> <p>(d) Chapter 7</p> <p>(e) Chapter 7</p> <p>(f) Chapter 7</p> <p>(g) Chapter 7</p> <p>(h) Chapter 7</p>
<p>3. An environmental impact assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—</p>	
<p>(a) details of—</p>	<p>Appendix 6.1</p>

<ul style="list-style-type: none"> i. the EAP who prepared the report; and ii. the expertise of the EAP, including a curriculum vitae; 	
<p>(b)the location of the activity, including:</p> <ul style="list-style-type: none"> i. the 21 digit Surveyor General code of each cadastral land parcel; ii. where available, the physical address and farm name; iii. where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties; 	Appendix 1
<p>(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale;</p> <p>or, if it is—</p> <ul style="list-style-type: none"> i. a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or ii. on land where the property has not been defined, the coordinates within which the activity is to be undertaken; 	Appendix 1
<p>(d) a description of the scope of the proposed activity, including—</p> <ul style="list-style-type: none"> i. all listed and specified activities triggered and being applied for; and ii. a description of the activities to be undertaken including associated structures and infrastructure ; 	Chapter 1 and Section 3.2
<p>(e) a description of the policy and legislative context within which the development is proposed including—</p> <ul style="list-style-type: none"> i. an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and ii. how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments; 	Chapter 3
<p>(f) a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;</p>	Section 2.2 and section 2.3
<p>(g) a motivation for the preferred site, activity and technology alternative;</p>	Appendix 6.4 (Technical evaluation process for alternatives)
<p>(h) a full description of the process followed to reach the proposed preferred alternative within the site, including:</p> <ul style="list-style-type: none"> i. details of all the alternatives considered; ii. details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs; iii. a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them; iv. the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; v. the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated; vi. the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential 	<ul style="list-style-type: none"> (i) Section 2.3 (ii) Chapter 4 (iii) Chapter 4 (section 4.7) and Appendix 3 (iv) Chapter 4 (v) Chapter 7 (vi) Chapter 7 (Section 7.3) (vii) Chapter 8 (section 8.3) (viii) Chapter 7 (ix) N/A (x) Chapter 8 (

<p>vii. viii. ix. x.</p>	<p>environmental impacts and risks associated with the alternatives; positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects; the possible mitigation measures that could be applied and level of residual risk; if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and a concluding statement indicating the preferred alternatives, including preferred location of the activity;</p>	<p>section 8.4)</p>
<p>(i)</p>	<p>a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including— (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;</p>	<p>Chapter 7</p>
<p>(j)</p>	<p>an assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;</p>	<p>Chapter 7</p>
<p>(k)</p>	<p>where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;</p>	<p>Chapter 8</p>
<p>(l)</p>	<p>an environmental impact statement which contains— (i) a summary of the key findings of the environmental impact assessment; (ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</p>	<p>i. Section 8.1 ii. Appendix 1.2 iii. Chapter 8.3</p>
<p>(m)</p>	<p>based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;</p>	<p>Appendix 7</p>
<p>(n)</p>	<p>the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment;</p>	<p>Section 8.4</p>
<p>(o)</p>	<p>any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;</p>	<p>Section 8.5</p>

(p) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 6.14
(q) a reasoned opinion as to whether the proposed 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 8.5
(r) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A
(s) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Appendix 6.1
(t) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(u) an indication of any deviation from the approved scoping report, including the plan of study, including— (i) any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and (ii) a motivation for the deviation;	N/A
(v) any specific information ¹ that may be required by the competent authority; and any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A
(w) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A

2. DEA REQUIREMENTS FOR THE ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Table 3 outlines DEA requirements as outlined in the acceptance of the scoping report dated July 2017, and where the requirements have been addressed within this report for ease of reference.

Table 3: Information Requested By DEA

INFORMATION REQUIREMENTS	CROSS REFERENCE IN THIS EIA REPORT
<p>i. It was noted during the review that the Blanco Substation does not form part of this application; please provide the Department with DEA Reference number for this EIA application.</p>	<p>The project will require connection to the proposed Narina substation that was approved by DEA on 1 September 2016 (DEA REF NO: 14/12/16/3/3/2/424) i.</p>
<p>ii. Please include the Start, Middle and End point coordinates for the proposed power line and the substation in the EIR;</p>	<p>Section 1.1 for powerline coordinates and Section 2.3.2 for the Blanco (Narina Sustation)</p>
<p>iii. Please ensure that all issues raised and comments received during the circulation of the SR from registered I&APs and organs of state which have jurisdiction (Including this Department's Biodiversity Section) in respect of the proposed activity are adequately addressed in the EIR. Proof of correspondence with the various stakeholders must be included in the EIR. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts that were made to obtain comments. The Public Participation Process must be conducted in terms of Regulation 39, 4041, 42, 43 & 44 of the EIA Regulations 2014.</p>	<p>Comment noted, all prior PPP is summarised in a report in Appendix 3, all issues raised by Organs of State and I&APs will form part of the FEIAr prior to the submission to the Department.</p>
<p>iv. In terms of Appendix 3 of the EIA Regulations, 2014, the report must include an undertaking under oath or affirmation by the EAP in relation to:</p> <ul style="list-style-type: none"> o the correctness of the information provided in the reports; o the inclusion of comments and inputs from stakeholders and I&APs; o the inclusion of inputs and recommendations from the specialist reports where relevant; o any information provided by the EAP to interested and affected parties and o responses by the EAP to comments or inputs made by interested or affected parties. 	<p>Affirmation by the EAP is attached in Appendix 6.1 of the EIA report</p>
<p>v. In accordance with Appendix 3 of the EIA Regulations 2014, the details of-</p> <p>(i) the EAP who prepared the report; and</p> <p>(ii) the expertise of the EAP to carry out Scoping and Environmental Impact Assessment procedures; must be submitted.</p>	<p>Details and expertise of the EAPs are attached in Appendix 6.1 of the EIA report</p>
<p>vi. You are further reminded that the EIR to be submitted to this Department must comply with all the requirements in terms of the scope of assessment and content of scoping reports in accordance with Appendix 3 and Regulation 23(1) of the EIA Regulations, 2014.</p>	<p>The EIA report has been drafted in accordance with Appendix 3, this is illustrated in Table 1.</p>
<p>vii. Please ensure that the Final EIR includes at least one A3 regional map of the area and the locality maps included in the final EIR illustrate the different proposed alignments and their start, middle and end points coordinates. The maps must be of acceptable quality and as a minimum (Google maps will not be accepted for decision-making purposes), have the following attributes:</p>	<p>Comment noted</p>

INFORMATION REQUIREMENTS	CROSS REFERENCE IN THIS EIA REPORT
<ul style="list-style-type: none"> ○ Maps are relatable to one another; ○ Cardinal points; ○ Co-ordinates; ○ Legible legends; ○ Indicate alternatives; ○ Latest land cover; ○ Vegetation types of the study area; and ○ A3 size locality map. 	
<p>viii. Further note that in terms of Regulation 45 of the EIA Regulations 2014, this application will lapse if the applicant fails to meet any of the timeframes prescribed in terms of the these Regulations, unless an extension has been granted in terms of Regulation 3(7).</p>	<p>Comment noted</p>

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ABBREVIATIONS AND ACRONYMS

AIA	Archaeological Impact Assessment
DEA	Department of Environmental Affairs
DEIR	Draft Environmental Impact Report
DFA	Development Framework At
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EC DEDEAT	Eastern Cape Department of Economic Development, Environmental Affairs & Tourism
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMFs	Electro-Magnetic Fields
EMP	Environmental Management Programme
GA	General Authorisation in terms of Section 39 of the NWA
FSR	Final Scoping Report
GN	Government Notice
ha	Hectares
HIA	Heritage Impact Assessment
HW	Heritage Western Cape
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IRP	Integrated Resource Plan
KV	kilovolts
LDO	Land Development Objectives
mm	Millimetres
MTS	Main Transmission Substation
MW	Mega Watt
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)
NID	Notice of Intend to Develop
NWA	National Water Act, 1998 (Act No. 36 of 1998)
NSBA	National Spatial Biodiversity Assessment
PoS	Plan of Study
PV	Photo Voltaic
SARCA	South African Reptile Conservation Assessment
SAHRA	South African Heritage Resources Agency
S&EIR	Scoping and Environmental Impact Reporting
SDF	Spatial Development Framework
SIA	Social Impact Assessment
SOC	State Owned Company
SPLUMA	Spatial Planning And Land Use Management Act
TNSP	Transmission Network Service Provider
TSS	Transmission Substation
VIA	Visual Impact Assessment
WCHRA	Western Cape Heritage Resources Agency
WULA	Water Use License Application

1 INTRODUCTION

1.1 Project Background

Envirolution Consulting (Pty) Ltd was appointed by Eskom Holdings SOC Limited to conduct the Environmental Impact Assessment (EIA) Process for the proposed construction of the Narina to Droërivier 400kV Power line and for the upgrade of the Droërivier substation. The development entails the construction of a 200km long 400kV Transmission power line from the Narina Substation at George to the Droërivier Substation at Beaufort West, in the Western Cape Province. The alternative route that are investigated (Alternative 2) is partly located in the Western Cape Province, but a section between Uniondale, Willowmore and Rietbron is located in the Eastern Cape Province (refer to **Figure 1**).

*Another application will be submitted for the construction of a 50-60km long 400kV Transmission power line from the Gourikwa Substation at Mossel Bay to the Narina (Blanco) Substation at George, and that **impact assessment will be presented in a seperate report.***

A Preferred Alternative 1 (red route) and an Alternative 2 route (blue route) have been proposed for the 400 kV transmission line between Narina and Droërivier, The two alternative alignments are proposed within a corridor of 2 km, as indicated in the locality maps but the actual servitude required will be 55m wide.

Alternative 1:

Alternative 1 (Red) is estimated at about 178 km and is a relative straight line connection (shortest route) between Blanco and Droërivier. The line passes about 16.8km east of Oudtshoorn and crosses over the Groot Swartberg Nature Reserve approximately 14km north-west of De Rust (the nature reserve is stretching over the Swartberg for over 200 km). It loosely runs in a corridor west of the N12 towards the Droërivier substation.

Alternative 2:

Alternative 2 (blue corridor) is 270 km long. It will exit the Narina substation and at the intersection of the N9 and N12, the proposed corridor will turn east and follow the N9/R62, running very close to the western side of Uniondale. It will cross the R339 and the R407, and run 14 km to the west of Willowmore and 8 km to the west of Rietbron. This small section of the line falls within the Eastern Cape Province. The section of lands between the R407 and the Droërivier substation appears to be untransformed Karoo veld.

The Start, Middle and End point coordinates for the power line alternatives are outlined as follows:

Coordinates Point	Alternative 1		Alternative 2	
	Latitude	Longitude	Latitude	Longitude
Start	32°24'20.72"S	22°31'54.46"E	32°24'20.72"S	22°31'54.46"E
Middle	33° 8'35.15"S	22°31'20.99"E	33°21'25.36"S	23°20'16.98"E
End	33°55'35.97"S	22°22'18.24"E	33°55'35.97"S	22°22'18.24"E

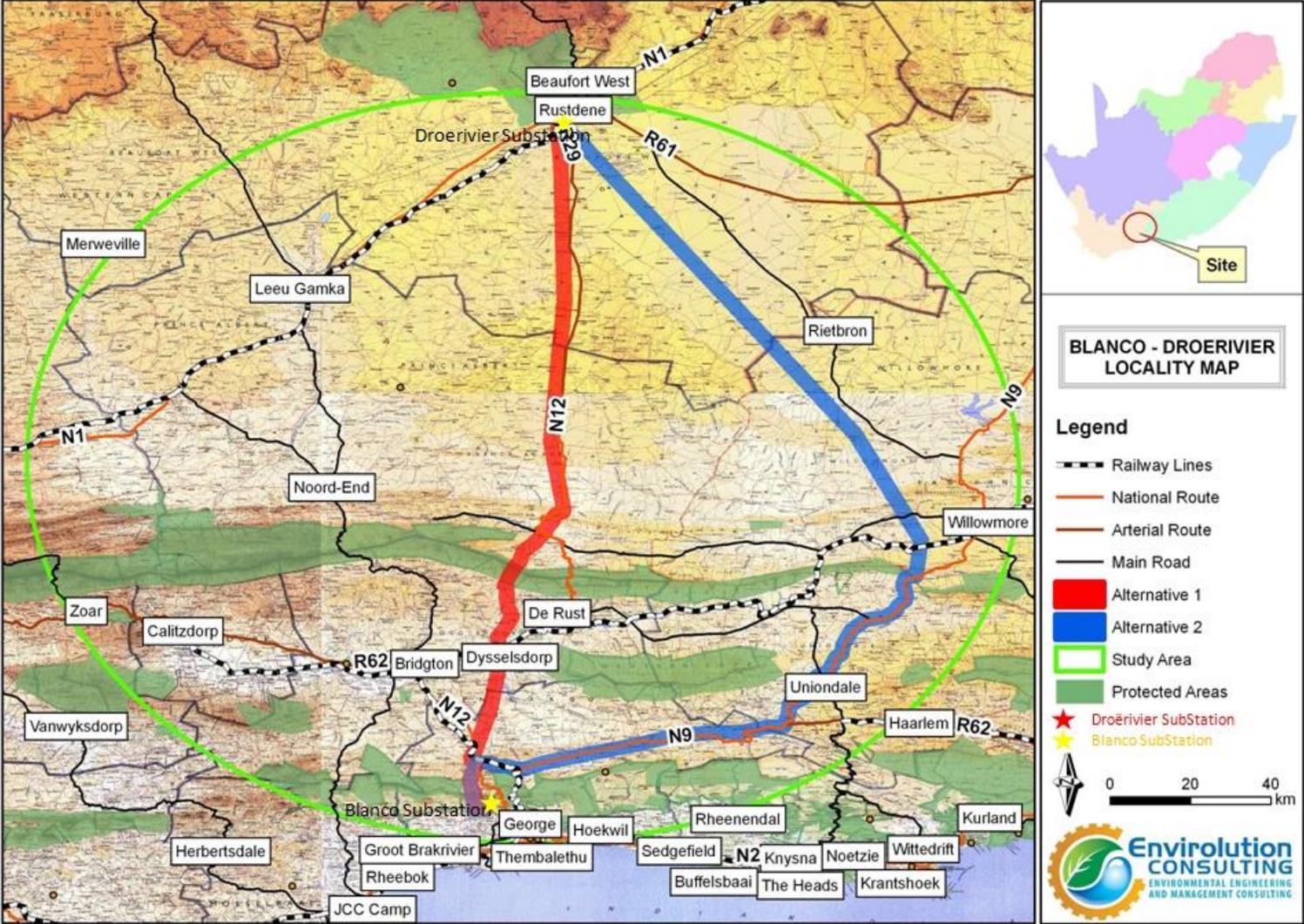


Figure 1: Study Area (Please refer to A3 size maps in Appendix 1 of the report)

1.2 Conclusions from the Scoping Phase

Several desktop specialist studies were undertaken for the purposes of identifying potential impacts and potential fatal flaws relating to the proposed powerline. The impacts identified as potentially resulting from the project broadly included agricultural, ecological, heritage, visual, and social impacts.

At the scoping phase, Alternative 1 was recommended as the preferred due to the shorter distance which would mean that it would result in a smaller footprint. The Scoping level assessment has however indicated that this route may impact negatively on intensive farming activities and sensitive vegetation, in particular the Swartberg Area and fynbos. Loss of vegetation along the Alternative 2 route could however also result in a loss of farming land and income. The latter situation needs to be evaluated in specialist agricultural and ecological studies.

No environmental fatal flaws were identified to be associated with the broader site during the Scoping stage of the EIA process and the Final Scoping Report was subsequently accepted by DEA.

1.3 Requirement for an Environmental Impact Assessment Process

The proposed projects are subject to the requirements of the Environmental Impact Assessment Regulations (2014 EIA Regulations) in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended). NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed, and reported on to the competent authority (the decision-maker) charged by NEMA with granting of the relevant environmental authorisation. The application is subject to Scoping and Environmental Impact Reporting. A Scoping and Environmental Impact Assessment Report (EIR) had to be completed for the proposed project and the information from the EIR must then be presented to the authorities for decision-making. The application for authorisation was handed in along with the Draft Scoping Reports. The National Department of Environmental Affairs (DEA) is the competent authority for this project. Through the decision-making process, the DEA will be supported by both the •Western Cape Department of Environmental Affairs and Development Planning and the Eastern Cape Department of Economic Development and Environmental Affairs (DEDEA).

The EIA is undertaken using the following phased approach as required by the Department of Environmental Affairs (DEA):

- **Phase 1:** Project Initiation: authority consultation, site visits, the initiation of the environmental process and public participation;
- **Phase 2:** Compilation of the Scoping Report, identification of the specialist studies, and compilation of Plan of Study of Environmental Impact Report (EIR);
- **Phase 3:** The compilation of the EIR and the draft Environmental Management Programme (EMPr);
- **Phase 4:** The compilation of the site specific EMPr.

1.4 Objectives of the EIA process

The scoping phase included desk-top studies and served to identify potential impacts associated with the proposed project and to define the extent of studies required within the EIA Phase. Input from the project proponent, specialists with experience in the study area and in EIAs for similar projects, as well as a public consultation process with key stakeholders, which included both government authorities and interested and affected parties (I&APs), was included in the evaluation of impacts.

The EIA Phase aimed to address those identified potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with the project including design, construction, operation, and decommissioning, and recommend appropriate mitigation measures for potentially significant environmental impacts. The purpose of this EIA report is to consider the impacts associated with the proposed powerline. This EIA report aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

The release of a draft EIA for a 30 day period will provide stakeholders with an opportunity to verify that issues that they raised through the EIA Process have been captured and adequately considered. The final EIA Report for submission to the DEA will incorporate all issues and responses raised during the public review period of the draft report.

1.5 Project Team

Project Applicant

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Expertise of the EAP to carry out the EIA procedures

- Cheda Sheila Bolingo, the principle author of this Basic Assessment, holds an Honours Bachelor degree in Environmental Management and 5 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping

through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.

- Gesan Govender, the project manager and Environmental Assessment Practitioner (EAP) responsible for this project, is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 15 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

Specialists

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Envirovolution Consulting has appointed the following specialist consultants (**Table 4**) to conduct specialist impact assessments:

Table 4: Project Specialists

Discipline	Organisation	Contact Person & Details
Public Participation & Facilitation	3E Consulting	Samuel M Scott Mobile: +27 (0)835862906 sam.scott@vodamail.co.za
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Vegetation Assessment	EnviroNiche Consulting Biodiversity and Environmental Consultants	Johann du Preez Tel: 022 376 4404 greenrsa@gmail.com
Economic & Tourism Assessment	Economic Modelling Solutions (EMS)	Dr Johannes Jordaan johannes.jordaan@economicmodelling.co.za +27 82 320 9996 (mobile) +27 86 552 1942 (fax)
Heritage Assessment (Archaeology, Cultural & Palaeontology)	ACO Associates Naturaviva	Dr Lita Webley Tel: 021 706 4104 lita.webley@aco-associates.com John Almond & Dr Wendy Taylor 021 462 3622 naturaviva@universe.co.za
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Visual Impact	i-scape	Mr. Mader van den Berg Cell: 076 169 1435 Fax: 086 520 4677 i-scape@vodamail.co.za
Wetlands & River Systems	Blue Science	Dana Grobler Tel: +27 (0)21 851 0555 Fax: +27 (0)86 620 181 dana@bluescience.co.za
Traffic Impact	Blue Science	Hermanus Steyn Tel: +27 21 5269454 Hermanus.Steyn@aurecongroup.com

2 PROJECT DESCRIPTION

2.1 Project Motivation

To motivate the project to construct a 400kV Transmission Power Line between the future Narina Substation and the existing Droërvier Substation, the broader picture needs to be given. When the alignment options were technically evaluated, the line into Droërvier Substation via Narina Substation was preferred based on the natural path for the power to flow. This can be attributed to the future generation in the Cape Peninsula and surrounding area. This option is also in alignment with the proposed second Droërvier – Proteus 400 kV line as per the Technical Development Plan.

Servitudes for the Transmission lines will need to be acquired. This EIA was undertaken to assess the impact of the introduction of the Transmission lines between George and Beaufort West. Impacts associated with the physical infrastructure of the power line and its 55m servitude (27.5m on either side of the centre of the line) will be assessed for the study. In addition, impacts associated with a distance of 1 km alongside each side of the line will also be assessed. If the project is authorised and routes secured, it is expected that the construction phase of the project will be over a period of up to 2 years, subject to confirmation by Eskom. The operations phase is expected to be for a period of 40 to 50 years.

2.2 Need and Desirability

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.

According to the Eskom Transmission Ten Year Development Plan 2011-2021 (TDP) (TDP, attached as Additional Information in Appendix I 6.3), the 400kV transmission lines are a result of the development of a more meshed transmission 400kV network to provide greater reliability and thus improve the levels of national network security. These new transmission lines form part of the long-term strategy to develop a main transmission backbone from which regional power corridors can be supported.

The proposed 400kV transmission power line from the Narina Substation to Droërvier 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 Droërvier Substation forms part of Eskom's West Grid and the Southern Cape CLN.

Local benefits of the proposed development include benefits to the local economy through possible job creation in the construction phase as well as during the operational phase of the development. The construction for the proposed power line is estimated to last for approximately two years.

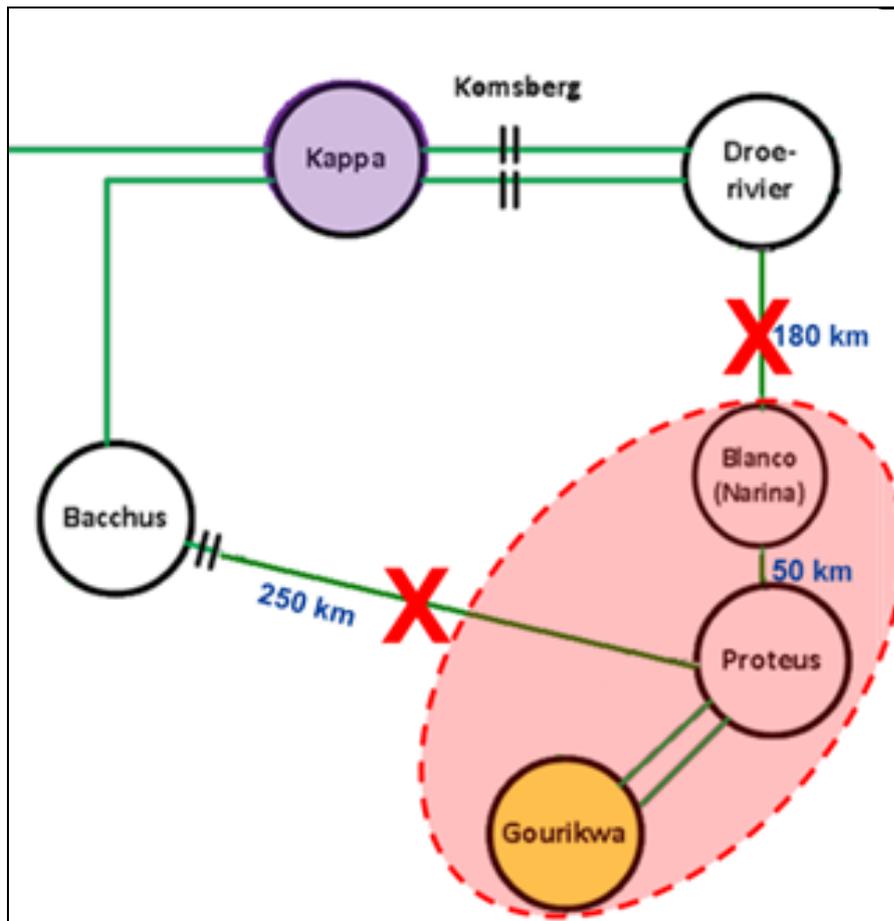
The project qualifies as a Strategic Infrastructure Project (SIP 10), namely "Electricity transmission and distribution for all". The project serves to "expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development. 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".

In summary: The Gourikwa – Blanco 400 kV line and Blanco – Droërvier 2nd 400 kV line – triggered in 2013 by Eskom Peaking Generation due to generation integration requirements.

At Gourikwa Power Station, the power output will be increased via the CCGT Conversion Project which will convert 5 x existing OCGT units at each station to CCGT. This will entail the installation of Heat Recovery Steam Generators (HRSG) that will use the heat from the exhausts of the gas turbines to create steam. The steam from the HRSGs will be used to drive two new steam turbines, leading to increased cycle efficiency. The resultant output per CCGT unit will be 225 MW comprising of 150 MW (gas turbine) + 75 MW (steam recovery). Additional Transmission network infrastructure is therefore required to enable an increase in power output in order to ensure compliance in accordance with the Grid Code.

The problematic double contingencies related to Power Station Grid Code compliance at Gourikwa are the loss of the:

- Gourikwa-Proteus 1 and 2 400 kV lines. This results in the islanding of the Gourikwa Power Station.
- Proteus – Bacchus and Droërvier – Blanco 400 kV lines. This results in the islanding of the Gourikwa Power Station together with Blanco and Proteus Transmission Substations.



In order to ensure that Gourikwa is Grid Code compliant, a 3rd line needs to be built out of the facility i.e. Gourikwa – Blanco 400 kV line and Blanco – Droerivier 2nd 400 kV line.

There is also a potential for renewable energy and gas powered IPPs in the area that will require this infrastructure. An added benefit of these lines is that it will reduce the risk of major outages in the broader area during maintenance of the existing Transmission lines.

The need date is dependent on the commitment from the generation project/s.

2.3 Description of the Alternatives to be considered and Assessed

The extent of the study area and the selection of the alternative alignment positions gave consideration to aspects such as ecological impacts, social impacts, visual impacts, technical feasibility and cost.

The following criteria were considered by Eskom Transmission in the identification of technically feasible corridors for the establishment of a new 400kV Blanco-Droerivier Power Line and Substation Upgrade:

- A number of technically viable and cost effective corridors and substation sites were identified
- As far as possible, the number and magnitude of angles along the line should be minimised in order to allow the use of less expensive and visually less-intrusive tower types
- Crossing over of existing major power lines should be avoided as far as possible as this increases the potential for technical incidents during operation

- The alignment should cater for known topographical/terrain constraints of the tower types to be used, and soil conditions for the foundations in terms of geotechnical suitability and costs
- The proposed alignment should provide for the need of appropriate access roads to the servitude and tower positions for both construction and maintenance/operation phases
- Care should be taken to avoid the following as far as tower positioning and access road construction are concerned:
 - extensive rock outcrops;
 - rugged terrain, hills and mountains;
 - active clay soil, vleis and floodplains;
 - potential unstable side-slope terrain; and
 - eroded and unstable areas.
- Other issues which technically affect the location of a Transmission power line include:
 - agricultural lands, in particular those under irrigation
 - large water bodies
 - open-cast mining
 - crossing points with roads, rail and telecommunication lines at off-set angles less than 60°.
- The following obvious and observable environmental issues were taken into account:
 - human settlements and communities;
 - land use (where possible)
 - passing between water bodies (bird flight paths usually extend between water bodies)
 - ecologically sensitive areas
 - scenic areas with high visual/aesthetic quality and
 - untransformed indigenous vegetation.

2.3.1 Transmission power

Two (2) technically feasible alternative Transmission power line development corridors have been identified for investigation within the study area during the EIA process (refer to **Figure 1**). A Corridor of 2 km in width was assessed for each alternative. The identified power line development corridors as proposed and the areas affected are described in more detail below.

Alternative 1:

Alternative 1 (Red) is estimated at about 178 km and is a relative straight line connection (shortest route) between Blanco and Droërvier. The line passes about 16.8km east of Oudtshoorn and crosses over the Groot Swartberg Nature Reserve approximately 14km north-west of De Rust (the nature reserve is stretching over the Swartberg for over 200 km). It loosely runs in a corridor west of the N12 towards the Droërvier substation.

Alternative 2:

Alternative 2 is estimated at 270 km. It uses the same proposed alignment as for the Red corridor till the intersection with the N9 and N12 roads. It loosely follows the N9 in an easterly direction, about 7.6 km east of the Kammanassie Nature Reserve, and west of Uniondale. It departs the N9 just east of the eastern point of the Swartberg Nature Reserve and heads north and north-west towards the Droërvier substation.

Table 5 below compares the aspects of the different Alternatives:

Table 5: Comparison of the two Alternatives

Characteristics	Alternative 1 (preferred)	Alternative 2
Length	178km	270km
No of Bends	45	46
Access	Fair	Fair
Tx Line Crossings	2	2
Dx HV Line Crossings	3	3
Rail Crossings	2	1
National Road Crossings	3	5
Regional road Crossings	1	4
Land Use	Agricultural lands, Grazing lands and game farming	Agricultural lands, Grazing lands and game farming
Topography	Undulating	Undulating

Alternative 1 follows a shorter distance which would mean that it would result in a smaller footprint. The specialist assessments have however indicated that this route may impact negatively on sensitive vegetation (Swartberg Unesco site) and wide spread farming activities. Loss of vegetation along either Alternative 1 or the Alternative 2 route could also result in a loss of farming land and income. During the Public Participation Process, resistance has been given to both alternatives and the specialist studies for the EIA phase have focussed specifically on the areas where I&APs have identified problem areas. Detailed mitigation measures were given in the specialist reports, and were refined during the EIA phase. These have the objective to address the impacts and risks that were identified for all phase of the proposed development.

2.3.2 Substations

Narina (Blanco) Substation

The Narina Transmission Substation at Blanco has not yet been built. The construction of the Blanco Narina Transmission Substation falls **outside the scope of this project**, and have been applied for in a separate EIA, in which SEFSA investigated the five alternatives and received EA for Alternative 5 on 1 September 2016. Alternative substation site 5 is located in the foothills of the Outeniqua Mountains, approximately 4.5km north east of the existing Blanco Distribution Substation.

The project will require connection to the proposed **Narina substation that was approved by DEA** on 1 September 2016 (DEA REF NO: 14/12/16/3/3/2/424 - NEAS REF NO: DEA/EIA/0001519/ 2012).

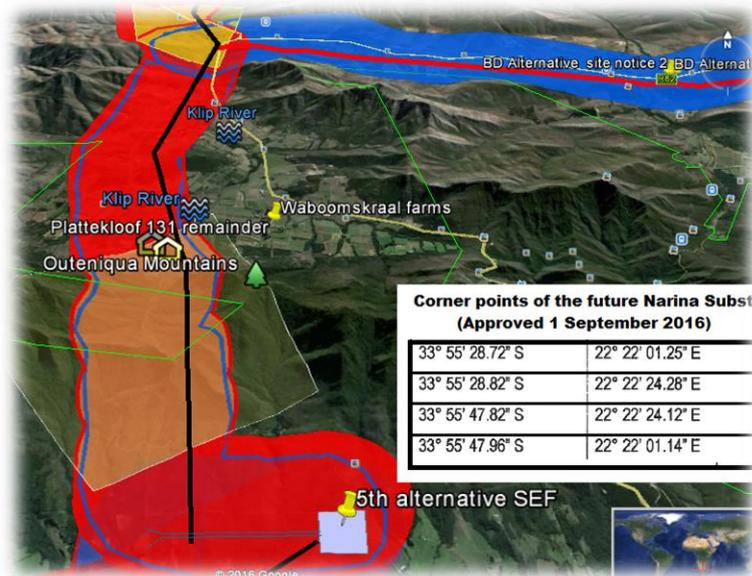


Figure 2: Location of the future Narina Substation

Droërvier Substation

The expansion of the Droërvier site will require that all new infrastructures are in the immediate vicinity of the existing substation. The expansion of the existing substation will be constrained by features such as a watercourse on the northern and north-eastern side. A railway line is located on the western side of the substation. The existing power lines and towers are located to east.

2.3.3 No-go alternative

The No-go option implies that the Project does not proceed, and Eskom does not go ahead with the construction of the 400 kV power line or the upgrade of the substations.

The electricity demand in South Africa is placing increasing pressure on Eskom's existing power Transmission capacity. Eskom is planning to increase the power output at the existing Gourikwa Power Station generating facility at Mossel Bay in the Western Cape. This will increase the output at Gourikwa by 375 MW, increasing the total output at the power station to an expected 1125 MW by 2018. An increase in power output will require strengthening of the existing Transmission network, in order to evacuate the additional power generated.

The 'do-nothing' alternative will result in future Transmission capacity shortages and power supply 'shedding' for this region. The 'do-nothing' alternative is therefore not considered to be a feasible alternative and will not be considered further within the EIA process.

2.4 Description of the proposed activities

2.4.1 Infrastructural description

The two route alignment alternatives should require similar tower designs, with the same technical specifications. The specialist studies during the EIA process have now determined which route is the preferred route, but only after that route has been authorised, the details regarding the number, tower design and other support infrastructures associated with the power line can be finalised. The Water Use License applications will then be undertaken.

Based on similar projects, it is anticipated that the following types of towers may be used on this project:

- Cross rope suspension tower;
- Compact cross rope suspension tower;
- Guyed-V suspension tower;
- Self-supporting suspension tower;
- Self-supporting strain tower; or
- Guyed strain structures.

Illustrative examples of 400 kV transmission pylons are shown below, and in **Figure 3**.

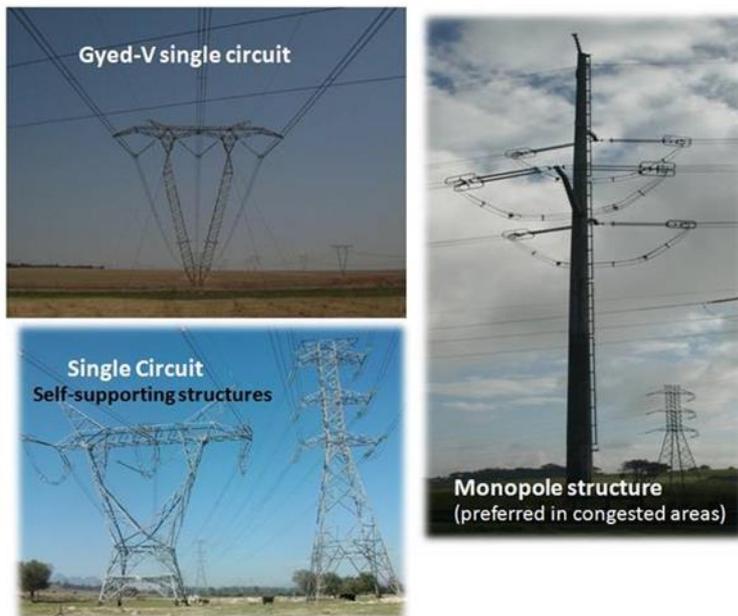


Figure 3: Pylon options

2.4.2 Servitude Requirements

A servitude of 55m is required for a single 400kV power line. A separation distance will be required between the 400kV and other lines, since two of the proposed routes will run parallel to existing power lines for a short distance. Power line servitudes are occasionally secured along existing servitudes such as roads and pipelines. In cases where the servitude is required next to a road reserve, a distance up to 95m from the centre of road to edge of power line servitude may be required. The land beneath the overhead lines can be continued to be used, as normal, by the landowners. Eskom, however, require that no dwellings or vegetation/crops higher than 4 m be established within the servitude. SPLUMA, the National Spatial Planning Land Use Management Act, has come into being since September 2015. The establishment and zoning requirements for the Sub-stations must be considered by the Proponent and the necessary Service Providers appointed in order for the process to be completed, prior to commencement of construction, as most of the property on which sub-stations of this magnitude are built is still zoned as agriculture.

2.4.3 Clearance Requirements (foundations and access)

It is anticipated that a 6m strip will be cleared to facilitate access and construction, except where tower erection and stringing requires more space. Eskom have their internal guidelines and standards for Bush Clearance and maintenance within Overhead Power line Servitudes. This document provides minimum clearances for overhead conductors that will need to be taken into account in the formulation of any power line development.

2.4.4 Required Services

During the EIA phase, the two alternatives were assessed and findings were included in the Environmental Impact Assessment (EIR). In addition, the draft Environmental Management Programme (draft EMPr attached to the as **Appendix 7**) will include a site walk down exercise after EA has been achieved, that will guide the final location of proposed infrastructure.

Access Routes & Storm Water

Most areas along the proposed routes are reasonably accessible and can be reached via the existing public and farm roads. Temporary access routes will be required to construct the lines in areas where the pylons will be placed on private properties, such as farms and reserves. The details and permissions will be negotiated after the project has been approved.

Storm water will be managed according to the Eskom Guidelines for Erosion Control and Vegetation Management as well as the Environmental Management Programme (EMPr), which will be compiled for the construction phase.

Construction Site Camps

Due to the length of the line it is possible that more than one site camp will be required, but the construction contractor would need to set up at least one site camp. This does not necessarily need to be near the power line route, as the contractor may prefer to use a fully serviced site at another location. The contractor will be encouraged to utilise already disturbed areas for construction camp purposes, in order to minimise cumulative impacts. It is likely that a number of construction camps would need to be established for the construction period.

Sewage

A negligible sewage flow is anticipated for the duration of the construction period. Chemical toilets will be utilised during construction, and the contractor will ensure regular treatment of these facilities. The toilets will be serviced regularly, as specified by the final site specific EMPr.

Solid Waste Disposal

All solid waste will be collected at a central location at each construction site and will be stored temporarily until removal to an appropriately permitted landfill site in the vicinity of the construction site.

Electricity

Construction team might have temporary connection and supply of electricity from the existing network. Diesel generators will be utilised as an option for the provision of electricity.

2.5 Eskom Project Procedure – Construction of Power Lines

Eskom uses the following procedure² for the construction of their new transmission lines.

2.5.1 Planning

The Transmission System Planning Department of Eskom are the system network planners which formulate five-year, ten-year or 20-year Transmission Development Plans (TDP), which are strategic documents aimed at identifying the entire infrastructure required throughout South Africa for the transmission of electricity.

All projects initiated by the Eskom planners have to be in line with the requirements stipulated in the TDP. All projects which are initiated are thoroughly investigated to ensure that they are both viable and feasible before being approved for implementation.

2.5.2 Appointment of EIA Practitioners

Once a project is internally approved to be investigated, the Eskom Land and Rights Department initiates the process of the Environmental Impact Assessment (EIA). In the case of the Narina to Droërivier project, a Scoping and EIA Process is followed by Envirolution Consulting (Pty) Ltd. The purpose of the EIA process is as follows:

- To identify both the positive and the negative impacts on the environment, communities and the local economy;
- To identify the impact on the proposed infrastructure;
- To recommend all possible mitigation measures for each impact identified; and
- To develop a plan for implementing the mitigating measures.

All the above information will be gathered and collated into a document called the Environmental Impact Report (EIR), which will be submitted to the decision making authority, the National Department of Environmental Affairs (DEA). The document will provide the DEA with all the alternative routes assessed during the EIA process and recommend the least impacting route for authorisation. If authorised, the DEA will issue an Environmental Authorisation, which will allow Eskom to implement the project. An Environmental Authorisation (EA) normally stipulates all conditions that should be adhered to before construction can commence. One such condition would be to draft an Environmental Management Programme (EMPr) for approval by DEA before construction can commence. During construction, an Environmental Compliance Officer (ECO) must be employed to ensure that the specifications of the EA and EMPr are adhered to.

² Eskom Fact Sheet: Construction of power lines

2.5.3 Land and rights acquisition

Once a positive uncontested Environmental Authorisation has been granted, the process of securing the servitude or title of the said portions of land will commence. To achieve this, the following activities have to be completed:

- The legal boundaries are identified for each property affected by the project;
- The legal ownership of each property is identified;
- An independent property evaluator is appointed to determine the market value of the affected properties; and
- Negotiations are conducted by Transmission negotiators with each legal landowner to acquire the rights to construct power lines over their properties. Rights are also acquired from affected statutory bodies and mineral right holders.

All land and rights acquired for the purpose of building power lines are registered at the Deeds Office as either title deeds for land or servitudes for rights.

2.5.4 Survey and line design

Topographical surveys are conducted subsequent to identifying and securing servitudes. The survey information is used by the design engineers to design the tower foundations, structures, buildings, and the exact placement of structures.

The EMPr will be finalised when all the profiles and local site plans are available. The EMPr will outline all activities that have to be undertaken, where they will take place, the responsible person, all possible environmental or social impacts, the mitigation measures, the rehabilitation plans, the monitoring methods, the frequency of monitoring and the performance indicators. The EMPr is a legally binding document which is used to ensure that Eskom adheres to all conditions of the Environmental Authorisation and EIR.

2.5.5 Construction

A procurement process is followed to identify a suitable construction contractor. During this process all potential contractors are invited to bid for the implementation of the project. Various factors are considered when appointing these contractors, among others capacity, legal status, adherence to all Eskom standards (ie safety, quality, and environment) and other legislated regulations, policies and procedures.

2.5.6 Rehabilitation & Maintenance

After the project has been completed, all affected properties are rehabilitated to their original status. Landowners sign off release forms to confirm the rehabilitated status.

Vegetation in servitudes needs to be kept under control to allow access and to prevent the spread of veld fires. This will be undertaken by experienced contractors and permission will be obtained from land owners where access is required over private property.

3 LEGISLATION AND GUIDELINES CONSIDERED

3.1 Requirement for an EIA

The overarching environmental legislation for the management of the environment in South Africa is the National Environmental Management Act, 1998 (Act 107 of 1998) ("NEMA"). Its preamble states that sustainable development requires the integration of social, economic and environmental factors in the planning, implementation and evaluation of environmental decisions to ensure that development serves present and future generations. Important sections of NEMA include:

- Section 2: The NEMA principles
- Section 28 Duty Of Care
- Section 30 The Prevention of incidents and reporting should an incident occur

Chapter 5 of NEMA makes provisions for regulations to be formulated and published. In December 2014, new EIA Regulations were published, that are relevant to the EIA to this project:

- Regulation Gazette No. 10328 Vol. 594 Pretoria, 4 December
 - GNR. 982: Environmnetal Impact Assessment Regulations (EIA Regulations)
 - GNR. 983.: EIA Regulations Listing notice 1
 - GNR. 984.: EIA Regulations Listing notice 2
 - GNR. 985.: EIA Regulations Listing notice 3

The development triggers activities in terms of the National Environmental Management Act, Government Notices R982, R983, R984 and R985 as shown in **Table 6**. In terms of the 2014 NEMA EIA Regulations, Scoping & Environmental Impact Assessments are required for the proposed power line Blanco to Droerivier SS due to the following listed activities:

Table 6 EIA Listed Activities Applicable applied for to be authorise

Detailed description of listed activities associated with the project	
Listed activity as described in GN R 983, 984 and 985	Description of project activity that triggers listed activity
GR 983 Listing Notice 1 (12): The development of (xii) infrastructure or structures covering 50 square metres or more Where such construction occurs- (c) if no development setback line, within a watercourse or within 32 metres of a watercourse, measures from the edge of a watercourse,	The proposed power line pylons <u>will</u> impede upon watercourses or pylon structures situated within 32 metres of a watercourse.
GR 983 Listing Notice 1 (19): 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 of more than 5	The power line <u>will</u> require the removal or infilling of material more than 5 cubic metres from a watercourse.

<p>cubic metres from- i.) a watercourse</p>	
<p>GR 983 Listing Notice 1 (24): The development of- ii) a road with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres</p>	<p>The project entails the development of temporary access roads of approximately 6m wide to allow vehicles to access the areas of construction. These roads will be required in areas where the alignment will not follow the existing roads and servitudes where access will be possible without new roads.</p>
<p>GR 983 Listing Notice 1 (47): The expansion of facilities for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.</p>	<p>Additional 400kV feeder bays will be required at the Droerivier Substation</p>
<p>GR 984 Listing Notice 2 (9): The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275kV or more, outside an urban area or industrial complex</p>	<p>The project entails that transmission power lines of 400kV will be erected outside towns in the Western Cape (Alternative 2 runs partly through the Eastern Cape).</p>
<p>GR 984 Listing Notice 2 (15): The clearance of an area of 20 hectares or more of indigenous vegetation</p>	<p>The clearing of more than 20 hectares of indigenous vegetation <u>will</u> be undertaken during construction of the power line.</p>
<p>GR 985 Listing Notice 3 (3): The development of masts or towers of any material or type used for telecommunication broadcasting or radio transmission purposes where the mast or tower- (a) is to be placed on a site not previously used for this purpose; and (b) will exceed 15 metres in height . (b) In Eastern Cape: i. In an estuarine functional zone; ii. <i>Outside urban areas,</i> (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (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; (dd) Sites or areas identified in terms of an International Convention; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans; (ff) Core areas in biosphere reserves;</p>	<p>At the Substations (Blanco), masts taller than 15m will be erected for the purpose of a lightning protection system (LPS). The external LPS (mast) is intended to:</p> <ol style="list-style-type: none"> 1. intercept a lightning flash to the structure 2. conduct the lightning current safely towards earth (using a down-conductor system), 3. disperse the lightning current into the earth (using an earth-termination system) <p><i>In some instances, Telecommunication infrastructure will need to be installed on pylons, which could be higher than 15m from ground level.</i></p>

<p>(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve; or</p> <p>(hh) Areas seawards of the development setback line or within 1 kilometre from the high-water mark of the sea if no such development setback line is determined; or</p> <p><i>iii. Inside urban areas; in:</i></p> <p>(aa) Areas zoned for use as public open space; or</p> <p>(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority or zoned for a conservation purpose.</p> <p>(f) In Western Cape:</p> <p>i. All areas outside urban areas; or</p> <p>ii. Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority, or zoned for a conservation purpose, within urban areas.</p>	
<p>GR 985 Listing Notice 3 (4):</p> <p>The development of a road wider than 4 meters with a reserve less than 13, 5 meters.</p> <p>(b) In Eastern Cape</p> <p>(ii) Outside urban areas,</p> <p>(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by competent authority or in bioregional plans,</p> <p>(gg) areas within 10km from national parks or 5km from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve</p> <p>(f) In Western Cape</p> <p>i. Areas outside urban areas;</p> <p>(aa) Areas containing indigenous vegetation</p> <p>ii. Areas in urban areas;</p> <p>(cc) areas zoned for conservation use</p> <p>(dd) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority</p>	<p>The project entails the development of temporary access roads of approximately 6m wide to allow vehicles to access the areas of construction. These roads will be required in areas where the alignment will not follow the existing roads and servitudes where access will be possible without new roads.</p> <p><i>Areas of the Swartberg are part of a UNESCO World Heritage Site.</i></p>
<p>GR 985 Listing Notice 3 (12):</p> <p>The clearance of an area of 300 sqm or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management</p> <p>(a) In Eastern Cape and Western Cape provinces:</p> <p>i. Within any critically endangered or endangered where such clearance of ecosystem listed in terms of section 52 of</p>	<p>The project will require the clearance of more than 300 sqm of indigenous vegetation between George and Beaufort West. Sections of the lines will be located in areas of Fynbos or Rhenosterveld vegetation on land that is zoned open space or used for agricultural purposes. Private Game farms are located on the corridors that are proposed for the infrastructure, where conservation is practised.</p> <p>For the placement of towers and access roads, it will be required that areas of more than 300 sqm of indigenous vegetation will have to be cleared, mostly in the Western</p>

<p>the NEMBA or indigenous vegetation is prior to the publication of such a list, within an area that is required for maintenance has been identified as critically endangered in the purposes undertaken in National Spatial Biodiversity Assessment 2004;</p> <p>ii. Within critical biodiversity areas identified in bioregional management plan.</p> <p>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</p> <p>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.</p>	<p>Cape (and the Eastern Cape for Alt 2)</p>
<p>GR 985 Listing Notice 3 (14): The development of: (xii) infrastructure or structures with a physical footprint of 10 square metres or more.</p> <p>within a watercourse;</p> <p>(b) In Eastern Cape (ii) Outside urban areas, (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by competent authority or in bioregional plans, (gg) areas within 10km from national parks or 5km from any other protected area identified in terms of NEMPAA or from the core areas of a biosphere reserve</p> <p>(f) In Western Cape iii. Areas outside urban areas; (aa) Areas containing indigenous vegetation iv. Areas in urban areas; (cc) areas zoned for conservation use (dd) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority</p>	<p>There is drainage lines on the proposed study are which will be impacted by the proposed infrastructures within an area defined as a CBA.</p>

3.2 Legislation and Guidelines that have informed the preparation of this EIA Report

The following legislation and guidelines have informed the scope and content of this EIA Report:

- National Environmental Management Act (NEMA) 107 of 1998

- EIA Regulations, published under Chapter 5 of NEMA (GNR R982 in Government Gazette No 38282 of December 2014)
- Guidelines published in terms of the NEMA EIA Regulations, in particular:
 - * Public Participation in the EIA Process (DEA, 2014)
 - * Integrated Environmental Management Information Series (published by DEA).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues assessed in this report. A listing of relevant legislation is provided in **Table 7**, where the level of applicability of the legislation or policy to the activity/project is detailed.

Table 7: Relevant legislative and permitting requirements applicable to the proposed project

Legislation	Applicable Requirements	Relevant Authority
National Environmental Management Act (Act No 107 of 1998)	<p>The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations.</p> <p>In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation.</p> <p>In terms of GN R982, R983, R984 and R985 of December 2014, a Scoping and EIA Process is required to be undertaken for the proposed project</p> <p><i>The final EIA report is to be submitted to the DEA and Provincial Environmental Departments in support of the application for authorisation.</i></p>	<p>Department of Environmental Affairs (DEA)</p> <p>Western Cape Department of Environmental Affairs and Development Planning</p> <p>Eastern Cape Department of Economic Development and Environmental Affairs (DEDEA)</p>
National Environmental Management Act (Act No 107 of 1998)	<p>In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised.</p> <p>In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.</p> <p><i>While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application during the EIA phase and will continue to apply throughout the life cycle of the project.</i></p>	DEA
National Water Act (Act No 36 of 1998)	<p>The development also triggers activities that require a Water Use License (WUL) because it crosses several water courses. Therefore, before construction activities may take place, the activity will require a Water Use License as per requirement in the National Water Act (Act No.36 of 1998) (NWA) under Section 21 Water Uses. In terms of the NWA, this development requires a Water Use License for the following water uses:</p> <ul style="list-style-type: none"> • Section 21(c) impeding or diverting the flow of water in a watercourse and; • Section 21 (i) altering the bed, banks, course or characteristics of a watercourse. <p>The purpose of the EIA Regulations is "to regulate the procedures and criteria as contemplated in Chapter 5 of the National Environmental Management Act relating to the submission, processing and consideration of, and decision on applications for</p>	Department of Water and Sanitation (DWS)

Legislation	Applicable Requirements	Relevant Authority
	<p>environmental authorisation for the commencement of activities in order to avoid detrimental impacts on the environment, or where it cannot be avoided, ensure mitigation and management of impacts to acceptable levels, and to optimise positive environmental impacts, and for matters pertaining thereto”.</p> <p><i>A water use license (WUL) is required in terms of Section 21(c) and 21 (i) of the National Water Act. If wetlands or drainage lines are impacted on, or the regulated area of a watercourse (being the riparian zone or the 1:100yr floodline whichever is greatest).</i></p>	
<p>National Environmental Management: Air Quality Act (Act No 39 of 2004)</p>	<p>S18, S19, and S20 of the Act allow certain areas to be declared and managed as “priority areas.”</p> <p>Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.</p> <p>GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas</p>	<p>DEA Affected District and Local Municipalities</p>
<p>National Heritage Resources Act (Act No 25 of 1999)</p>	<p>» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including</p> <ul style="list-style-type: none"> » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length; » Any development or other activity which will change the character of a site exceeding 5 000 m² in extent <p>» The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m²; or the re-zoning of a site exceeding 10 000 m² in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided.</p> <p><i>The Heritage Specialists on the project team will ensure compliance with these requirements, and has submitted the Notice of Intent to Develop (NID) to Western Cape Heritage. A permit may be required should identified cultural/heritage sites on site be required to be disturbed or destroyed as a result of the proposed development.</i></p>	<p>South African Heritage Resources Agency (SAHRA)</p> <p>Provincial Heritage Resources Authority</p>
<p>National Environmental Management: Biodiversity Act (Act No 10 of 2004)</p>	<p>In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007.</p> <p>In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase.</p> <p>The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National</p>	<p>DEA</p>

Legislation	Applicable Requirements	Relevant Authority
	<p>Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (GG 34809, GN 1002), 9 December 2011).</p> <p>GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants.</p> <p><i>Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.</i></p> <p><i>An ecological study has been undertaken as part of the EIA Phase. As such the potential occurrence of critically endangered, endangered, vulnerable, and protected species and the potential for them to be affected has been considered. This report is contained in Appendix 4 of the EIA Report.</i></p>	
National Forests Act (Act No. 84 of 1998)	<p>In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated”.</p> <p>Protected trees: According to this act, the Minister may declare a tree, group of trees, woodland or a species of trees as protected. The prohibitions provide that ‘ no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister’.</p> <p>Forests: Prohibits the destruction of indigenous trees in any natural forest without a licence.</p> <p>According to the Vegetation Report, “In the pockets of Southern Afrotperate Forest along the southern slopes of the Outeniqua tinkwood (<i>Ocotea bullata</i>), Mountains Yellowwood (<i>Afrocarpus falcatus & Podocarpus latifolius</i>), Assegai (<i>Curtisia dentata</i>) and Cheesewood (<i>Pittosporum viridiflorum</i>) could occur.</p> <p><i>Permits must be obtained from DAFF (Department of Agriculture, Forestry and Fisheries) to remove individual of any of these abovementioned species. The contractor must apply for these permits in a phased manner</i></p>	Department of Agriculture, Forestry and Fisheries
National Veld and Forest Fire Act (Act 101 of 1998)	<p>In terms of S13 the landowner would be required to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land. In terms of S13 the landowner must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.</p> <p><i>While no permitting or licensing requirements arise from this legislation, and this Act will find application during the construction and operational phase of the project.</i></p>	Department of Agriculture, Forestry and Fisheries
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	<p>According to S27 of the act, any person who wishes to apply to the Minister for a mining permit must simultaneously apply for an environmental authorisation and must lodge the application (repealed by section 23 (b) of Act 49 of 2008).</p> <p>Requirements for Environmental Management Programmes and Environmental Management Plans are set out in S39 of the Act (repealed by section 33 of Act 49 of 2008)</p> <p>S53 Department of Mineral Resources: Approval from the</p>	DMR

Legislation	Applicable Requirements	Relevant Authority
	<p>Department of Mineral Resources (DMR) may be required to use land surface contrary to the objects of the Act in terms of section 53 of the Mineral and Petroleum Resources Development Act, (Act No 28 of 2002). Section 42 of Act 49 of 2008 (Repealed of section of S53) states that the Minister may cause an investigation to be conducted if it is alleged that a person intends to use the surface of any land in any way that could result in the mining of mineral resources being detrimentally affected.”.</p> <p><i>As no borrow pits are expected to be required for the construction of the facility, no mining permit or environmental authorisation is to be obtained.</i></p>	
<p>Electricity Regulation Act 4 of 2006</p>	<p>This Act governs the control of generation and supply of electricity in South Africa and the existence and functions of the National Energy Regulator. The Act aims to establish a national regulatory framework for the electricity supply industry; to make the National Energy Regulator the custodian and enforcer of the national electricity regulatory framework; to provide for licences and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated; and to provide for matters connected therewith.</p>	<p>Department of Energy</p>
<p>Hazardous Substances Act (Act No 15 of 1973)</p>	<p>This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products.</p> <ul style="list-style-type: none"> » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product; and » Group V: any radioactive material. <p>The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.</p> <p><i>It is necessary to identify and list all the Group I, II, III, and IV hazardous substances that may be on the site and in what operational context they are used, stored or handled. If applicable, a license is required to be obtained from the Department of Health.</i></p>	<p>Department of Health</p>
<p>National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)</p>	<p>The Minister may by notice in the <i>Gazette</i> publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment.</p> <p>The Minister may amend the list by –</p> <ul style="list-style-type: none"> » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. <p>In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and</p>	<p>Hazardous Waste –DEA</p> <p>General Waste – Provincial Authorities</p>

Legislation	Applicable Requirements	Relevant Authority
	<p>standards.</p> <p>Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that:</p> <ul style="list-style-type: none"> » The containers in which any waste is stored, are intact and not corroded or in » any other way rendered unfit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented. <p><i>As no waste disposal site is to be associated with the proposed project, no permit is required in this regard.</i></p> <p><i>Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of the Act, as detailed in the EMPr (refer to Appendix G).</i></p> <p><i>The volumes of waste to be generated and stored on the site during construction and operation of the facility will not require a waste license.</i></p>	
<p>National Road Traffic Act (Act No 93 of 1996)</p>	<ul style="list-style-type: none"> » The technical recommendations for highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. » Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts. » The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations. <p><i>An abnormal load/vehicle permit may be required to transport the various components to site for construction. These include: Route clearances and permits will be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. Transport vehicles exceeding the dimensional limitations (length) of 22m. Depending on the trailer configuration and height when loaded, some of the power station components may not meet specified dimensional limitations (height and width).</i></p>	<p>South African National Roads Agency Limited (SANRAL) (national roads)</p> <p>Provincial Department of Transport</p>
<p>Conservation of Agricultural Resources Act (Act No 43 of 1983)</p>	<p>Regulation 15 of GNR1048 provides for the declaration of weeds and invader plants, and these are set out in Table 3 of GNR1048. Declared Weeds and Invaders in South Africa are categorised according to one of the following categories:</p> <p>Category 1 plants: are prohibited and must be controlled.</p> <p>Category 2 plants: (commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread.</p>	<p>DAFF</p>

Legislation	Applicable Requirements	Relevant Authority
	<p>Category 3 plants: (ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading thereof, except within the floodline of watercourses and wetlands.</p> <p>These regulations provide that Category 1, 2 and 3 plants must not occur on land and that such plants must be controlled by the methods set out in Regulation 15E.</p> <p><i>While no permitting or licensing requirements arise from this legislation, this Act will find application during the EIA phase and will continue to apply throughout the life cycle of the project. In this regard, soil erosion prevention and soil conservation strategies must be developed and implemented. In addition, a weed control and management plan must be implemented.</i></p> <p><i>The permission of agricultural authorities will be required if the Project requires the draining of vleis, marshes or water sponges on land outside urban areas. However, none of these activities are expected to be undertaken on site.</i></p>	
<p>Subdivision of Agricultural Land Act (Act No 70 of 1970)</p>	<p>Details the subdivision of agricultural land and provisions under which the act is triggered. It also provides for the approval of such division by the Minister of Agriculture. Applies for subdivision of all agricultural land and long-term leasing of portions of agricultural land.</p> <p><i>Long-term leases on portions or subdivision of the site properties will require an approval of the Minister of Agriculture. An application to DAFF will need to be submitted detailing the areas to be subdivided or leased for the purposes of the proposed development. An application in terms of SALA will need to be undertaken and submitted following the issuing of an environmental authorisation for the proposed project.</i></p>	<p>(DAFF) Provincial Departments of Agriculture and Environment - commenting authority. Local Municipality – competent authority</p>
<p>Spatial Planning And Land Use Management Act 16 OF 2013</p>	<p>This Act has the main objectives to:</p> <ul style="list-style-type: none"> • provide for a uniform, effective and comprehensive system of spatial planning and land use management for the Republic; • ensure that the system of spatial planning and land use management promotes social and economic inclusion; • provide for development principles and norms and standards; • provide for the sustainable and efficient use of land; • provide for cooperative government and intergovernmental relations amongst the national, Regulations under the SPLUMA not in force yet. <p>Legislation that regulates Land Use Planning has lead to “spatial planning tools” that are contained in Municipal and District Strategic Management Frameworks (SMFs), Strategic Development Initiatives (SDIs) and Municipal By-laws. These include the by-Laws of the Eden District Municipality, the George Local Municipality and the Mossel Bay Municipality. The Eden District Municipality’s Municipal Health By-Laws were Published in Western Cape Provincial Gazette 6566 of 17 October 2008. (see Chapter 8 waste management). and the Mossel Bay Local Municipality’s By-Law Relating To Public Nuisances (Published in Western Cape Provincial Gazette 6688 of 18 January 2010) has relevance. The Land Use Planning Ordinance (Ordinance 15 of 1985) has relevance in the Western Cape Province.</p>	<p>Local municipalities</p>
<p>Development Facilitation Act (Act No 67 of 1995)</p>	<p>The Development Facilitation Act contains development facilitation regulations under the Regulations under Development facilitation Act 3. The Act is directed at provincial and local spheres</p>	<p>Provincial Department of Environmental</p>

Legislation	Applicable Requirements	Relevant Authority
	<p>of government; and serves to re-address the imbalances of the past and to ensure that there is equity in the application of spatial development planning and land use management systems.</p> <p>Provides for the overall framework and administrative structures for planning throughout the Republic.</p> <p>S (2-4) provide general principles for land development and conflict resolution.</p> <p>The applicant must submit a land development application in the prescribed manner and form as provided for in the Act. A land development applicant who wishes to establish a land development area must comply with procedures set out in the DFA.</p>	<p>Affairs</p>

3.3 Policy Guidelines

The following Guideline documents have been considered in the preparation of this report:

- Department of Environmental Affairs (DEA) Integrated Environmental Management Guideline Series 7, Public Participation in the EIA Process as published in Government Gazette No. 33308, 18 June 2010
- Implementation Guidelines (published for comment) in Government Notice 603 of 2010
- Integrated Environmental Management Information Series (Booklets 0 to 23) (DEAT, 2002 – 2005)
- DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7
- Western Cape Department of Environmental Affairs & Development Planning (DEA&DP Guideline on Transitional Arrangements, August 2010)
- DEA&DP Guideline on Alternatives (August 2010)
- DEA&DP, Guideline on Public Participation (August 2010)
- DEA&DP Guideline on Need and Desirability (, August 2010)
- Guidelines for Involving Specialists in the EIA Processes Series (DEA&DP; CSIR and Tony Barbour, 2005 – 2007)
- Eastern Cape Provincial Growth and Development Programme (2004-2014).
- Nature Conservation Ordinance (Act No. 19 of 1974)
- Cacadu District Municipality Integrated Development Plan

4 APPROACH TO UNDERTAKING THE EIA

An EIA process refers to that process (in line with the EIA Regulations) which involves the identification of and assessment of direct, indirect, and cumulative environmental impacts associated with a proposed project/ activity. The EIA process comprises two main phases: i.e. **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr)) to the competent authority for decision-making.

The Public Participation Process (PPP) was conducted in accordance with **Chapter 6 of the Environmental Impact Assessment (EIA) Regulations, Published in Government Notice (G.N.) Number R 982 (2014)**. In addition the PPP was guided by the Integrated Environment Management Guidelines Series 7, Public Participation in the EIA process, published in Government Gazette no. 33308, 18 June 2010. See **Appendix 2** for Public Participation Report.

4.1 Purpose of Public Participation

The engagement of Interested and Affected Parties (I&AP's) and the Stakeholder Engagement Process continue into the EIA phase, and is an important part of any environmental Impact assessment. The main objectives of the Stakeholder Engagement/ Public Participation Process includes amongst others:

- Informing the adjacent landowners, tenants, residents' associations, ward councillors, the local municipality and other organs of state of the proposed project;
- Establishing lines of communication between the stakeholders, I&AP's and the project team;
- Providing all parties with an opportunity to exchange information and to express their views and concerns regarding the proposed project;
- Obtaining comments/input from stakeholders and I&AP's, and ensuring that all views, issues, concerns and queries raised are fully documented; and
- Identifying all the significant issues associated with the proposed project.

4.2 Scoping Phase & EIA Phase Public Participation

The following has been undertaken as part of the **initial EIA process**:

- Notification and Consultation with Organs of State may have jurisdiction over the project, including:
 - Provincial departments
 - Parastatals and Non-Governmental Organisations
 - Local Municipality and District Municipality
- Focus group meetings and a public meeting
 - Open Days (Public meetings) which serve as information sessions to introduce the proposed project to the public and to discuss the project aim were held in August 2015 and details are included in this EIA report (Appendix 3 PPP Report).
 - Risk areas were identified in which focus group meetings were held from 19 to 23 September to convey information and allow the technical team to get a better understanding of the practical challenges in the project area. Details and minutes are contained in the PPP Report (Appendix 3).
- Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants).

- Written, faxed or e-mail correspondence.

A record of the above consultation in the EIA process is included within **Appendix 3**.

In terms of the requirement of Chapter 6 of the EIA Regulations of December 2014, the following key public participation tasks are required to be undertaken:

- Fixing a notice board at a place conspicuous to the public at the boundary or on the fence of—
 - (i) the site where the activity to which the application relates is or is to be undertaken; and
 - (ii) any alternative site mentioned in the application;
- Giving written notice to:
 - (i) the owner or person in control of that land if the applicant is not the owner or person in control of the land;
 - (ii) the occupiers of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iii) owners and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;
 - (iv) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
 - (v) the municipality which has jurisdiction in the area;
 - (vi) any organ of state having jurisdiction in respect of any aspect of the activity; and
 - (vii) any other party as required by the competent authority.
- Placing an advertisement in:
 - (i) one local newspaper; and
 - (ii) in at least one provincial newspaper.
- Open and maintain a register/ database of interested and affected parties and organs of state.
 - » Release of a Draft EIA Report for Public Review
 - » Preparation of a Comments and Responses Report which documents all of the comments received and responses from the project team.

In compliance with the requirements of Chapter 6 of the EIA Regulations, 2014, the following summarises the key public participation activities conducted to date.

4.2.1 Placement of Site Notices

Site notices were displayed within the boundaries of the study area from 5 March 2015.

4.2.2 Steps taken to notify I&AP's

See details in **Appendix 3** - Public Participation Report.

i. Stakeholder and land owner Identification

Stakeholder and land owner identification will provide a basic understanding of the social context in which the public participation process will be undertaken in the project. The following methods have been used for Stakeholder and land owner identification:

- Windeed searches to identify landowners;
- Consultation with Provincial, District and Local Authorities; and
- Consultation with farmers Association;

ii. Project Announcement

Project announcement, which included the placement of site notices and distribution of Background Information Documents (BID's) in Blanco and Beaufort West commenced during March and April 2015. The public participation process (PPP) part in the EIA was announced in March 2015 and was done as follows.

- **Distribution of flyers**
Flyers were distributed to I&APs accompanied by a Background Information document (BID). A registration form with map was distributed. (Knock and drop) from March 2015 to end May 2015.

- **Background Information Documents**

A Background Information Document was produced and distributed during Scoping phase, which included:

- A "knock and drop" exercise in Beaufort West and Blanco;
- Open Day meetings;
- Information Sharing Sessions with Councillors and officials; and
- Requests due to advertisements placed.

4.2.3 Newspaper advertisement

Newspaper advertisement was placed in The Herald (Eastern Cape) on 8 April 2015, Die Courier (Western Cape) on 2 April 2015 & Sunday Times (National) on 29 March 2015 requesting Interested and Affected Parties (I&APs) to register, and submit their comments.

In addition to the above, Newspaper articles were encouraged and numerous reporters were approached and supplied with information on the project. This resulted in the publication of numerous news articles published, broadening the reach of the public notification process.

4.2.4 I&AP Register

An I&AP's register (See **Appendix 3** for Public Participation Report) was opened and maintained in terms of Regulation 55 and contains the names, contact details and addresses of:

- All persons who, as a consequence of the public participation process have submitted written comments or attended meetings with the applicant or EAP; and
- All organs of state which have jurisdiction in respect of the activity to which the application relates.

4.2.5 Review of the Draft Reports

- **Public review of the Draft Reports:** Notice was given regarding the availability of the draft SR. The Draft Scoping Report and specialist reports were made available to registered I&AP's and Organs of State for review on Dropbox, and the DSR was e-mailed upon request. After the commenting period for I&AP's has expired, Envirolution (Pty) Ltd has considered the comments received, and complete the Final SR. **Notice was again given regarding the availability of the draft EIAR.** The Draft EIAR and specialist reports were made available on Dropbox. After the commenting period for I&AP's has expired on 16 October 2016, Envirolution (Pty) Ltd has consider the comments received, and completed the Final EIAR. Envirolution will now submit the final EIAR together with those comments received on the draft EIAR to the Department of Environmental Affairs for consideration of authorisation.
- **Authority Review of the Draft Reports:** Following the registration and commenting period, the Final Scoping Report was updated with comments received during the public review period. Hard copies and CDs of the Final Scoping report were sent to:

- Western Cape Department of Environmental Affairs and Development Planning, George;
- Eastern Cape Department of Economic Development and Environmental Affairs (DEDEA),
Cacadu District,
- Department of Environmental Affairs
- Department of Agriculture , Forestry and Fisheries
- District and Local Municipalities

4.2.6 Comments and Responses Report

At the end of the announcement phase, all comments/input from stakeholders and I&AP's, were captured in the Issues and Response Report (IRR) which formed part of the Scoping reports, the Draft EIA Report, and subsequently to the Final EIA Reports. The Comments and Response Report includes responses from members of the EIA project team and/or the project proponent. This is included in **Appendix 3**

4.2.7 Additional Public Participation Process

Following the lapsing of the previous application, a new EIA process was initiated, an application form was submitted to DEA along with the Draft Scoping report in February 2017. DEA has acknowledged receipt and acceptance of the application and the project reference number DEA Reference: 14/12/16/3/3/2/995 was assigned. The final Scoping Report together with the Plan of Study was approved in May 2017 after a review period of 30 days. In terms of this acceptance, an EIA was required to be undertaken for the proposed project. The following additional PPP have been conducted to support the new EIA process:

- Release of the Draft Scoping Report for comments;
- Release of the Draft EIA Report for comments;
- Notification of the availability of the two draft reports to registered I&AP's on the distribution list
- New comments received are captured in a Comment and Response Report.

NB: This new PPP undertaken is appended as an addendum to the Public Participation Report (see point 4.2.8 below).

4.2.8 Public Participation Report

A specialist report is attached to this Final EIA Report document, summarising the Public Participation Process (PPP) that the project consultants have performed in the initial application, which subsequently form part of the new EIA application. The Comments that were received on the Draft Scoping Report during the review period were included in the Final Scoping Report and again in the Draft EIAR, and this Final EIAR. The Comments and Response Report has been updated and included in this EIA Draft Report as Appendix 3. New comments that were received during the review of the draft document, were included and responded to in this Final EIA Report.

It must be noted that the PPP for the new EIA process is included in this Report as Appendix 3.2

4.3 Summary of Issues Raised by I&AP's

Issues and concerns raised by I&AP's to date have been integrated into the Issues and Responses Report of this FEIAR (see Appendix 3). The issues and concerns were raised by means of:

- issues raised during open day meeting and focus group meetings;
- written submissions in response to advertisements

- Telephonic communications with I&AP's;
- Issues raised through written correspondence received from I&AP's (fax, email and mail).

Issues raised during the previous EIA Process

The issues raised during the **Scoping Phase and the EIA phase** to date are presented in the PPP report. Comments on the FEIAR were received during the review period, and via the focus group meetings. The list below provides a summary of the main issues that were raised thus far (up to submission of the FEIAR in October 2016).

1. **Risk of fires** from the Eskom lines and impact on farms
2. Concerned about the line going past **irrigation** dams and over fences
3. There are currently two power lines along the N12, one of them a 400 KVA line and another, much older line. We have a number of fences crossing this area so would be very much affected by the proposed project. So little has been publicized about this project. Two lines are traversing the property already – we want no more lines
4. There are sights of significant **cultural** value on the farms. Some of the buildings date from the 1800's some bushmen paintings exist on the farms
5. Concerned about the **arable land covered by the servitude**. Pylons will hamper future expansion of pivot point irrigation plans
6. **Wind farm** of Mainstream RP (30km from Scheurfontein) the line will traverse through a planned wind farm. With existing alignment the project will be badly affected.
7. Concerned about the close proximity of the line to the existing house this will be exacerbated with an extra line. There is **no space to place another** line. The existing lines are hampering cutting and cultivation of existing fields. Additional pylons will make mechanization of activities virtually impossible. Suggests that the line be built to the south of the existing line away from cultivated fields.
8. The line will go over **established dams and apple orchards**. Existing orchard support wires close to the existing ESKOM lines build up static electricity with "possible electrocution" . Lines will have to be earthed at extra cost. With the construction of the previous line, construction teams destroyed the road and despite numerous requests from the farm management the damage were not repaired. The farmer had to repair the road at own expense after a year of correspondence and no rectification.
9. The new line and the existing lines are crossing the **catchment dam**. Some of the existing lines have no flight path aversion markers on it causing bird fatalities. In 2015 eagles have collided with the line. Blue Cranes are at risk.
10. The limited **compensation** that is normally paid does not compensate the farmer enough for the "loss" he incurs both financially and loss of aesthetics of his land.
11. There is 'ethical problem" with the line **destroying the natural beauty** of an unspoilt area in south Africa.
12. **Low density of vegetation** (shrubs) in the Karoo is already a problem and further disruption and destruction of the veld would reduce grazing capacity and income. Depending on the rainfall, it could take up to 3years for the veld to return to original state and will be available for grazing. Will farmers be compensated for the time that areas of servitudes that are under rehabilitation cannot be used?
13. **Vehicles for maintenance** will drive for 10Km or more in areas where these plants will be destroyed, leaving ground open for erosion. Angora goats prefer new soft vegetation under the lines and eat the plants rather than graze in the rest of the farm, thus the area will be cleared further and more erosion follow.
14. Disturbed areas should be **fenced** off (at Eskom cost - It would cost R25000 per km to fence both sides of the servitude).However, the area between the road and the line turns into a barren

- strip without water, so the strip cannot be used as a separate camp for stock. Water systems need to be provided for blocks of veld between fences and servitude.
15. In the Eastern Cape, unpaved roads are not maintained and heavy vehicles will destroy the surface and worsen the situation.
 16. *Suurpootjie* **tortoises** found in the Karoo
 17. Sections of **stock camps will be sterilised** for a period during and after construction. Rehabilitation takes time and Eskom not always replanting.
 18. For **dust** suppression water trucks will be required. Where will water be obtained? From private farms? This is not acceptable.
 19. **Electro-magnetic fields** may impact on animal and human health.
 20. The line over Uniondale will impact on farm lands where other lines already exist. **Visual** impact to be investigated. Existing and planned Pivot points to be taken into consideration.
 21. Concerns about the close proximity of the line to the existing house. The existing lines are hampering cutting and cultivation of **existing fields**. Additional pylons will make mechanisation of activities virtually impossible.
 22. A property is 3km long, but only 750 metres wide, with a nature based lodge specialising in the natural beauty and the views. A powerline anywhere along the length of our property with the combined ground clearing would render us **unable to trade** and force closure.
 23. Why Eskom wants to run a line over our land when the **existing high voltage line** is situated less than 1km to the east of some properties.
 24. **Koi San** graves to be investigated
 25. Clearing of the servitude in the **Ranteveld** must be approached in an ecologically sensitive manner
 26. Farmers already have to pay **levies** for Eskom regarding the network, the environment and services. Can Eskom not cut down (exempt farmers) from levies? In the past lines were built by private sector and later Eskom bought it back.
 27. **Cumulative** impact studies must be done on all existing power lines and the other impacts associated with all the numerous mining and renewable energy applications in the area.
 28. There will be substantial negative impact of the existing line on priority bird species
 29. Maintenance issues – “Eskom sometimes flattens fence lines and leave gates open (break locks) etc”.
 30. Could the line not be moved to the area along the slopes of the mountain where the existing 132kv is located? Propose this as another alternative.
 31. Can the exiting line not be optimised to carry the extra load?
 32. **Cumulative** Avifaunal impact studies must be done
 33. **How practical** is the Alternative 2? (Cape Nature comment)
 34. **There are mining prospecting areas to the south of Beaufort West (Ferret Mining and Environmental)**
 - 35.

The most important issues below can be categorised into the following:

Visual impact (servitude widths, B&Bs, natural areas)

Health issues (electro-magnetic fields)

Maintenance and rehabilitation

Ecology: Disturbance of natural areas & Impact on birds in particular

Economic issues - loss of **farming** infrastructure and land, loss of **tourism** and income, physical (practical) impact on lucern and other crops, impact on mining prospecting

Social Issues – impact on tourism (B&B facilities) and farming activities/way of life

Heritage artefacts (Khoi San paintings, graves, old buildings)

These particular issues were investigated in more detail during the EIA Phase, and specialist studies include reference to the issues that have been raised by the public and stakeholders during the Scoping Phase. Comments were received after the commenting period of the Scoping phase, during the review period of the Draft EIAR and up to when this FEIAR was submitted. The new issue raised was that there are **mining prospecting applications** for areas south of Beaufort West that may be relevant to the project (Ferret Mining & Environmental, correspondence from EAP doing the EIA for the mining group September 2016). A focus group meeting was held on 9 September 2016 to obtain more details, and a dedicated focus group meeting was held at Uniondale on 22 September, to discuss the project with the mining group in particular.

The project has a combined effect when assessed in conjunction with other activities. The individual insignificant impacts of several developments might have a significant **cumulative** adverse impact on the environment when viewed together.

Main comment received/Issues raised during the **NEW** EIA Process

1. CapeNature objection of Alternative 1

Eskom is a state-owned utility and the first principle should be that the state uses its own properties over which these linear activities can be undertaken. Our Client alerts the competent authority to the fact that the property to the North and adjacent to our Client's property, is owned by the state and the preferred alternative for the state and Eskom, should be to construct the proposed power lines as well as the incidental infrastructure, over the state owned land and not over.

NB: The above issues and responses are recorded in the CRR (refer to **Appendix 3.2**)

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section provides a description of the environment that may be affected by the proposed Gourikwa to Blanco project. It is intended to provide an overview of the affected environment and is not a detailed environmental study. Detailed environmental specialist studies, which focus on significant environmental issues of the project, will be provided during the impact assessment phase.

5.1 Climate

The climate data summarized in this section originates in the Agrometeorology database at ARC-ISCW, where data from the relevant weather stations in the study area were averaged to provide meaningful long-term figures. The study area can be broadly divided into three climatic zones, namely:

- the coastal belt,
- the Klein Karoo south of the mountains and
- the Karoo proper in the north.

The coastal belt has cool, moist to wet winters and warm, moist summers (Koch, 2006). The long-term average annual rainfall is between 800 and 1 000 mm. Average temperatures vary between 12°C (daily min) and 27°C (daily max) in summer and between 6°C (daily min) and 13°C (daily max) in winter. The extreme high temperature that has been recorded is 39.5°C and the extreme low temperature –1.5°C.

The Klein Karoo has cool to cold, dry winters and warm, moist summers (Koch, 2006). The long-term average annual rainfall is between 400 and 500 mm. Average temperatures vary between 15°C (daily min) and 33°C (daily max) in summer and between 15°C (daily min) and 18°C (daily max) in winter. The extreme high temperature that has been recorded is 44.2°C and the extreme low temperature –7.5°C.

Frost occurs regularly between late-May and late-August, but with the average annual evaporation being over 2 400 mm, the area is problematic for dryland (rain-fed) cultivation.

5.2 Topography, Soils and Geology

5.2.1 Topography

The study area comprises a mixture of mountainous and flatter topography closer to the coast, culminating in the Swartberg mountain range north of George. Further north, the flatter topography of the Karoo, classified as “Plains with low relief”, according to Kruger (1983) is prevalent all the way to Beaufort West. The altitude above sea level is around 800-900 m across the Karoo, rising to over 2 000 m in the mountains, falling to less than 100 m near George. The topography in general slopes relatively steeply from the Outeniqua Mountains towards the sea, with foothills just south of the mountains followed by a narrow, flat coastal strip which is interspersed with river valleys.

The Great Karoo lies to the north of the Swartberg range; the Little Karoo is to the south thereof. The Little Karoo is separated from the Great Karoo by the Swartberg Mountain range, a 290 km long valley (40–60 km wide) formed by two parallel Cape Fold Mountain ranges, the Swartberg to the north, and

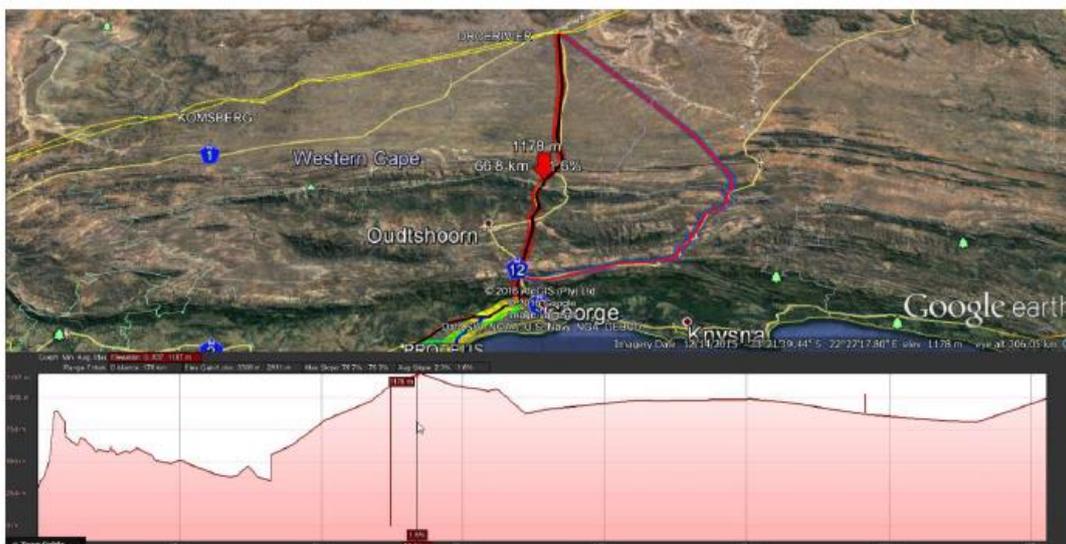
the Langeberg-Outeniqua range to the south. The northern strip of the valley, within 10–20 km from the foot of the Swartberg mountains is a well watered area and mostly utilised for farmlands.

The southern 30–50 km wide strip, north of the Langeberg range is as arid as the western Lower Karoo, except in the east, where the Langeberg range (arbitrarily) starts to be called the Outeniqua Mountains. The Little Karoo can only be accessed by road through the narrow ravines that have been cut through the surrounding Cape Fold Mountains by rivers. On the coastal plain of the study area, the main road between Oudtshoorn and George crosses the mountains to the south via the Outeniqua Pass. The only exit from the Little Karoo that does not involve crossing a mountain range is through the 150 km long, narrow Langkloof valley between Uniondale and Humansdorp. The road between Uniondale and Willowmore forms the approximate eastern extremity of the Little Karoo.

During the EIA Phase, the technical team has investigated the site to evaluate the challenges of each alternative. Findings are summarised below:

Route Alternative 1

- The route Alternative 1 travels through undulating terrain area ranging from 327 m to as high as 1655m with an average height of 832m.
- and the existing line has had a number of outages due to snow. This will call for specialized design and construction to be able to have this line connecting Droërvier to Narina SS.
- The risk of working close to existing lines throughout the route during construction will require specialized personnel and equipment. Most part of the servitude is also occupied by Distribution Voltage Lines 132kV.
- Valleys on the servitude are also characterized by agricultural activities which will require special designs to avoid and disturbance on the farming activities.
- On the northern parts towards Droërvier the servitude is a typical Karoo landscape with minimal activity such as game farming.



- The high laying areas of the Swartberg Mountains are characterized with snow

Figure 4. Elevation profile for Alternative 1

Route alternative 2

The Alternative 2 route travels through undulating terrain area ranging from 558 m to as high as 991m with an average height of 839 m. This will call for specialized design and construction to be able to have this line connecting Droerivier to Narina. The smoother the elevation profile, the easier is to place towers on the route.

- Alternative 2 is 270 km long. It will exit the Narina substation and at the intersection of the N9 and N12, the proposed corridor will turn east and follow the N9/R62, running very close to the western side of Uniondale.
- The power line will cross the R339 and the R407, and run 14 km to the west of Willowmore and 8 km to the west of Rietbron. This small section of the line falls within the Eastern Cape Province.
- The section of lands between the R407 and the Droerivier substation appears to be untransformed Karoo veld.
- The proposed route runs parallel to existing infrastructure and other power lines from Distribution. This will make access road easily accessible via the current N9 national road and other frequently used regional dirt roads.
- The crossing over the Swartberg mountain range is also a problem on this route but the altitude is not as high compared to Route Alternative 1.

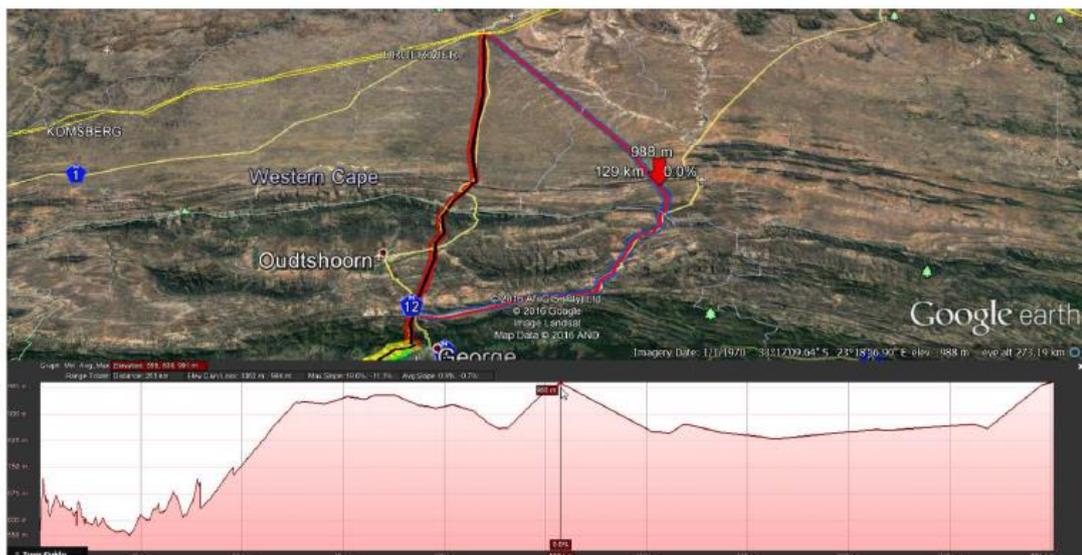


Figure 5. Elevation profile for Alternative 2

5.2.2 Soils

Information of the soils are also contained in the EIA Phase study that was conducted by Terrasoils (Appendix 4.6). Erosion is a natural, though long-term, process and without it, soil formation would not occur. However, when the process is unnaturally accelerated, usually by human intervention, the results can be severe. The two forms of soil erosion are wind erosion, where sandy topsoils that become exposed may be removed in the dry season by the action of wind, and water erosion, where topsoils that become exposed can be washed away by water flowing over the soil surface.

The study area is not one where significant zones of soils susceptible to water erosion occur (le Roux *et al.*, 2008). Susceptible areas would generally include soils where sandy topsoils abruptly overly

more clayey, usually structured subsoils (“duplex” soils), but areas of such soils in area are restricted to the south. However, some significant areas of degradation in the form of sheet erosion were recorded by the National Land-Cover Database (CSIR, 2005), mostly in the north-east. Areas susceptible to erosion were identified in the specialist study, which suggests that Alternative 1 (red line) would be preferable, as it crosses less of an area that might be affected by erosion, either currently or in future.

Wind erosion is not potentially a serious problem for most of the study area. The topsoils are not excessively sandy, and the low rainfall means that grazing pressures are generally low, although organic carbon levels for the area are generally between 0.5% and 1.0% (Schoeman & van der Walt, 2004).

5.2.3 Geology

For the southern half of the area, parent material comprises a range of folded sediments, including arenite, shale, tillite and conglomerate of the Cape Fold Mountain Belt. North of the mountains, the underlying material is mainly mudstone and sandstone of the Teekloof Formation, Adelaide Subgroup, Karoo Sequence, along with occasional dolerite intrusions (Geological Survey, 1984). Quaternary alluvium occurs extensively in many of the lower-lying parts in the north-east, but neither route alternative crosses this area. Most of the study area (north of the Cape Fold Mountains) is underlain by the Beaufort Group. The area closest to the Mountains features the Ecca Group. The Ecca Group consist largely of shales, and extend over the entire former Karoo Sea.

During the EIA phase consultations, a project for prospecting rights covering an area of around 7,549 km² was identified. The aforementioned project would be relevant to the EIA for the 400kV power line between Narina and Droërvier due to the location of proposed mining on the farm Rystkuil and Lombaardskraal. The prospecting rights would be for uranium and molybdenum in the Karoo region and EIA applications for prospecting rights is already underway (Ferret Mining and Environmental Services Pty Ltd, 2016). The map below shows the location of the explorations in close vicinity to the two alternatives for the 400kV Transmission Power Line project:

The potential mining infrastructure at Rystkuil seems not to be a problem for Alternative 2 (marked in purple in the map below), as it seems as though the lines would cross the underground operational area.

Although the map below shows that Alternative 1 transects the Lombaardskraal area, the latter is a long term project that is not foreseen to realise within the next 10-15 years. It is not yet know if and where uranium deposits are located on this property.

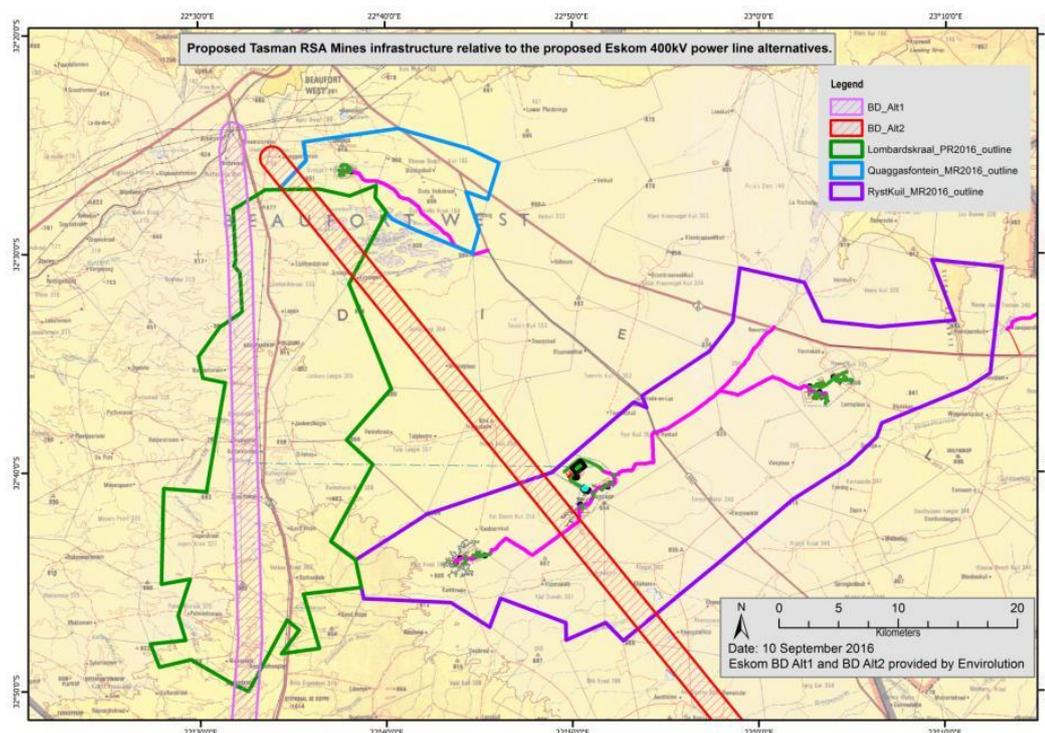


Figure 6. Tasman RSA Mines infrastructure in relation to Alternative 1 and Alternative 2

5.3 Agriculture

During the site visits, the EAP has identified areas of particular sensitivity in terms of agriculture, namely: Waboomskraal, Dysselsdorp, Kammanassie and Klarstroom. Farms that are under irrigation are sensitive in the sense that lines may impact on existing and planned pivot points.

An EIA Phase specialist study was conducted by Terrasoils (Appendix 4.6). The study area comprises a mixture of mountainous and flatter topography closer to the coast, culminating in the Swartberg mountain range north of George. Further north, the flatter topography of the Karoo, classified as “Plains with low relief”, according to Kruger (1983) is prevalent all the way to Beaufort West. The altitude above sea level is around 800-900 m across the Karoo, rising to over 2 000 m in the mountains, falling to less than 100 m near George.

Route and alternative	Agricultural Field Type (ha)					
	Annual crop cultivation / planted pasture rotation	Horticulture	Viticulture	Shade net	Pivot irrigation	Old fields
Blanko-Droërivier Alt1	2049.3	126.9	33.0	1.8	26.3	17.2
Blanko-Droërivier Alt2	6431.2	214.8	48.2	1.8	229.6	2.1

The major rivers in the area are the Olifants River, close to George, and the Gamka River, in the west of the area which is not crossed by either route alternative. The Outeniqua- and Swartberg Mountain Ranges are parallel to each other, defining an area known as the Klein Karoo. The Klein Karoo is mostly undulating topography, with the exception of the Kammanassie Mountains. Ostrich farming is synonymous with the Klein Karoo (Oudtshoorn and Kammanassie in particular) and is considered the largest commercial industry. Sheep farming in conjunction with game farming is also a popular agricultural practice. Due to the arid climate, small-scale cultivation practices are mostly concentrated along rivers.

5.3.1 Irrigated land

Where irrigation is possible, grapes and grains (wheat, lucerne and oats - the latter mainly as summer fodder for Ostriches) are the main agricultural crops. Ostriches lie at the centre of farming in the Klein Karoo section of the Alternative 1 region, although small stock and cattle are also farmed.

Zones of temporary or periodic irrigation are generally quite narrow and isolated, so that spanning such areas with a transmission line would not be problematic. However, more in-depth studies would need to be carried out at potential crossing points to avoid active areas of irrigation, such as centre-pivots or any overhead sprayers.

The coastal belt (south of the study area in the vicinity of the Blanco Substation) has sufficient rainfall for dryland cultivation, where suitable soils occur.

For Alternative 1, only isolated areas in the far south and close to Oudtshoorn may have some proportion of moderate to high potential agricultural soils. For Alternative 2, some areas in the south and at the eastern extent may also have such soils present.

The very dry nature of the prevailing climate in much of the area means that arable cultivation under dryland conditions would be impossible, and the only possibility of cultivation would be using irrigation close to the existing rivers. However, coupled to the soil restrictions mentioned above, the majority of the groundwater in the area, which might be available for irrigation, is of poor quality, with high salt content. Irrigation would therefore be a problematic proposition.

Some zones of temporary or periodic irrigation occur which are generally quite narrow and isolated, so that spanning such areas with a transmission line would not be problematic. However, more in-depth studies would need to be carried out at potential crossing points to avoid active areas of irrigation, such as centre-pivots or any overhead sprayers.

5.3.2 Grazing Capacity

The southern Karoo lies in a very dry part of South Africa, and the grazing capacity (measured in hectares required for one large stock unit) is extremely low, generally around 40-60 ha/l su. In the wetter parts of the coastal belt, the situation is more favourable, with the capacity varying from 5-10 ha/l su close to the coast to around 14-20 ha/l su in the Klein Karoo (Schoeman & van der Walt, 2004). This classification does not apply to game farming, where more detailed specialized knowledge is

required, mainly in terms of relating plant species composition in both the grass layer and woody layer to the requirements of various grazing and/or browsing species of game.

5.4 **Ecology**

5.4.1 **Vegetation**

For the EIA phase botanical investigations, EnviroNiche Consulting was appointed to undertake a floristic impact assessment (see **Appendix 4.1**) to determine the impacts which may be triggered by the proposed development. The requirements of this assessment were to undertake a specialist study to assess the floristic biodiversity and ecology of this proposed linear development as well as to determine the significance of the impacts this proposed 400kV powerline will have within the identified project site.

A number of vegetation types in the project area are listed as Critical Biodiversity Areas (CBAs) and threatened ecosystems. The reasons why these vegetation types are listed as endangered ecosystems are because they have relatively high plant species diversity but due to human impacts, especially agricultural practices such as ostrich, sheep and goat farming as well as crop production, relatively few natural areas remain in these vegetation types.

In terms of the two alternative power line options, the following was found:

- **Alternative 1: Droërivier substation** – N9-N12 junction just north of the Outeniqua Mountains (shortest route directly across the Swartberg Mountains):

The proposed powerline route cuts across several Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). Some are listed as threatened ecosystems. They are the Kango Limestone Renosterveld (Status: Vulnerable)(width of impact zone ± 16 km), the Muscadel Riviere (Status: Critically Rare)() (width of impact zone ± 2 km) and the Eastern Little Karoo (Status: Vulnerable)(width of impact zone ± 23 km). The route cuts across a national protected area in the Swartberg Mountain range namely the Groot Swartberg Nature Reserve, which is a UNESCO - listed World Heritage Site. According to the Plants of South Africa Species List (POSA) a total of 146 Red Data species of various Red Data categories occur in the quarter degree squares over which the proposed alternative is planned. There are also a large number of NFEPA-listed seasonal streams and ephemeral pans present along the proposed power line route.

- **Alternative 2: Droërivier substation** – N9-N12 junction just north of the Outeniqua Mountains: (long route via Uniondale along the N9):

This Alternative 2 powerline route cuts across two Critical Biodiversity Areas (CBAs) and threatened ecosystems in this section. They are the Eastern Little Karoo (Status: Vulnerable)(16km) and the Langkloof Shale Renosterveld (Status: Critically Rare)(60km). The route does not cut across any national protected areas. According to the Plants of South Africa species list (POSA) a total of 39 Red Data species of various statuses occur in the quarter degree squares over which this proposed alternative is planned. A relatively large number of NFEPA-listed seasonal streams and ephemeral pans are present along the proposed power line route.

5.4.2 Fauna

An EIA Phase study was conducted by EOH (see report in [Appendix 4.2.](#)) Areas chosen for ground-truthing were based on the levels of biodiversity, the presence of terrestrial faunal Species of Conservation Concern (SCC), endemic and protected species within the proposed route alternatives, habitat associations of faunal SCC, and the presence of conservation areas and habitats where disturbance should be avoided or minimized based on municipal and national protection plans. The faunal specialists collected relevant field data on the terrestrial vertebrate fauna in the project area from the 22nd-27th of July 2016. Areas and habitats surveyed include:

- North and South Facing slopes of the Outeniqua Mountain Range;
- Four sections of the Klein Karoo (proposed alternative 1);
- North and South Facing slopes of the Swartberg Mountain Range;
- Riparian and rocky habitats between the Swartberg and Beaufort West;
- Vetkuil Amphibian Hotspot;
- Riparian areas between Beaufort West and Willowmore (proposed alternative 2);
- Rocky outcrops in the Uniondale area;
- And at four locations on the N9 between Uniondale and Outeniqua Pass.

A vast diversity of reptile, amphibian, bird and mammal species are likely to be found in a variety of habitats within the greater project area. Furthermore, all discussed faunal groups contain SCC which is likely to be found within the project area. Some of these species are restricted to isolated patches (most amphibian and reptile SCC), whilst others are widespread throughout the project area (most mammals and birds of SCC). Insight and recommendations for each of the proposed alternatives is given below.

Alternative 1

Alternative 1 extends mostly through arid areas with limited habitats for amphibians, as it avoids major wetlands and SKEP identified Amphibian Hotspots/Priority Areas. The route traverses two Important Bird Areas, namely the Outeniqua Mountains IBA and the Swartberg Mountains IBA. In terms of Important Bird Areas (IBAs), The northern extreme of Alternative 1 is approximately 10 kilometres from the southern tip of the Karoo National Park IBA. Moving south, the proposed alternative crosses the Swartberg Mountains IBA before crossing the Little Karoo. The route then bisects the Outeniqua Mountains IBA before joining at the Narina substation at the south facing foothills of the Outeniqua Mountains. Although this alternative bisects two large IBAs (Swartberg and Outeniqua) the route follows an existing powerline which already fragments the landscape.

Although the route crosses many perennial rivers south of the Swartberg, these rivers are all large and generally fast flowing. Therefore, it is unlikely that over-head power lines crossing the river will have a significant impact on amphibians. However, the route does cross through a reptile Priority Area identified by SKEP, and is also likely to have habitats suitable to the above mentioned reptiles of SCC.

Furthermore, the route will also pass through habitats suitable for the Critically Endangered Riverine Rabbit (*Bunolagus monticularis*). Alternative 1 also crosses through a Formally Protected Area and several Critical Biodiversity Areas. However, following field observations, many of the areas classified as CBAs are not deemed to be sensitive from a faunal perspective. With careful pylon hardstand and access road planning, the majority of areas defined as highly sensitive can be avoided.

The northern extreme of Alternative 1 borders on the southern tip of one of the Karoo SKEP mammal priority areas. Moving south, just before the Swartberg Mountains, this alternative bisects a SKEP

reptile priority area. The alternative then passes through the Swartberg Bird Priority Area. The route passes west of another SKEP mammal priority area in the Little Karoo area.

Alternative 2

Alternative 2 extends into the Eastern Cape, navigating around the Formal Protected Areas of the Swartberg region. The majority of the alternative route is likely to have a moderate impact on reptiles as there is no existing powerline route along this alternative, and therefore no service roads – all infrastructures would need to be constructed.

The Outeniqua range section of the proposed alternative route is likely to provide habitat for a high diversity of reptile species. The route crosses priority areas for amphibians according to SKEP, as well as many pristine wetlands and wetland clusters according to NFEPA, which provide suitable habitat for amphibians.

Like Alternative 1, the Alternative 2 starts just below the Karoo SKEP mammal priority area. Moving south, the proposed route crosses a large SKEP amphibian priority area before heading south-east around the Swartberg Mountains. The route runs along the Outeniqua Mountain Range south of the SKEP mammal priority area in the Little Karoo.

The Baviaanskloof Bird Priority Area falls just to the south west of the proposed route. The proposed alternative skirts the northern boundary of the Outeniqua Mountain IBA and crosses the Kouga-Baviaans Complex IBA. Large flocks of Blue Crane, numerous Bustards, and generally high diversity of birdlife was observed along this section of the powerline. As no existing large scale powerline infrastructure is found along most sections of this route it is likely that the impact on avifauna will be significant.

Like Alternative 1, the Alternative 2 starts just below the Karoo National Park IBA. Moving south, the proposed route skirts the eastern boundary of the Swartberg IBA. The route then skirts the north western section of the Kouga-Baviaanskloof IBA, before running parallel to the Outeniqua IBA all the way to the Outeniqua Pass. Although the route does not cross the Outeniqua range, that fact that it runs in close proximity (and parallel) to the IBA for a great distance, is likely to have a significant impact on the birds protected by the IBA status. Large powerlines were only found along short sections of the proposed route.

This alternative route also runs through the Vetkuil Amphibian Hotspot to the south east of Beaufort West. The hotspot provides a highly isolated habitat required by numerous amphibian species, including the Near Threatened Giant Bullfrog (*Pyxicephalus adspersus*). This alternative option is likely to have a significant impact on amphibians without mitigation. The alternative avoids crossing any Formally Protected Area but it does cut across several Critical Biodiversity Areas.

Table 8: Protected Areas which are affected by the proposed powerline alternatives

Route	Comment
Alternative 1	This line crosses the Grootswartberg Mountain Catchment Area (Formal B) and the Groot Swartberg Nature Reserve (Formal A) protected areas in the Swartberg Mountains. The line crosses the Ruitersbos Nature Reserve and Doringrivier Wildernis Area (both Formal A protected areas) as it moves south from the Little Karoo through the Outeniqua Mountains.
Alternative 2	This line crosses the most eastern section of the Swartberg-

Oos Mountain Catchment Area (Formal B), and is located along the northern boundary of the Witfontein Nature Reserve (Formal A) protected area in the Outeniqua Mountain range.



Figure 7: Protected and NPAES Areas

From a faunal perspective it is recommended that the Blanco-Droërvier **Alternative 1** is the **preferred route option** for the proposed power line as it is i) the significantly shorter route option, ii) there is existing powerline infrastructure including service roads and therefore a smaller footprint, iii) it avoids the Vetkuil Amphibian Hotspot which provides a highly isolated habitat for numerous amphibian species including species of conservation concern.

5.4.3 Avifauna

Regional bird overview: As result of the wide diversity of habitats found along the route of the proposed powerline there is a considerable number of bird species which have been observed in the region. Bird records from the area have identified 290 bird species and the importance of the region is recognised by the presence of four Important Bird Areas (IBAs): the Karoo National Park, Kouga-Baviaanskloof Complex, the Outeniqua Mountains and the Swartberg Mountains. A total of 133 bird species were recorded during the survey, including 11 bird SCC.

Birds of conservation concern: There have been 21 bird species of conservation concern (SCC) recorded in the area of the proposed powerline and alternative route (Table 9) of which four (4) are recorded as regionally endangered (EN).

Table 9: Bird SCC recorded along the Blanco-Droerivier powerline routes

Common Name	Scientific name	Global Status	Regional Status	Recorded during survey
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Bustard, Denham's	<i>Neotis denhami</i>	NT	VU	✓
Bustard, Kori	<i>Ardeotis kori</i>	NT	NT	✓
Bustard, Ludwig's	<i>Neotis ludwigii</i>	EN	EN	✓
Cursorer, Burchell's	<i>Cursorius rufus</i>	LC	VU	-
Crane, Blue	<i>Anthropoides paradiseus</i>	VU	NT	✓
Duck, Maccoa	<i>Oxyura maccoa</i>	NT	NT	-
Eagle, Martial	<i>Polemaetus bellicosus</i>	VU	EN	-
Eagle, Verreaux's	<i>Aquila verreauxii</i>	LC	VU	✓
Falcon, Lanner	<i>Falco biarmicus</i>	LC	NT	✓
Flufftail, Striped	<i>Sarothrura affinis</i>	LC	VU	-
Harrier, Black	<i>Circus maurus</i>	VU	EN	✓
Kingfisher, Half-collared	<i>Alcedo semitorquata</i>	LC	NT	-
Korhaan, Karoo	<i>Eupodotis vigorsii</i>	LC	NT	✓
Korhaan, Southern Black	<i>Afrotis afra</i>	VU	VU	✓
Marsh-harrier, African	<i>Circus ranivorus</i>	LC	EN	✓
Rock-jumper, Cape	<i>Chaetops frenatus</i>	LC	NT	-
Secretarybird,	<i>Sagittarius serpentarius</i>	VU	VU	✓
Seedeater, Protea	<i>Crithagra leucopterus</i>	LC	NT	-
Stork, Black	<i>Ciconia nigra</i>	LC	VU	-
Warbler, Knysna	<i>Bradypterus sylvaticus</i>	VU	VU	-
Woodpecker, Knysna	<i>Campethera notata</i>	NT	NT	-

Powerline Priority Bird Species: The Eskom–Endangered Wildlife Trust Strategic Partnership has identified several interactions between birds and electrical infrastructure, highlighting the significant impacts that electrification can have on birds (Smallie *et al.*, 2009). Research indicates that the birds most prone to powerline (and associated infrastructure) impacts include vultures, eagles, cranes, bustards, storks, and flamingos (Smallie *et al.*, 2009), many of which are found within the proposed project area.

The list of “powerline priority species” found below (see **Table 10**) is based on the bird species described in Smallie *et al.*, (2009), as well as electrocution and collision data relevant to the proposed powerline routes supplied by the Endangered Wildlife Trust (2016) and Eskom (2016). Although not all species listed are considered SCC, species which have historically been impacted on by powerline developments have been included. The list takes into account the likeliness of priority species to occur within/traverse the proposed alternatives.

Table 10: Blanco-Droerivier Powerline Priority Species List

Common Name	Scientific name	Global Status	Regional Status	Electrocutions/collisions recorded by EWT/Eskom
Bustard, Denham's	<i>Neotis denhami</i>	NT	VU	-
Bustard, Kori	<i>Ardeotis kori</i>	NT	NT	✓
Bustard, Ludwig's	<i>Neotis ludwigii</i>	EN	EN	✓
Crane, Blue	<i>Anthropoides paradiseus</i>	VU	NT	✓
Eagle, Martial	<i>Polemaetus bellicosus</i>	VU	EN	✓

Eagle, Verreaux's	<i>Aquila verreauxii</i>	LC	VU	-
Eagle-owl, Cape	<i>Bubo capensis</i>	LC	LC	✓
Eagle-owl, Spotted	<i>Bubo africanus</i>	LC	LC	✓
Goose, Spur-winged	<i>Plectropterus gambensis</i>	LC	LC	✓
Secretarybird	<i>Sagittarius serpentarius</i>	VU	VU	-
Stork, Black	<i>Ciconia nigra</i>	LC	VU	-
Stork, White	<i>Ciconia ciconia</i>	LC	LC	✓

Bird species most likely to be impacted on by the proposed powerline are described below.

Denham's Bustard (*Neotis denhami*), a regionally Vulnerable species, was recorded in agricultural lands north of the Outeniqua Mountain Range while driving a transect along a section of proposed alternative 2. The species is known to occasionally frequent cultivated fields. As the species distribution range is restricted to the southern part of the project area, proposed alternative 2 is likely to have the greatest impact on the species.

Kori Bustard (*Ardeotis kori*), a globally and regionally Near Threatened species, was recorded in dwarf shrublands near Willowmore on alternative 2. The species is a locally common resident of most habitats within the project area north of the Outeniqua Mountain Range. Both powerline routes are likely to have an impact on the species. Powerline related mortalities for the species have been recorded in the project area (EWT, 2016).

Ludwig's Bustard (*Neotis ludwigii*), a globally and regionally Endangered species, was recorded in two locations along proposed alternative 1, and at one location on proposed alternative 2. The species inhabits semi-arid dwarf shrublands. Both powerline routes are likely to have an impact on the species. Powerline related mortalities for the species have been recorded in the project area (EWT, 2016).

The globally Vulnerable **Blue Crane** (*Anthropoides paradiseus*) was recorded in vast numbers (flocks of over 50 individuals) in cultivated pastures along the southern section of proposed alternative 2. The species is known to frequent agricultural fields, mostly composed of cereal crop fields and planted pastures. As the species have frequent local movements (usually from one agricultural area to another), proposed alternative 2 is likely to have the greatest impact on the species. Powerline related mortalities for the species have been recorded in the project area (EWT, 2016).

The globally Vulnerable and regionally Endangered **Martial Eagle** (*Polemaetus bellicosus*) is rare in mountainous areas, preferring open woodland in flat areas. The species is also known to utilise high-tension pylons as perches (Roberts, 2016). The species is likely to be impacted on by both of the proposed alternatives. Although the species was not recorded during the field survey, powerline related mortalities for the species have been recorded in the project area (EWT, 2016).

The regionally Vulnerable **Verreaux's Eagle** (*Aquila verreauxii*) was recorded during the survey in the Outeniqua and Swartberg Mountain Ranges. The species strictly prefers mountainous areas with steep cliffs (used for nesting). Alternative 1 is likely to have the biggest impact on the species as it traverses both major mountain ranges between Blanco and Droerivier Substations.

The Cape and Spotted **Eagle-Owls** (*Bubo sp.*) are both listed as species of Least Concern on regional and global Red Lists. However, powerline related mortalities for both of the species have been recorded in the project area (EWT, 2016). Spotted Eagle Owls (*Bubo africanus*) are found in a wide

variety of habitats. The species is likely to be impacted on by both of the proposed alternatives. Cape Eagle Owls (*Bubo capensis*) roost and nest in caves and crevices associated with rocky habitats. Alternative 1 is likely to have the greatest impact on this species.

Spur-winged Goose (*Plectropterus gambensis*) and **White Stork** (*Ciconia ciconia*) are both listed as species of Least Concern on regional and global Red Lists. However, powerline related mortalities for both species have been recorded in the project area (EWT, 2016). Both species are known to frequent agricultural fields and cultivated lands. Therefore, proposed powerline alternative 2 is likely to have the greatest impact on both species.

Although no powerline related mortalities have been recorded in the area for the regionally Vulnerable **Black Stork** (*Ciconia nigra*) and the globally and regionally Vulnerable **Secretarybird** (*Sagittarius serpentarius*), powerline related mortalities outside the project area have been recorded. Secretarybirds were recorded in dwarf shrublands during the field survey and Black Storks have been recorded during SABAP2. Habitats suitable for both species are found throughout the greater project area, therefore both of the proposed alternatives are likely to have an impact on both species.

Photographs of bird SCC recorded on site can be seen in Plates 1-4:

Plate 1: Denham's Bustard (*Neotis denhami*) recorded on alternative 2



Plate 2: Blue Crane (*Anthropoides paradiseus*) recorded on alternative 2.



Plate 3: Kori Bustard (*Ardeotis kori*) recorded near Willowmore on alternative 2.



Plate 4: Karoo Korhaan (*Eupodotis vigorsii*) recorded on alternative 2.



5.5 Land use and Socio-Economical Profile

The Socio-Economic study that was conducted for the EIA Phase (EMS, 2016), also investigated the potential impacts on certain land uses (see Appendix 4.5).

The study area for Alternative 1 consists of the Central Karoo and Eden District, with a portion of the Alternative 2 route located in the Cacadu District.

The local municipalities that form part of the Alternative 1 proposed transmission line study area are the George Local Municipality (WC044 part of Eden), Oudtshoorn Local Municipality (WC045 part of Eden), the Prince Albert Local Municipality (WC052 part of Central Karoo) and Beaufort West Municipality (WC053, part of the Central Karoo DC5).

The local municipalities for Alternative 2 include George Local Municipality (WC044 part of Eden), Baviaans Local Municipality (EC107, part of Cacadu) and Beaufort West Municipality (WC053, part of the Central Karoo DC5).

Table 11 below shows selected socio-economic data from the 2011 census and Quantec. This includes population and household density figures for the municipalities.

Table 11: Population, household and density data for local municipalities located in the study area³

Municipality	Prince Albert Municipality (WC052)	Beaufort West Municipality (WC053)	George Municipality (WC044)	Oudtshoorn Municipality (WC045)	Baviaans Municipality (EC107)
Province	Western Cape	Western Cape	Western Cape	Western Cape	Eastern Cape
District	Central Karoo	Central Karoo	Eden	Eden	Cacadu
Population (2011)	13 136	49 586	193 672	95 933	17 761
Area size km ²	2 015	21 917	5 191	3 537	11 668
Population density (population per km ²) (2011)	1.6	2.3	37.3	27.1	1.5
GVA (2011)	R327.06 million	R1 607.4 million	R8 851 million	R3 376.8 million	R522 million
Major sectors	Business services (R86m), Construction (R50m), General government (R41m).	General Government (R259m), Wholesale and retail (R235m), Transport and storage (R222m).	Wholesale and retail (R1490m), Business services (R1303m), General government (R1295m).	General government (R891m), Wholesale and Retail (R489m), Business services (R399m).	General government (R221m), Community, social and personal services (R71m), Agriculture R57m.
Main land use in local municipalities	Small stock grazing (Dorpers Merinos, and Angoras). Olive and fruit farms.	Small stock grazing (Dorpers Merinos, and Angoras) 6 ha per small stock unit.	Forest (timber), cattle, wine, tourism	Ostriches, seed production, wine, tourism.	Small stock grazing (Dorpers Merinos, and Angoras).
Unemployment rate	32.5%	30.7%	19.3%	23.7%	16.5%

³ Source: StatsSA, own calculations, Municipal LED's

Results of the desktop investigation show the low population and activity for the proposed transmission lines in the Beaufort West, Prince Albert and Baviaanskloof Local Municipality, with increased population, economic and agricultural activity in the Oudtshoorn and George Local Municipality. The largest town of the Klein Karoo is Oudtshoorn but it is located outside of the project area. The location of towns in relation to the project are shown in the table 12 below:

Table 12: Distance of line alternatives to towns of the study area

Town	Distance from Line alternatives
Beaufort West	Alternative 1 and 2 end 7 km south-west of Beaufort West
Blanco	Alternative 1 ends 4 km north-west of Blanco
De Rust	14 km to the east of Alternative 1
Dysseldorp	800 m to the east of Alternative 1
Klaarstroom	3 km to the east of Alternative 1
Schoonberg/Ezeljagt	1 km to the south of Alternative 2
Rietbron	8 km east of Alternative 2
Uniondale	700 m to the east of Alternative 2
Waboomskraal:	Alternative 1 will run through the middle of the valley
Willowmore	14 km east of Alternative 2

5.6 Traffic

For the EIA phase, a Traffic Impact Assessment was conducted by Aurecon (see **Appendix 4.10** of the FEIAR). Proclaimed provincial roads make up the bulk of roads between towns in the Central Karoo. Of these, the N12 links to the N1 at Beaufort West and connects to Oudtshoorn, George, the Southern Cape and the N2. The R61 also connects with the N1 at Beaufort West and provides access to Aberdeen/Graaff-Reinet and the inland areas of the Eastern Cape. The R63 trunk road connects to the N1 in the northeast of the area and passes to the south through Murraysburg and on to Graaff-Reinet, and to the north, to Victoria West in the Northern Cape. The R407 connects Prince Albert with the N1 in the north at Prince Albert Road, and connects with the N12 in the south. The R309 (Vleiland Road) to Seweweekspoort, which connects to Calitzdorp, is a vital link between Laingsburg and the R62, and the R309 requires upgrading.

The roads are maintained on an agency basis by the District Municipality on behalf of the Provincial Government Department and funding is provided for the service provided. Projects are registered and the agency service is delivered in terms of an agreed programme. There is no known road planning that will directly affect the development.

An existing main railway line is located along the N12 and could be utilised to transport equipment to the site. A station is located in the area and it should be possible to use the station (depending on the status of roads serving the station). Although the railway line is active, it must be accepted that all equipment might not be transported via rail, with the result that one or more of the other routes mentioned, will also be utilised. From a roads and traffic point of view, utilisation of the railway line should be considered.

5.7 Tourism

The Socio-Economic study that was conducted for the EIA Phase (EMS, 2016), also investigated the potential impacts on tourism (see Appendix 4.4 of the FEIAR). The main road networks are often travelled by tourists on their way to the coast. The Klein Karoo has redefined itself as a tourist destination over the last couple of decades. Many guesthouses and lodges can be found along the foothills of the Outeniqua- and Swartberg Mountain Ranges. The N12 is an important link between Beaufort West and Meiringspoort and is much travelled by tourists.

According to Domestic Tourism Survey of 2013 from Statistics South Africa, the Western Cape had 2.7 million domestic overnight trips or 9.2% of the total overnight trips (expressed per province as the main destination of overnight trips). More than half (58%) of the overnight trips to the Western Cape were for leisure/vacation/holiday and according to the mode of transport, 77% of all overnight trips to the Western Cape were with a car.

5.7.1 George area

There are a number of tourism attractions, including the George museum, Outeniqua Mountains, Montagu Pass (that was declared a National Monument in 1972), Fancourt (National Monument and well-known hotel) and Lake system (Wilderness, Swartvlei, Sedgfield and Groenvlei). The area is host to the George Old Car Show, that was first held in 1997, the George Cheese Festival (since 2002) and the George NAM Sevens Premier League. The George airport was built in 1977 and served 560 432 passengers in 2013, up from 154 000 in 2003.

In the 2014/15 IDP, the George Local Municipality highlights the need to promote the municipality as a sports, tourism and business destination. This includes the re-establishment of a Tourism Bureau, and projects like the Apple Express and the Outeniqua Choo-Choo train project are essential for tourism development in the rural areas. Further tourism opportunities include business tourism, agri-tourism, eco-tourism (hiking, birding, etc) and adventure-tourism potential like paragliding, canoeing, absailing, diving and mountain biking. Strengths also include the natural beauty of the area, the national parks, moderate climate, long sandy beaches and good hotels, guesthouses and restaurants.

5.7.2 Prince Albert area

According to the 2011/12 Prince Albert Municipality's Integrated Development Plan, the area has the potential to become a tourism hub to drive the growth and tourism within the Central Karoo region. Tourism has over the last two decades become one of the fastest-growing sectors in the region, with smaller rural communities benefited specifically. According to the IDP, around 1995 there were two guest houses, one hotel and one restaurant in the town. Today, Prince Albert boasts 39 guest houses, a hotel, 10 restaurants and a cooking school, as well as 12 shops catering for the tourist. At present there are 92 members of the Tourism Association, who employ 311 permanent staff, of which 262 are HDI's and of which 46 have been employed in 2009.

5.7.3 Baviaans Area

According to the draft 2015/15 Baviaans Municipality IDP, agri- and eco-tourism form the primary tourism activities within the municipality. Most of the economic activity is centred around the Baviaanskloof World heritage Site as well as along the identified tourism routes, particularly routes T1 and T2. The Baviaanskloof Wilderness Area in the south of the municipality and the Baviaanskloof Mega Reserve covers almost 90% of the municipality area. According to the IDP, a lot of money is spent on the marketing of Baviaans, which results in an annual increase in tourists visiting our area. Tourism at the local municipality contributes to the development of SMME's in areas of Art & Craft

Development, hiking trail at Sewefontein, and Leopard Trail in the Western part of the World Heritage site in Baviaanskloof.

During 2015/16 an investigation will be launched to establish a tourism development project on the farm Wanhoop in the Willowmore district.

5.7.4 Oudtshoorn Area

The tourism sector has a high impact on the economy of Oudtshoorn and is estimated that tourism expenditure makes out about 33% of total trading income in Oudtshoorn and up to 16% of the total income for the transport sector.

Tourism attractions include the Cango Caves (Africa's largest show cave system), ostrich farms, wildlife adventures, adventure activities and game lodges. Oudtshoorn is home to the annual Klein Karoo Nasionale Kunstefees (KKNK) (South Africa's biggest Arts Festival), the start of Route 62 wine route and some of the best South African Port style wines are produced in area. Other activities include endurance races like the Cango Marathon and the "To Hell and Back" maintain bike race. The region also includes part of the Swartberg mountain range which is part of the Cape Floral World Heritage Site (and, as part of the Gouritz Initiative, will soon be part of a major conservation corridor that will link the Klein Karoo to the Indian Ocean).

5.7.5 Beaufort West

According to the Beaufort West Spatial development plan (SDP) (2004), Beaufort West has a great geographic advantage in the region (and nationally) since it is located in the northern tip of the Cape Karoo and provide a natural gateway to the province as well as the Cape Karoo, the Klein Karoo, the Garden Route and many seaside resorts. Beaufort West is geographically also a gateway to the Eastern Cape Province, the Northern Cape Province and the Free State and on the N1 route between Gauteng to the Western Cape. The SDP (2004) mentions that 1 500 cars and 1 000 trucks pass through Beaufort West on an average day and provide a huge source of revenue that has barely been tapped. This figure of cars and trucks would have increased since 2004, but more recent statistics could not be found.

According to the Beaufort West IDP for 2012 – 2017, tourism (together with hunting) is identified as one of the key opportunities in the area. Tourism and Agriculture are currently the two leading regional economic sectors (Beaufort West, Spatial development plan, 2004).

The Karoo National Park, just outside Beaufort West, is the most important tourism facility in the area. According to the Beaufort West IDP (2012 – 2017) this is a national asset which aims to reclaim the original flora of the Karoo and is one of the chief tourist attractions in the region. The Karoo National Park has a wide variety of endemic wildlife. Many species have been relocated to the former ranges, such as black rhino, buffalo, and Cape mountain zebra. There are also a wide diversity of succulent plants and small reptiles. The main entrance of the Karoo National Park is on the N1, close to the existing Droërivier substation.

According to the SDP (2004), hotels, guesthouses, restaurants, filling stations, etc. cater for the needs of travellers along this busy N1 route with a concentration of activities in towns like Beaufort West. There are also numerous examples of historic buildings and museums throughout the area. The Great

Karoo is also considered one of the wonders in international scientific circles given the ancient, fossil-rich land⁴. The area also boasts the largest variety of succulents anywhere on earth with over 9 000 species of plants and herds of plains game in the area.

Travellers visiting Beaufort West are predominantly South African male travellers between 30 and 40 years old that are accompanied by a wife and children. They see Beaufort West as a refuelling place where they can also rest and eat while stopping. The town also has a good ambiance, but visits to tourism attractions are limited due to time constraints. Tourists view Beaufort West as the “Gateway to the Cape”, as “Karoo-Lamb country”, as “Heart of Silence” and as a “good night’s rest”. Perceived major attractions are the “eco-tourism”, the “history”, the “traditional culture” and the “rural lifestyle”. The majority of visitors stay an hour or less and travellers who stay overnight prefer guest houses and B&B’s (Central Karoo Beaufort West Tourism Gateway Research Project Proposal, September 2003).

According to the Beaufort West SDF there were 59 accommodation establishments in the Beaufort West Municipal area in 2004, and this sector is growing at a faster rate compared to other economic sectors. Tourism is a logical way to stimulate general economic growth in the region and can assist in employment generation. Accommodation facilities in the region include guest houses, game lodges, hotels, B&B’s, lodges, cottages (self-catering), budget rooms (self-catering), flats and accommodation in private rooms and farm holiday opportunities.

Beaufort West also has a privatised airport, which is mainly being used for light aircraft for tourism purposes. The airport already has a bed-and-breakfast establishment and has potential for further development.

Some of the world’s most important archaeological sites are located in the Cape Karoo, particularly the Beaufort West and Nelspoort areas. This includes a multitude of stone-age sites and Bushmen petroglyphs. As a result, the Great Karoo is an important research area to scientists, botanists, archaeologists, geologists, palaeontologists and ecologists. The story of the evolution of mammals from reptiles is here recorded in stone (being 190 to 500 million years old). There are also reptile fossil sites and a small fossil trail at the Karoo National Park. Even though Beaufort West lies in the middle of this fossil rich area, there is no museum of natural history in the town.⁵

⁵ *Beaufort West SDP, 2004*

5.7.6 Nature Reserves

A number of nature reserves are included in the study area. This includes the Groot Swartberg Nature Reserve, Swartberg East Nature Reserve, Gamkapoort Nature Reserve, Gamkaskloof (Die Hel) Nature Reserve, Kammanassie Nature Reserve, the Doringrivier Wilderness Area, Ruiterbos Nature Reserve, Witfontein Nature Reserve, Gamkaberg Nature Reserve, Susterdal Private Nature Reserve and the Karoo National Park close to Beaufort West.

Due to the inaccessibility of the mountains of the Outeniqua Mountain Range, large parts of this area remained in a pristine natural condition and areas such as Ruiterbos Nature Reserve and Doringrivier Wilderness Area conserves parts of the Outeniqua Mountain Range. The Outeniqua Nature Reserve is located near George and is accessible from Mossel Bay, Knysna and Oudtshoorn. The primary function of this nature reserve is the conservation of water resources.

The Swartberg Nature Reserve is situated in the vicinity of Oudtshoorn in the Swartberg Mountains between the Great and Little Karoo. The Swartberg Mountain Range is protected by the Groot Swartberg Nature Reserve and the Swartberg East Nature Reserve.

The Kammanassie Mountains is currently protected by the Kammanassie Nature Reserve. The Kammanassie Nature Reserve is situated between Uniondale and De Rust. The total extent of the area managed as a conservation area is 49 430 ha of which 21 532 ha is privately owned declared Mountain Catchment Area.

Conservation Areas	Size	Managed by
Kammanassie Nature Reserve	49 430 ha	WCNCB & Private
Outeniqua Nature Reserve	38 000 ha	WCNCB
Swartberg Nature Reserve	121 000 ha	WCNCB

A number of Private Game Reserves and Game Farms are located in the study area.

5.8 Heritage

Findings of the Heritage studies that were conducted for the EIA Phase has also taken visual impacts into consideration (see Appendix 4.5 of the FEIAR for HIA and AIA). The Heritage Western Cape was engaged by means of a Notice of Intent to Develop (NID) to get them on board and request inputs and comments. Although the two proposed powerline options do not cross any Provincial Heritage Sites, some farm buildings are of potential Grade IIIA significance. Findings of the **EIA phase heritage studies** (see Appendix 4.5 for details) are summarised in the paragraphs to follow.

Alternative 1: Individual farm house complexes of historic significance were noted in the Waboomskraal valley, along the Kammanassie River valley near Dysselfdorp, along the Oude Muragie Valley and on the escarpment of the Great Karoo (Klue/Middelwater and Seekoeigat).

Alternative 2: Individual farm house complexes of historic significance were observed along the N9 between Uniondale and its intersection with the N12 (Langkloof).

Anticipated Impacts on Heritage Resources

While the footprint of the towers is relatively small so that direct physical impacts to heritage resources are unlikely, the visual impacts to heritage resources are high.

Impacts on Palaeontology

The Baseline Assessment that was done during the Scoping Phase (Almond, 2015) concluded that: A substantial proportion of proposed power-line sectors will cross formations that are conservatively regarded as moderate to high sensitivity". "In practice, however, the likelihood of significant negative impacts on fossil heritage on the ground is low over most sectors of these routes because the bedrocks here are often highly weathered, tectonically- deformed or covered by a substantial thickness of fossil-poor superficial deposits (scree, alluvium, soils, etc)".

Impacts on Archaeology

- Caves and rock shelters, whilst not directly impacted by the construction of a tower footing, may become more easily accessible to people leading to potential vandalism of rock art sites and archaeological deposits. The likelihood of this occurring is medium to low;
- In situ scatters of ESA and MSA stone artefacts may be damaged. The likelihood of this occurring is very low;
- In situ, LSA archaeological sites may be damaged by the construction of the tower footings and access roads. The likelihood of this occurring is medium to low;
- Ruined structures and historic rubbish dumps may be impacted by the tower footings and access roads. The likelihood of this occurring is medium;
- The proposed tower footings may result in the destruction of farm cemeteries and graves. The likelihood of this occurring is medium.

Impacts on Built Environment

- Visual impacts on the towns of Uniondale and Dysveldorp may occur;
- Visual impacts to historic farm complexes, particularly those in close proximity to the lines - impacting on their sense of place.

Impacts to Cultural Landscape

- The two proposed alternative lines will be crossing a number of mountain ranges (the Outeniqua, Kammanassie and Groot Swartberge). These mountains are of high significance and the impacts of the powerlines will be of a visual nature;
- With respect the mountain passes (Outeniqua & Montague Passes), the powerlines will run at a distance of at least 4 km and will not be visible. The powerlines will not be visible from Meiringspoort or Perdepoort;
- With regard scenic routes, Alternative 1 crosses the N12 and the R341 on two occasions, and then runs parallel to the N12 through the Great Karoo. However, it will be running in parallel to an existing 400 kV line. Its impact will be cumulative;
- Alternative 2 will run along the N9/R62 for a considerable length (120 km). Although there is a small powerline along sections of this route, a new line will introduce a very high visual impact in the narrow Langkloof valley.

The cultural landscape is impacted on by the lines visual "disturbance" of the area. Briefly, the VIA (i-scape 2016, see Appendix 4.7 of the DEAIR) noted that the viewers that are mostly affected are motorists, tourists and farming communities. Overall, a relatively low to medium viewer incidence is expected apart from the areas where major transport routes are crossed or are running parallel to the proposed routes. Highly sensitive viewers and viewer groups occur all along the proposed routes. Concentrations of highly sensitive viewers have been identified as:

- Residents of Dysveldorp and Uniondale;
- Motorists on the scenic routes such as the N9 through Langkloof to Willowmore and on the N12 section through Waboomskraal; and
- Tourists visiting the tourist attractions and overnight facilities that are closest to the line.

Cumulative Impacts

Alternative 1 runs in parallel with an existing 400 kV line for most of the route. Alternative 2 will run in parallel with a smaller powerline through the Langkloof. A high risk of cumulative visual impacts will be experienced along Alternative 1 as the route is proposed alongside an existing transmission line and lower voltage power line. These parallel running power lines increase the visual dominance of electrical infrastructure, and contrast with the rural or pristine natural character that prevails.

Comments from Registered Conservation Bodies, Municipalities and I&APs

The De Rust Heritage Conservation Association was approached directly by the consultant to comment on the proposed line options, although Alternative 1 is at least 14 km to the west of the town. They have indicated that they have no comments to make. The Simon van der Stel Foundation, Oudtshoorn Heritage, Prince Albert Cultural Foundation and the George Heritage Trust have all been approached to comment.

During land owner interviews at least five landowners reported that they had "Bushmen Paintings" on their properties and that they were concerned about potential impacts. However, the information provided with respect location of these sites it too vague to assist in their identification or mapping. They all occur within the Langkloof valley, where rock art sites have been reported in the past. Cognisance is taken of the presence of San paintings on both line options, particularly in mountainous areas. Some landowners have reported on historic farm buildings on their properties.

Further specific comments from the public include:

- The historic wool washing troughs at Klaarstroom;
- A palaeontological museum on the farm Klue (Middelwater), near Klaarstroom;
- The mission station of Ganzenjacht in the Langkloof;
- Kammanassie settlement along the Kammanassie River;
- De Kruis and Voorsorg "ostrich palaces".

Archaeological Recommendations:

The tower footings for the 400 kV line are relatively small and they are unlikely to result in significant damage to archaeological material such as scatters of ESA and MSA material, which are generally not in situ.

Cultural Landscape Resources

The Cultural Landscape assessment (ACO 2016) stated that the following landscapes are of high scenic importance:

- The Outeniqua Mountains, the Kammanassieberge and the Groot Swartberge (all of Landscape Grade II significance).
- The Waboomskraal valley is a landscape of considerable aesthetic value with combination of a valley setting, wilderness surroundings and intensive hop cultivation (Landscape IIIB) and the Langkloof which extends through to Uniondale and is a rural settlement dating to the early 19th century, regarded as a distinctive valley, one of the most important fruit producing areas of the Cape (Landscape Grade II or IIIA).
- Mountain Passes including the Outeniqua Pass (Route II/III), the Montagu Pass (PHS), Perdepoort (Route III), Meiringspoort (Route II), the Potjiesbergpas and the Duiwelskop Pass (the latter two both ungraded).
- Scenic Routes including the road between Oudtshoorn and De Rust (Route III), the N9 from George to Uniondale (Route III) and the N12 from Klaarstroom to Beaufort Wes (Route III).

The above is interlinked with the findings of the Visual Impact Assessment (VIA) summarised in the Section 3.8 to follow.

5.9 Visual Impact Assessment (VIA)

The EIA phase VIA (i-*scape*, 2016) has assessed the potential visual changes that may occur as a result of the construction and operation of a new 400 kV transmission line between the Droërvier and future Narina Substations (see **Appendix 4.6** for VIA report). Both routes are proposed through areas that are considered highly scenic, either for its pristine natural character or for its unique agricultural activities. In most cases, the transmission line will impact on the visual quality of the visual resource by blemishing the natural character of the study area or interfering with unique and visually interesting land uses.

Areas of high scenic value and visual quality have been identified as:

- Groot Karoo
- Swartberg Mountain Range
- Klein Karoo Mountains
- Klein Karoo
- Outeniqua Mountains

The sensitivity of a landscape's character is a measure of the robustness of its character and the ability of the landscape to accommodate certain changes without detrimental impacts to its qualities. A landscape character with a high sensitivity will typically have one or a combination of the following attributes:

- A low Visual Absorption Capacity (VAC);
- A high degree of inter-visibility with adjacent landscapes;
- A well-established identity and sense of place;
- Is often in a pristine natural condition with high ecological value that contributes to a valued aesthetic condition; and
- Is considered scarce or uncommon.

A landscape character with a low sensitivity will typically have one or a combination of the following attributes:

- A high VAC;
- Is often visually isolated with a low degree of inter-visibility with adjacent landscapes;
- A poorly established identity and sense of place;
- Is often greatly developed to an extent where no or very little aesthetic features exist; and
- Is considered common and found in numerous places.

5.9.1 **Groot Karoo**

The Groot Karoo LT is considered a landscape with **medium** sensitivity along Alternative 1, but **high** sensitivity along Alternative 2 due to the following reasons:

- Generally, the study area has a low VAC due to the low vegetation growth, mostly undulating topography and the panoramic views that can be experienced over the large expanse of the Karoo plains. VAC is increased in the southern region due to the more varied topography;
- Its identity is very unique due to its desolate sense of place and the arid landscape character that offers experiences such as clear starry nights and tranquillity. This characteristic is even

more prominent along Alternative 2 due to its limited accessibility and sparse gravel road network. From a motorist's perspective, especially when travelling at a high speed along the N12, the landscape can be experienced as mundane and monotonous with few roadside attractions. However, the true identity of the Groot Karoo can only be enjoyed when one spends time in its presence;

- It is mainly undeveloped with the natural scrub vegetation canvassing the endless plains. Its identity is strongly supported by the fact that it appears deserted and that it is remote and isolated. A sense of isolation is even stronger along Alternative 2 due to the limited accessibility and extremely low population density;
- The study area is part of a larger region that features a similar landscape character and is widespread over the central parts of South Africa. This region has attributes that are present throughout the region, but is considered unique in the South African context; and
- An existing high voltage power line follows the same route as proposed by Alternative 1 along the N12. A lower voltage power line, supported by gum pole structures, is also present in the same corridor, which provides a baseline condition which is already impacted by power infrastructure. No major electrical infrastructure could be identified along Alternative 2, thereby increasing its sensitivity towards large-scale projects.

5.9.2 Swartberg Mountain Range

The Swartberg Mountain Range LT is considered **highly** sensitive due to the following reasons:

- VAC is considered high due to the mountainous terrain and the lack of accessibility near Alternative 1. The area where Alternative 2 passes over the mountains is more exposed and accessible, and VAC is considered slightly lower in this region;
- Inter-visibility around Alternative 1 is limited due to the mountainous areas north and south of the Swartberg Mountain Range. The Swartberg Mountains along Alternative 2 is located in an area where it is less mountainous around its base, and the potential of inter-visibility with its surroundings is higher;
- The mountains are in a pristine natural condition and are an important conservation area. It is also a proclaimed World Heritage Site. Its ecological value establishes a strong sense of wilderness. The mountain range is a unique natural attribute that provides an identity to the region and is also valued for its perceivable beauty and scenic qualities. Snow-capped mountain peaks are often present during winter;
- It is unique in its context, dividing the Groot and Klein Karoo. It is one of the few untouched, pristine, natural environments in South Africa, and is considered a scarce visual resource on an international scale. Its ecological value is supported by the fact that it is a World Heritage Site; and
- An existing high voltage as well as a lower voltage power line follow the same route as proposed by Alternative 1 over the Swartberg Mountains. It provides a baseline condition that is already impacted by power infrastructure. No high voltage power lines could be identified over the Swartberg Mountains along Alternative 2. Although the entire Swartberg Mountains LS is considered highly sensitive, the area over which Alternative 2 passes is regarded as even more sensitive towards electrical infrastructure due to its lower VAC and lack of existing high voltage power line development.

5.9.3 Klein Karoo Mountains

The Klein Karoo Mountains are considered **highly** sensitive due to the following reasons:

- VAC is generally very high due to the undulating and mountainous terrain and the positioning of access roads, mainly in the valleys. In some instances, the road passes over a crest and

panoramic views are observed down the valleys and over the mountaintops. VAC near Uniondale is considered lower, as the topographic elevation is less exaggerated and panoramic views are more regular;

- Inter-visibility is considered limited;
- The mountains are mostly covered with natural vegetation, but concentrated farming is present along the Nels and Kango Rivers. The agricultural land use is in visual harmony with its natural context, and interesting and visually pleasing views are often experienced along the roads. A predominantly natural landscape character prevails, with rural features such as farms and the occasional tourist accommodation. The part of the study area near Uniondale provides interesting topographical features through Potjiesberg Pass, and panoramic views are often present along the N9;
- The Klein Karoo Mountains stretch over a large area along the southern part of the Swartberg Mountain Range. It is considered an environment with pristine and semi-natural attributes, with concentrated agriculture in some of the valleys. It provides high scenic value and is an uncommon visual resource on a national scale; and
- An existing high voltage as well as a lower voltage power line follow the same route as proposed by Alternative 1 through the Klein Karoo Mountains. It provides a baseline condition which is already impacted by power infrastructure.

5.9.4 Klein Karoo

The Klein Karoo is generally considered **moderately** sensitive due to the following reasons:

- VAC is moderate owing to the varied topography near Kammanassie Dam, but evens out towards Dysseldorp in the north and the Outeniqua Mountains in the south. In these regions the VAC is considered low and the landscape is exposed;
- There is a much greater possibility for inter-visibility in the northern part near Dysseldorp and the southern part near the foot of the Outeniqua Mountains. The topography is even and creates large plains around the Olifants River near Dysseldorp, as well as along the northern foothills of the Outeniqua Mountains. The central part has a varied topography with rolling hills and small ridges that limit inter-visibility between parts of the study area;
- This part of the Klein Karoo is predominantly used for agriculture, with large pasture fields on the plains. The more mountainous central region has a degree of naturalness in the valleys and hillsides, but ostrich farming is also prominent. The Kammanassie Dam and the agricultural activity in the Kammanassie River valley are visually interesting and provide scenic value. Other individual natural features such as the flowering aloes, as well as smaller valleys and ridges, provide visual variety to the predominantly rural landscape character;
- Ostrich farming is a unique agricultural activity associated with the Klein Karoo. It provides an identity that the Klein Karoo is famous for, and the large ostrich flocks sometimes provide visual interest from a tourist's perspective. It is considered a unique identity on a national scale, but very common in the region;
- An existing high voltage power line follows the same route as proposed by Alternative 1 through the Klein Karoo. It provides a baseline condition which is already impacted by power infrastructure.

5.9.5 Outeniqua Mountains

The Outeniqua Mountains LT is considered **highly** sensitive due to the following reasons:

- VAC is considered medium. The mountainous terrain provides a high potential for screening, but both alternatives pass through areas that has a medium VAC. These areas are comprised

of the entire Langkloof valley along the N9, Waboomskraal valley, as well as the top section of the Outeniqua Pass between Langkloof and Waboomskraal;

- Inter-visibility is considered medium. The Langkloof and Waboomskraal valleys are relatively open, and distant views are often uninterrupted. It is however contained within the Outeniqua Mountains LT;
- The mountain slopes and peaks are in a pristine natural condition and are important conservation areas. Its ecological value establishes a sense of wilderness, but a prominent agricultural character is present in the Langkloof and Waboomskraal valleys. The mountain range is a unique natural attribute that provides an identity to the region and is also valued for its perceivable beauty and scenic qualities. The Langkloof and Waboomskraal valleys are established scenic areas due to the unique farming practices associated with the hop-plantations, together with the farming history in the Langkloof dating back to the 1760s;
- The mountain range stretches over several 100 kilometres and provides a backdrop to the highly acclaimed Garden Route. It is one of the few untouched, pristinely natural environments in South Africa, and is considered a scarce visual resource on a national and international scale. The farming practices in Waboomskraal are very unique in the South African context; and
- Existing high voltage power lines traverses the Outeniqua Mountains and Waboomskraal valley along the same route as proposed by Alternative 1. It provides a baseline condition which is already impacted by power infrastructure. A power line, supported by gum pole structures, also follows the N9 through Langkloof, but is considered relatively unobtrusive.

5.9.6 Summary

The EIA phase VIA has assessed the potential visual changes that may occur as a result of the construction and operation of a new 400 kV transmission line between the Droërvier and Narina Substations. The study area is predominantly a rural area, with the exception of a few relatively small towns. The viewers that are mostly affected are motorists, tourists and farming communities. Overall, a relatively low to medium viewer incidence is expected apart from the areas where major transport routes are crossed or are running parallel to the proposed routes. Highly sensitive viewers and viewer groups occur all along the proposed routes. Concentrations of highly sensitive viewers have been identified as:

- Residents of Dysseldorp and Uniondale;
- Motorists on the scenic routes such as the N9 through Langkloof to Willowmore and on the N12 section through Waboomskraal; and
- Tourists visiting the tourist attractions and overnight facilities that are within the ZMVE;

A high risk of cumulative visual impacts will be experienced along Alternative 1 as the route is proposed alongside an existing transmission line and lower voltage power line. These parallel running power lines increase the visual dominance of electrical infrastructure, and contrast with the rural or pristine natural character that prevails.

Reduction and remediation mitigation will not be effective to prevent residual impacts from occurring. The proposed transmission line will remain visible unless major design or alignment changes are implemented. The option of consolidating existing lines into the design of the new transmission line is regarded as very effective and is highly recommended to prevent major cumulative impacts. Although cumulative impacts may still occur, the significance thereof will be reduced and the breaching of a visual intolerance threshold may be avoided.

Avoiding sensitive landscape features and observers is regarded as being the most effective mitigation measure in reducing direct, cumulative and residual impacts. This is, however, a complex

measure to implement, and is reliant on technical/feasibility studies as well as a much larger study area assessment to ensure that other sensitive features and observers are not impacted. Due to these unknown factors, avoidance mitigation is only proposed within the 2 km corridor that will reduce visual impacts on certain receptors.

The **most preferred route is Alternative 1** as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on landscapes that are free of transmission lines, thereby spreading the impact. Empirical research has indicated that two parallel running power lines are considered below the visual tolerance threshold in most cases, but three or more power lines nears, or exceeds, the threshold, increasing cumulative impacts to unacceptable levels. This is especially relevant in landscapes with high scenic value or high tourist potential as is found in parts of the study area. Without drastic mitigation measures, these impacts will remain high.

5.10 Wetlands and Surface Water Bodies

The Scoping Phase freshwater assessment was updated for the EIA Phase for the proposed Eskom Project between the Blanco and Droërivier Substations (Blue Science, 2016). See **Appendix 4.4** for findings of the study.

The following water features were identified and assessed within the study area:

- Gouritz River System: Upper Gamka River tributaries in the Quaternary Catchments J21A/B/C/E; J23B/D, J32A, as well as the Olifants River and its tributaries in the Quaternary Catchments J31A-D; J32A/E; J33C/E/F; J34A-F; J35B;
- Southern Cape Coastal Rivers: Upper Maalgate River (K30A) and Upper Keurbooms River (K60A);
- Gamtoos River System: Upper Groot/Sout River tributaries in the Quaternary Catchments L11G; L30B; and
- Some valley-bottom/floor wetlands that are largely associated with the rivers as well as some seeps and pans.

The habitat integrity of the rivers range from being largely natural (upper reaches of the larger rivers as well as the smaller streams) to being in the seriously modified ecological state (lower reaches of the larger river systems). The riparian habitat of these rivers tends to be more impacted by the direct impact of the surrounding land use activities which has resulted in removal of the natural indigenous vegetation and the subsequent growth of invasive alien plants. Within the instream habitat, water abstraction and flow modification have the most impact, particularly on the lower reaches.

The wetland areas are predominantly valley bottom wetlands that are linked to the rivers with their ecological condition and importance directly linked to that of the rivers. Some smaller seeps are also located on the mountain slopes of the Outeniqua Mountains that are still in a natural condition. The pans along the Alternative 2 corridor near Beaufort West are considered to be in a largely natural ecological state. Olifants River in particular has been identified as FEPA river and a Fish Sanctuary Area as the river contains populations of an endangered fish species (Small-scale *redfin P. asper*).

The proposed Alternative 2 crosses more sensitive areas such as the many smaller tributaries and associated wetlands of the Kammanassie River in the Little Karoo as well as the large area of pans near Beaufort West. With mitigation, Alternative 1 is likely to have an impact of a very low significance on the freshwater features while Alternative 2 is likely to have an impact of lower significance. The

map below shows the wetlands and rivers, and the condition of the wetlands in the study area. It is clearly noted that the Alternative 2 crosses fewer drainage lines and wetlands.

6 DESCRIPTION OF ISSUES AND POTENTIAL IMPACTS

6.1 Identification of Potential Impacts

An important element of the impact assessment process is to evaluate the issues that were raised during the Public Participation Process (see Appendix 2 of the FEIAR) and technical processes and ensure that those identified as key issues are included within the scope of the EIA process. In addition, scoping allows for the identification of the anticipated impacts, particularly those that will require detailed specialist investigations (see Appendix 4 for reports) .

This section of the report aims to predict the potential impacts likely to occur from the undertaking of the proposed activities. The activities that are associated with the construction, maintenance and operation of the proposed power line and substations, which could potentially have an impact on the environment, are also highlighted in this section.

In addition, the Department of Environmental Affairs guide on assessing cumulative effects⁶ describes that it is not practical to analyse the cumulative effects of an action on every environmental receptor. Therefore, for cumulative effects analysis to help the decision-maker and inform interested and affected parties, it must be limited to effects that can be evaluated meaningfully. This chapter will highlight potential impacts and issues that can be evaluated.

6.2 Possible Impacts on Topography, Geology and Soils

6.2.1 Topography

The Karoo section of the Alternative 2 alignment has much less dramatic topographic variations than Alternative 1 (that is aligned over the Swartberg Mountains near Meiringspoort) The much longer Alternative 2 was proposed for this reason – to avoid steep mountainous areas that will make installation of pylons and lines problematic and more expensive, but more important – to avoid the visual impact that the infrastructure may have on a UNESCO heritage site, the Swartberg Nature Reserve. In 2004 the Cape Floral Region (of which the Swartberg mountain forms part) was declared the sixth World Heritage Site in South Africa.

6.2.2 Geology and soils

For the southern half of the area, parent material comprises a range of folded sediments, including arenite, shale, tillite and conglomerate of the Cape Fold Mountain Belt. North of the mountains, the underlying material is mainly mudstone and sandstone of the Teekloof Formation, Adelaide Subgroup, Karoo Sequence, along with occasional dolerite intrusions (Geological Survey, 1984). Quaternary

⁶ DEAT (2004) *Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7*, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

alluvium occurs extensively in many of the lower-lying parts in the north-east, but neither route alternative crosses this area.

The terrain along the Karoo section of Alternative 1 and 2 servitudes is relatively flat with gentle slopes in most places, which suggests that slope stability problems are unlikely. Erosion through surface run-off should be insignificant with the exception of areas near watercourses.

During tower foundation excavation, bush clearing and earth grading will be done in order to provide vehicle access to the towers. Depending on location, this may lead to soil erosion. This will be localized rather than an extended linear disturbance. If in close enough proximity to streams and other water courses, erosion or poor management of stockpiles or materials may impact directly on the river in the form of siltation and pollution. This would be significant should it occur in the streams or other water bodies. Major impacts are anticipated to occur during construction only.

Transported soils are likely to be encountered over large parts of the study area, particularly in areas defined as Southern Karoo Riviere vegetation units. These soils are frequently potentially compressible. Due to the low permeability of both the soil and the underlying rock the transported soils have a tendency to be wet for a relatively long time. Even though these soils may be relatively shallow and overly rock, it will be difficult to traverse the soils during the rainy season with machinery or vehicles. The alluvial soils are transported by sheet flooding and consist of sandy clays and clayey sands which may be expansive.

Rocky areas along the area of Alternative 1 that is proposed over the Swartberg Mountains are expected to complicate the placement of pylon structures. Visual impact in mountainous areas is another concern.

6.3 Possible Impacts on Land Use

The land in the study area is used mainly for small stock grazing due to the climatic and soil constraints. The agricultural potential is relatively low due to the low rainfall, but large areas are dedicated to ostrich, sheep and cattle farming. The areas surrounding Klaarstroom, Kammanassie and Dysseisdorp are sensitive in this regard and placing of pylons would be an issue to be carefully considered. The Waboonskraal area to the West of George supports intensive irrigation farming such as vegetables and fruit.

Impacts can be expected where the alignment would be in close proximity to the dwellings and/or homesteads of the affected farms. Due to the vastness of the study area and size of the farms in the Karoo in particular, it is however possible that the negative impacts in this regard can be mitigated.

In many instances, limited public and farm access routes exist. Additional access roads would thus have to be constructed even in the case of Alternative 1 which is situated in relative close proximity to the N12. Internal farm roads have been created at great costs for the farmers and were not designed to accommodate heavy construction vehicles. The main negative impact associated with the movement of the construction vehicles is the temporary access roads that would have to be created to enable the vehicles to access the actual construction areas. Heavy vehicles transporting the pylons could thus result in increased risk of accidents, dust creation, degradation of local roads and possible erosion. As this would result in severe negative intrusions on the private properties and possible environmental degradation (e.g. damage to veld and erosion), an intensive consultation process with property owners during the negotiation phase and prior to the construction of these roads would be

critical. Property owners could provide valuable information with regards to the sensitivities of their land and the best routes for the access roads.

Existing Eskom access roads (for the distribution lines) are said to have already create erosion (e.g. animals walking along these tracks creating permanent unwanted paths). With the limited roads and road infrastructure currently present in the study area, and the existing experience with Eskom's access roads, such heavy construction vehicle movement and new access roads, whether temporary or permanent could result in severe negative impacts on previously unspoilt areas and could create further erosion problems. This impact is possible along both Alternatives. The significance of the impact will be assessed during the EIA phase.

A limited impact on existing infrastructure and services are anticipated during the construction phase. Existing road crossings are limited and are expected to successfully respond to project management and mitigation measures. Care should further be taken to avoid placing towers within the water furrows made by property owners, and to take cognisance of farmer's planning where pivot points are concerned. The property owners in the vicinity of Narina SS have indicated that the centre pivot irrigation system on their farms would be initiated or expanded. The line alignment should thus take this in consideration and should avoid having any impact on such possible farming activities and infrastructure.

Maintenance activities would be undertaken only when required for the life of the line. It is not anticipated that this would have severe negative intrusions on the landowners, mainly due to the size of the affected properties (lines could be situated far away from homesteads and other dwellings) and the fact that stock farming activities such as grazing could continue underneath the proposed line and within the servitude. However, complaints were received during the PPP process (March-April 2015) regarding the maintenance of power lines. Issues include the following:

- The need for additional access routes which could result in erosion, intrusion, loss of land;
- Maintenance personnel leaving gates open;
- Maintenance personnel driving on private roads without obtaining permission first;
- Maintenance personnel driving through the veld;
- Littering during construction and maintenance;
- Maintenance personnel accessing properties without prior notification and
- Illegal capturing or poaching of game and other livestock and theft of plants.

The effects of misconduct such as those mentioned above could result in long-term secondary negative impacts with possible negative financial implications for farmers and damage to the environment. For the maintenance activities of the line, proper conduct and mitigation measures could address the possible negative impacts.

Operations at the substation are anticipated to be of a low input and are thus not expected to negatively impact on the daily living and movement patterns of the affected residents. Access to the substation already exists, thus it is anticipated that the existing status quo at the substation would continue.

Typical agricultural activities undertaken in the study area refer to sheep and goat (Angora, Boer Bok) farming, cattle farming, hunting, lucern production and crop production (vegetables & fruit e.g. strawberries). During the construction phase, the possibility of stock losses due to theft and/or poaching, increase in noise and the actual construction activities placing stress on the animals, would

remain of concern. Livestock should thus be moved away from the construction activities and/or be fenced off. This could intrude on the implementation of the rotational grazing system used by farmers.

On various properties in the area, the farmers created stock watering dams. Due to the arable land, the farmers' are dependent on these systems, in addition to the groundwater for their subsistence, livestock and irrigation needs. It is important to avoid negatively impacting on the water berms with the tower footprints and/or servitude alignment. The maximum distance between towers for a 400 kV transmission line varies from 350 metres to 400 metres and it might thus be possible to span these berms.

As sheep farming can be seen as the main agricultural activity in the study area, the impact of the transmission line and towers, once operational, on the land-use would be limited. Farming of sheep could continue undisturbed as the animals are allowed within the servitude. Should possible negative impacts occur in this regard, the study area lends itself to mitigation through re-routing of the alignments in such areas.

The proposed project (Alternative 1 and 2) is located to the south of Beaufort West and thus will not impact upon the town itself however, farming activities in the area of the Droërvier substation should be kept in mind when the proposed power lines are erected.

Due to the location of the Narina Transmission substation to the north of George, the proposed project (both alternatives) should not impact upon the town itself however, cultural/heritage value of the Blanco area should be kept in mind when the proposed power lines are erected.

Alternative 1 is located in close proximity to the town of Klaarstroom and the farming and cultural/heritage (tourism) value of the town should be kept in mind when the proposed power lines are erected. Discussions with local residents and farmers were held during the Public Participation Process. See Appendix 2 for PP Report.

6.4 Impacts on the ecology

6.4.1 Vegetation

During the Scoping Phase, a Botanical desk top study was done by Regalis Environmental Services, and that report was attached to the FSR. For the **EIA Phase in 2016**, **Envirovolution Environmental Consultants (Pty) Ltd** has commissioned **EnviroNiche Consulting**, to undertake a floristic impact assessment to determine the impacts which may be triggered by the proposed development. The report can be reviewed as **Appendix 4.1** of the Final EIA Report.

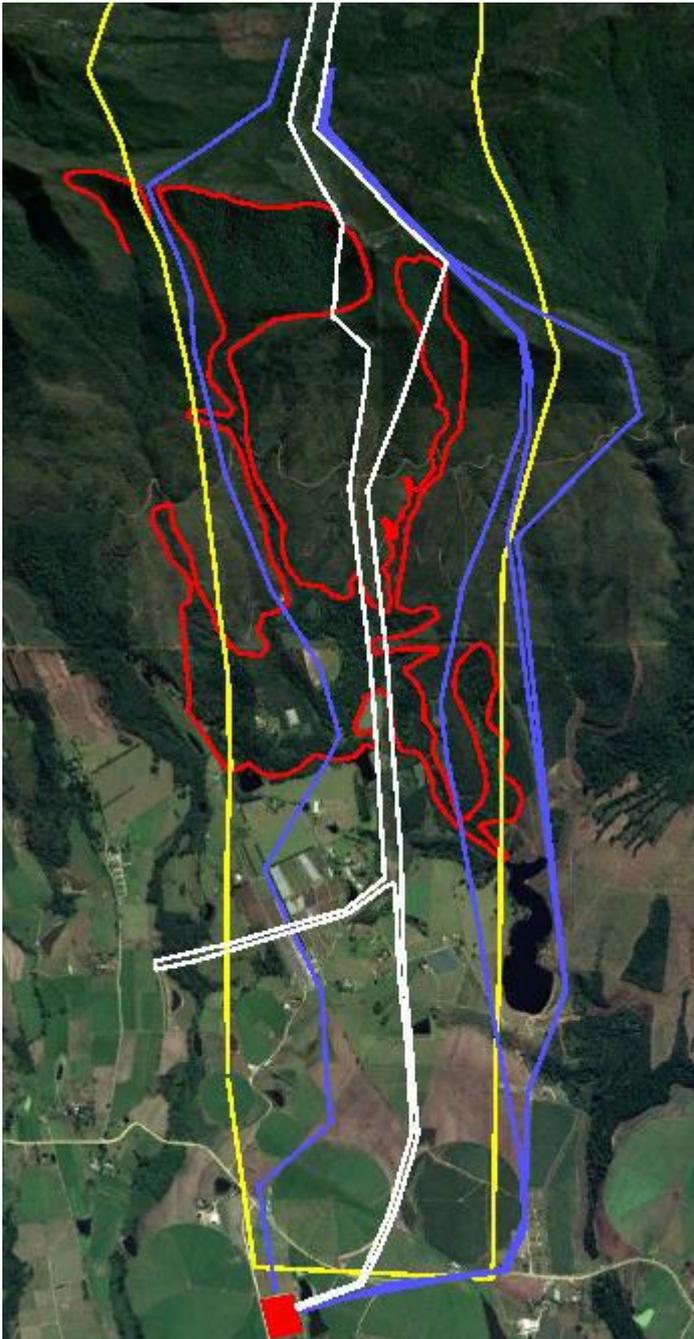
Ecological sensitivity: The sensitivity assessment identifies those parts of the project site that will have a medium to high conservation value or that will be sensitive to disturbance. Areas containing untransformed natural vegetation, high diversity or habitat complexity, Red List organisms or systems vital to sustaining ecological functions are considered sensitive. In contrast, any transformed area that has no importance for the functioning of ecosystems is considered to have a low sensitivity. There are features within the project site or just outside of the project site that may be considered to have a medium conservation value, as follows:

- Streams (perennial & seasonal) and wetlands (pans): Episodic streams and pans with a medium sensitivity occur on the plains between Beaufort West and the foot slopes of the

Swartberg Mountain range. The slopes of the Swartberg Mountains as well as the Outeniqua Mountains are also drained by many seasonal streams.

- Sensitive vegetation: The plant communities in the Nama-Karoo, Fynbos, Renosterbos and Forest biomes can all be regarded as sensitive. Although the some vegetation types such as the Gamka-Karoo occur over an extensive area, the species composition is still unique and a number of bulbous species and succulents occur.
 - Nama-Karoo, Fynbos, Renosterbos: The vegetation will be destroyed at the footprints of the power line pylons because construction vehicles and people will be moving around the construction site. It is also one of ESKOM's maintenance policies to clear the trees and shrubs under the power lines to lower the fuel load of the vegetation. By doing so they want to prevent fires to occur under or near power lines. This activity can potentially destroy the shrubs such as *Protea*, *Leucodendron*, *Erica*, *Brunia* and others. Because both actions (the cutting of shrubs as well as the prevention of fire) may destroy fynbos species. Fynbos is fire dependent and requires fire to stimulate seed germination and the vigor of fynbos vegetation (please refer to Appendix 4.1 for mitigations)
 - Forests: There is only one alternative (corridor) to cross the Outeniqua Mountain Range. The forest occurs in pockets along the Outeniqua Mountain's southern slopes. Forest vegetation will be destroyed at the footprints of the power line pylons. It is also one of ESKOM's maintenance policies to clear the trees and shrubs under the power lines to lower the fuel load of the vegetation. By doing so they want to prevent fires to occur under or near power lines. This activity can potentially destroy trees such as *Ocotea bullata*, *Afrocarpus falcatus*, *Podocarpus latifolius*, *Curtisia dentata*, *Pittosporum viridiflorum* and some fynbos shrubs such as *Protea*, *Leucodendron*, *Erica*, *Brunia* and others.

It will be difficult to choose an ideal route through the existing infrastructure (centre pivots, hothouses, crop fields, dams, farmsteads and timber forests) as well as natural forests. **Figure 8** indicates suggested line routes (Options A, B, C, & D) which aim to avoid as much natural forest as possible. Options C and D are partly outside the 2 000m corridor.



- **Figure 8:** A Google image of the southern slopes of the Outeniqua Mountains. Note the pockets of Southern Afrotemperate Forests (red areas) and the cleared vegetation where existing power lines are (white lines). The yellow lines indicate the corridor within which the proposed power line must fit. The red square is the Narina substation and the blue lines are possible route options (A, B, C & D).Threatened and protected plant species: There are a number of protected and Red Data species present along the powerline routes. There are 241 Red Data species noted in the quarter degree squares over which Alternative. 1 is planned. There are 259 Red Data species noted in the quarter degree squares over which Alternative 2 is planned. It is not to say that all these Red Data species occur in the power line corridor.
- Critical Biodiversity areas (CBAs), Ecological support areas, Threatened Ecosystems and Protected areas: Cape Nature published a new biodiversity sector plan for the Western Province. According to the Western Cape Biodiversity Sector Plan (WCBSP) (2017) the power

line corridors (Alternatives 1 & 2) cuts across many newly identified Critical Biodiversity Areas (CBAs), Ecological Support Areas (ECAs) as well as protected areas (WCBSP) (2017).

Possible impacts:

Construction: Impacts on vegetation and protected plant species, consequences of the impact occurring may include:

- general loss of habitat for plant and animal species;
- general reduction in biodiversity;
- disturbance to processes maintaining biodiversity and ecosystem goods and services;
- and
- loss of ecosystem goods and services: Loss of connectivity and habitat fragmentation happened already because it is a transformed area situated under the existing power lines (construction scars, access roads and bush clearing)
- erosion risk may result due to the loss of plant cover and soil disturbance created during the construction phase especially in areas where the vegetation cover is already sparse;
- bush clearing will also destroy the trees and shrubs under power line.
- The prevention of fire by cutting the shrubs and trees can potentially eliminate *Protea*,
- *Leucodendron*, *Erica*, *Brunia* and other shrub species from the power line corridor. Fynbos species are fire dependent and requires fire to stimulate seed germination and vigor of fynbos vegetation. Fire suppression actions in the long run could cause species composition change in the proximity of the power line;
- Major factors contributing to an invasion by alien invader plants include habitat disturbance and associated destruction of indigenous vegetation.

Operation: Maintenance activities may include:

- Bush clearing will also destroy the trees and shrubs under power line.
- The prevention of fire by cutting the shrubs and trees can potentially eliminate *Protea*, *Leucodendron*, *Erica*, *Brunia* and other shrub species from the power line corridor. Fynbos species are fire dependent and requires fire to stimulate seed germination and vigor of fynbos vegetation. Fire suppression actions in the long run could cause species composition change in the proximity of the power line;
-

Both powerline routes are along sections of existing powerlines which cut through the Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). In terms of the impacts on the plants and vegetation types which could be affected by the proposed power line both these two options will have relatively similar impacts, namely disturbance of natural vegetation (trampling, road construction, bush clearing) creation of disturbed habitats for alien invasives. However in the case of Alternative 1 the distance of affected areas in a particular CBA is relatively short because it crosses the CBAs and ESAs in a perpendicular way. Alternative 1 goes also through an UNESCO-listed World Heritage Site. The implication of this is that the Swartberg Nature Reserve might lose its World Heritage Status if another power line and its associated infrastructure is being constructed through this nature reserve. Furthermore the regular cutting of the fynbos to maintain a low fuel-load under the power line is another impact which could jeopardise the status of this reserve. The absence of fire could also alter plant species composition in the long run because most fynbos species are dependent on frequent fires – something that ESKOM would try to prevent along the power line route.

6.4.2 Fauna

During the EIA phase investigations, the vertebrate specialist (EOH 2016, see report as Appendix 4.2) has identified the following main impacts that are likely to be caused by power lines being constructed along either Alternative Route 1 or 2:

- Habitat loss and fragmentation
- Loss of Reptile Diversity
- Loss of Amphibian Diversity
- Loss of Mammal Diversity
- Loss of Bird Diversity
- Impact of Dust and Noise

1. Habitat loss and fragmentation

During construction, there will be some loss of faunal habitats through the clearing of vegetation for service/access roads and the construction of pylon bases. The extent of habitat loss will be dependent on how many new service/access roads need to be made and the number of pylon bases. This is usually a loss of vegetation (plant communities) that supply food or shelter, but may include abiotic features such as the loss of temporary wetlands, caves or a rocky outcrop.

Alternative 1 will pass through a range of protected areas and CBAs such as Groot Swartberg NR and NPAES areas (Lower and Upper Karoo), the Bruinrante SKEP area, and the Swartberg Mountains IBA. Sensitive areas that this route may impact on are the Outeniqua and Swartberg Mountains Protected Areas and IBAs and various rivers and drainage lines which will need to be traversed. The riparian areas between the Swartberg Mountains and Beaufort West provide habitat for the Critically Endangered Riverine Rabbit (*Bunolagus monticularis*). Construction of pylon hardstands and road infrastructures through these habitats could have a significant impact on an already fragmented population of the species. Habitat loss and fragmentation will definitely occur. However, the presence of an existing powerline on the route is a mitigating factor.

Alternative 2 will avoid the Swartberg NP and the Bruinrante SKEP area but pass through the Swartberg Kamanassie Gamkaberg NPAES areas. The most sensitive areas that this route may impact is a complex wetland cluster, the Vetkuil SKEP Amphibian Hotspot, and various other river and drainage line which will need to be traversed. Although Alternative 2 avoids many of the highly sensitive areas identified along Alternative route 1, there are no existing power lines in this area and therefore the need for the construction of new service/access roads is much greater and this will require a greater clearance of vegetation from faunal habitats. Construction of pylon hardstands and road infrastructures through these habitats could significantly fragment faunal populations. The route option is also significantly longer than Alternative 1. Habitat loss and fragmentation will definitely occur.

During operation there will be the need to keep the area beneath the power lines clear which will involve grass cutting and shrub clearance where necessary. The creation of new roads may provide access to new areas which may increase poaching rates or natural resource use.

2. Loss of Reptile Diversity.

There is the potential for some reptile species to be disturbed and possibly killed by the construction activities where service/access roads and pylon bases impact reptile habitats. During operation there will be a continued risk to reptiles as a result of road kills on the service/access roads.

3. Loss of Amphibian Diversity.

There is the potential for some amphibian species to be disturbed and possibly killed by the construction activities for either of the two alternatives where service/access roads and pylon bases impact amphibian habitats. The majority of amphibians are associated with wetland and/or river habitats and so there is less likelihood of encountering amphibians compared to reptiles. However, the proposed **Alternative 2** route does traverse the Vetkuil Amphibian Hotspot which provides a highly isolated habitat relied on by numerous amphibian species. As there are no existing service roads on this proposed route option, there may be the need to cross wetland or riparian areas.

There should be fewer chances of additional loss of amphibian diversity once operational although the use of service/access roads may cause some amphibians to be killed, and pollution of wetlands and/or rivers may affect amphibian populations.

4. Loss of Mammal Diversity.

Construction: There is a possibility for both **Alternative 1 or 2** that some mammal species may be impacted as a result of the clearing of vegetation for service/access roads and the construction of pylon bases. The most notable and sensitive species which could be affected is the Critically Endangered Riverine Rabbit (*Bunolagus monticularis*). Nocturnal mammal species may be killed on the roads if there is an increase in the number of project vehicles using roads at night.

Operation: There should be few chances of additional loss of mammal diversity once operational although the use of service/access roads may cause some mammals to be killed. The creation of new roads may provide access to new areas which may increase poaching of some mammal species

6.4.3 Avifauna

A field survey was carried out by the specialists from the 22nd to the 27th of July 2016. Transects were conducted during daylight hours to record all bird species encountered during the survey. Habitats pre-defined as having a high avifaunal sensitivity or known nesting/roosting sites of species of conservation concern were mapped prior to the field trip. These areas were all actively surveyed with the aim of ground-truthing habitats in order to make accurate species composition associations. Apart from the pre-defined sensitive areas, the field survey was conducted using an opportunistic approach to list bird species encountered along the proposed route options.

Areas and habitats surveyed include:

- North and South Facing slopes of the Outeniqua Mountain Range;
- Four sections of the Klein Karoo (proposed alternative 1);
- North and South Facing slopes of the Swartberg Mountain Range;
- Riparian and rocky habitats between the Swartberg and Beaufort West;
- Riparian areas between Beaufort West and Willowmore (proposed alternative 2);
- Rocky outcrops in the Uniondale area;
- And at four locations on the N9 between Uniondale and Outeniqua Pass.

Site sensitivity: The sensitivity map (**Figure 9**) was developed using available spatial planning tools (e.g. SKEP Bird Areas, NFEPA, IBAs, Protected Areas, CBAs, etc), distribution ranges of SCC, process areas such as perennial rivers and pristine wetlands, and specialist avifaunal knowledge. Areas defined as “sensitive” during the desktop scoping phase were visited during a field survey to verify sensitivities and conduct checklists of species present on site, as well as the likeliness of species to occur within areas due to habitat preferences.

Identified **No-Go** areas for pylon hardstands (unless recommendations and mitigation measures are implemented) include:

- **Rocky outcrops** on the Swartberg Mountain range (IBA) and Outeniqua Mountain range (IBA) which provide suitable breeding/nesting sites for raptors of conservation concern.
- **All breeding and roosting sites** encountered during the construction phase (e.g cormorant and falcon nests – see #2 on the sensitivity map).

Identified areas of **high sensitivity** include:

- Important Bird Areas (IBAs);
- SKEP identified hotspots for birds; and
- Formal Protected Areas.

Areas of **medium sensitivity** include:

- 5km buffer around IBAs;
- Critical Biodiversity Areas; and
- Wetlands and Rivers.

Areas of **low sensitivity** include:

- Areas that are highly impacted by current land use and provide little value to the ecosystem; and
- Highly degraded areas.

An avifaunal sensitivity map has been created to illustrate areas of high, medium and low sensitivity (Figure 9). This map has been created as a guide to identify the preferred route for the field survey.

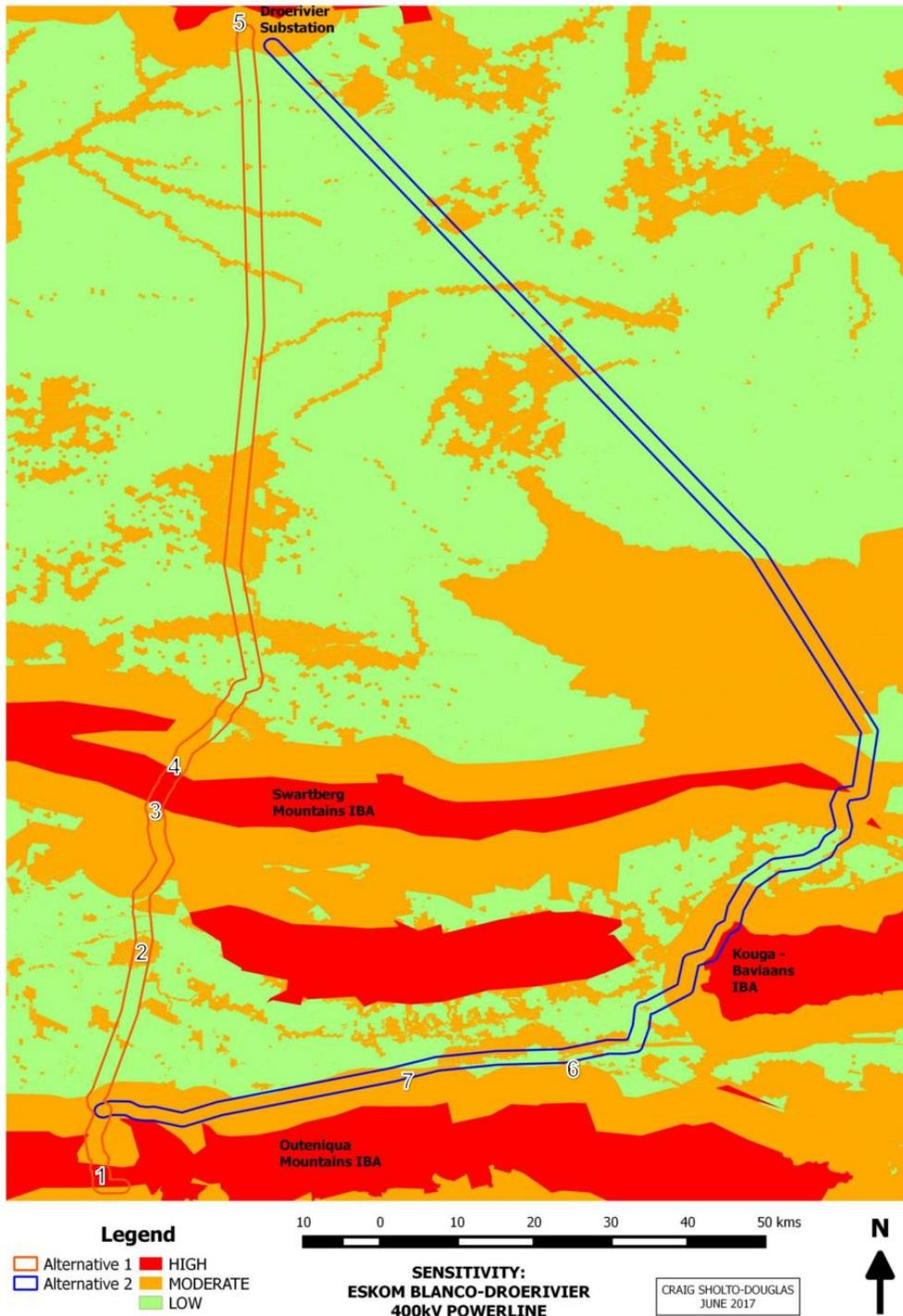


Figure 9: Avifaunal sensitivity map of the project area

Possible impacts:

The main impacts likely to be caused by power lines being constructed along either Alternative Route 1 or 2 will include:

1. Loss of Bird Habitat:

Construction: There will be some loss of bird habitat through the clearing of vegetation for service/access roads and the construction of pylon bases. The extent of habitat loss will be dependent on how many new service/access roads need to be made and the number of pylon bases required. This is usually a loss of vegetation (plant communities) that supply food and shelter, but may include abiotic features such as the loss of temporary wetlands, caves or rocky

outcrops, which provide suitable nesting or roosting sites. Alternative 1 route will pass through the Outeniqua and Swartberg Mountains IBAs. As the Swartberg Mountains are classified as a UNESCO World Heritage Site, the destruction of habitat within the Swartberg classifies the impact as having an 'international' extent. **Alternative 2 route** will pass the most eastern section of the Swartberg Mountains IBA and intersect the Kouga-Baviaanskloof Complex IBA.

Operation: During operation there will be the need to keep the area beneath the power lines clear which will involve grass cutting and shrub clearance where necessary.

2. Disturbance and Displacement of Birds:

Construction: Birds will be disturbed by the powerline construction activities (e.g. noise, dust, operation of heavy machinery, anthropogenic activities). There is the potential for some nesting birds to be displaced (particularly breeding eagles) during construction activities where service/access roads and pylon bases are located within a close proximity to nesting sites. This impact will have a regional extent due to the number of bird SCC, including Verreaux's Eagle (*Aquila verreauxii*), which inhabit both the Outeniqua and Swartberg Mountain ranges.

Operation: Birds will utilise pylons to construct nests or to use as roosts. There will be continued disturbance during the operation of the powerline due to maintenance activities. The powerline infrastructures can also act as a barrier for birds in flight, and can influence flight paths of migratory species. **For alternative 2**, as there is no existing powerline along this route option, the barrier effect will be greater than alternative 1 as birds will not be accustomed to powerlines along the route. This barrier separates three IBAs (Swartberg, Outeniqua, and Kouga-Baviaanskloof Complex). The migration of bird SCC (particularly raptors) between these IBAs is highly likely

3. Loss of Bird Diversity and Species of conservation concern

Construction: Some birds, particularly nocturnal species such as owls and night-jars may be killed on the roads if there is an increase in the number of project vehicles using roads at night.

Operation: The main issue during the operation phase is the possibility of bird species colliding with the power lines while in flight or being electrocuted by contacting live parts of the system. As there are numerous bird species of conservation concern which inhabit the project area, the likelihood of collision is high and the potential impact is significant. The length of the power line and the abundance of habitats associated to different bird species compositions further exacerbate the potential impact. Although **proposed route Alternative 2** avoids bisecting the Swartberg Important Bird Area (IBA) it does border the Kouga-Baviaanskloof Complex IBA. The proposed Alternative 2 is substantially longer than proposed Alternative 1 and so has more power lines for birds to encounter. During the field survey flocks of over 50 of the globally Vulnerable Blue Crane (*Anthropoides paradiseus*) were observed utilising the agricultural lands which run along the northern perimeter of the Outeniqua Mountain Range

6.5 Impact of Dust and Noise.

Construction: The impacts of noise and dust are likely to result from the construction of the various components of the power lines. Roads especially are known to alter physical characteristics of the environment and it is likely that all species may be affected to some extent. Amphibians are likely to be the most impacted by an increase in dust levels. Unmitigated dust can increase the turbidity of streams and wetlands which may in turn inhibit amphibian's ability to feed and breed.

Construction and associated vehicle traffic will create noise pollution that can depress local populations of sensitive faunal groups. Animals differ in the degree to which they tolerate such disturbance, and can be expected to have potentially negative and positive impacts on various faunal groups. Large breeding birds do not usually tolerate continuous disturbance. Increased noise and motor vibrations in wetlands may also impact amphibian breeding choruses, but these impacts will be localised and many amphibian species are surprisingly tolerant of vehicle noise. Noise pollution will occur during all phases (construction, operational, and decommissioning/ closure) and is difficult to mitigate.

Operation: While the number of vehicles using the service/access roads during the operation phase will be greatly reduced they will still create dust and noise which could impact faunal populations in the area.

6.6 Possible impacts on Wetlands and Surface Water Bodies

The specialist study that was conducted by Blue Science (Appendix 4.4) has stated that “construction may lead to some direct or indirect loss of or damage to seasonal wetlands or drainage lines”. This will lead to localised loss of wetland habitat and may lead to downstream impacts that affect a greater extent of wetlands or impact on wetland function. Where these habitats are already stressed due to degradation and transformation, the loss may lead to increased vulnerability (susceptibility to future damage) of the habitat. Physical alteration to wetlands can have an impact on the functioning of those wetlands. Consequences may include:

- Increased loss of soil;
- Loss of or disturbance to indigenous wetland vegetation;
- Loss of sensitive wetland habitats;
- Loss or disturbance to individuals of rare, endangered, endemic and/or protected species that occur in wetlands;
- Fragmentation of sensitive habitats;
- Impairment of wetland function;
- Change in channel morphology in downstream wetlands, potentially leading to further loss of wetland vegetation;
- Change in runoff and drainage patterns; and
- Reduction in water quality in wetlands downstream of road.

The specialist study stated that “*it is often the access roads associated with the transmission lines that are likely to have a greater impact on the freshwater features than the power lines themselves*” as the lines can usually span the freshwater features such that the pylons can be constructed outside of the rivers and wetland areas as well as their recommended buffer areas, whereas the roads need to be constructed through the freshwater features. It is thus often best if the new power lines are placed adjacent to existing lines or roads where new roads do not need to be constructed as part of the project.

Water resources are scarce in the Karoo region, but as a whole, the shorter Alternative 1 has the potential to impact on fewer of the freshwater features within the study area. Should this alignment be selected, a localized shorter term impact of moderate to low intensity (depending on the distance between the construction activities and the freshwater features) with a low overall significance. Water Use License Applications (WULAs) will have to be made to the Department of Water and Sanitation (DWS) for authorisation before construction can commence.

Most of the freshwater features within the proposed corridors are already in a modified ecological state as a result of the existing land use activities. The proposed lines are in general proposed along routes where there are already power lines in place. Provided the new lines are constructed close to these lines such that the associated access roads can be shared, the cumulative impacts are likely to be low.

Erosion and sedimentation from the project activities, together with invasive alien plant growth and the possible modification of surface water runoff and water quality may lead to additional impacts on the freshwater habitats within the study area. In general, by selecting the route with the least impact, one can prevent any unacceptable impacts, particularly over the longer term, from taking place within the freshwater features within the study area. These impacts are likely to be of a low significance and can be monitored and easily mitigated.

In terms of the selection of the route selection for the transmission lines, it is recommended that a buffer of 50 from the top of the river banks; approximately 100m from the edge of the wetland areas and 500m from the pans be allowed for as a development setback for the construction of the pylons.

Table 13: Likely impacts of the alternative powerline routes on wetlands and rivers

Route	Comment
Alternative 1	Alternative 1 avoids major wetlands and wetland clusters. Although the route crosses many perennial rivers south of the Swartberg, these rivers are all large and generally fast flowing. Therefore, it is unlikely that over-head power lines crossing the river will have a significant impact on amphibians.
Alternative 2	This route crosses many pristine wetlands and wetland clusters according to NFEPA, which provide suitable habitat for amphibians. This alternative option is likely to have a significant impact on amphibians.

The corridor with the least potential impact on the freshwater features in the area is likely to be the more direct route namely Alternative 1 as it would need to cross fewer rivers than the route. In addition, it would avoid **more sensitive areas crossed by the Alternative 2 corridor** such as the many smaller tributaries and associated wetlands of the Kammanassie River in the Little Karoo as well as the large area of pans near Beaufort West. The alignment of the route within the corridor could also be determined to minimise the potential impact on the freshwater features within the study area. With mitigation, Alternative 1 is likely to have an impact of a very low significance on the freshwater features while Alternative 2 is likely to have an impact of a low impact.

Water use authorizations (WUL) will need to be obtained from the Department of Water and Sanitation: Western Cape Regional Office for approval of the water use aspects of the proposed activities.

6.7 Possible Heritage Impact

The specialist studies (Appendix 4.5) has found that various cultural and heritage resources exist in the study area. The risk of archaeological features such as graves and old infrastructure such as

farmsteads, bridges and wells do exist and could result in the removal or damage of these resources during construction of access roads and towers or during the establishment of camps.

Site visits were conducted during the EIA phase for the project, during which more detail related to heritage resources could be identified. The most prominent heritage resource would be the Swartberg Pass and certain items such as the Eerstewater Convict Station, Blikstasie Convict Station, the Ou Tol, the ruins of the Hotelletjie (little hotel), ruins of the Stalletjie (little stable), and the dry stone walls. The De Rust Heritage Conservation Association was approached directly by the consultant to comment on the proposed line options, although Alternative 1 is at least 14 km to the west of the town. They have indicated that they have no comments to make. The Simon van der Stel Foundation, Oudtshoorn Heritage, Prince Albert Cultural Foundation and the George Heritage Trust have all been approached to comment.

Since heritage sites, such as archaeological sites, are non-renewable, it is important that they are identified and their significance assessed prior to development. The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The significance of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the project. It is possible that the pylon footings may impact directly on surface and below-surface archaeological remains. However, previous surveys, inland of the coast, have not identified any significant archaeological remains.

The construction of pylons in close proximity to farmsteads, may result in the destruction of historic rubbish dumps (middens), old kraals or the ruins of old dwellings. For this reason, a targeted walk-down of the line will be required after the final powerline route has been decided.

The pylons may be constructed on/or in close proximity to farm graveyards. A survey during the walk-down phase can address these issues. Human remains are the most complicated aspects of heritage to mitigate since they require their own public participation process (See Section 36 of the NHRA) before they can be exhumed. Human remains are protected by a plethora of legislation including the Human Tissues Act (Act No 65 of 1983), the Exhumation Ordinance of 1980 and the National Heritage Resources Act (Act No 25 of 1999). In the event of human bones being found on site, HWC must be informed immediately and the remains removed by an archaeologist under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.

Cognisance is taken of the presence of San paintings on both line options, particularly in mountainous areas. Rock art sites have been reported in the past in the Langkloof in the past (Alternative 2). Some landowners have reported on historic farm buildings on their properties. Further specific comments from the public include:

- The historic wool washing troughs at Klaarstroom;
- A palaeontological museum on the farm Klue (Middelwater), near Klaarstroom;
- The mission station of Ganzenjacht in the Langkloof;
- Kammanassie settlement along the Kammanassie River;
- De Kruis and Voorsorg "ostrich palaces".

There are no anticipated fatal flaws with regard the construction of the powerline. The Heritage studies have concluded that there are no archaeological reasons to exclude the use of either of the proposed powerline alternatives. However the Swartberg Mountains are of particular relevance to Alternative 1, and the only way to avoid the possible impacts on this area, the (much longer) Alternative 2 would need to be taken. The Visual Impact specialist has indicated that avoiding sensitive landscape features is the most effective mitigation measure in reducing direct, cumulative and residual impacts. The position of the powerline with respect the farm structures, particularly those that are older than 60 years, will need to be negotiated with the landowner, on an individual case basis. In many cases it is preferable that the powerlines run behind the main residence, so that it is not visible in the viewshed, but landowners may differ in their perception of the visual impacts of powerlines. Some landowners may prefer the visual impacts to buildings rather than impacts to arable farm lands.

- From an archaeological and built/cultural environment perspective, Alternative 1 is considered the preferred alternative merely because it is shorter, and therefore the impacts are potentially less to heritage sites;
- From a visual impact assessment, preferred route is Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on landscapes that are free of transmission lines, thereby spreading the impact.

6.8 Possible Visual and landscape Impact (see VIA specialist study in Appendix 4.7)

Visual and aesthetic impacts will result from the construction activities of excavation, erection of towers and transporting of materials. In most areas the construction activities will however be of short duration.

The study area includes landscape features that contribute to a highly valued visual resource in specific regions. Outdoor recreational activities and the tourism industry, latches on to the opportunities the visual resource offer. Many activities and industries are specifically located in areas of pristine natural landscapes or at points where scenic views can be experienced.

The Klein Karoo has managed to redefine itself over the last couple of decades to become a tourist destination. Festivals such as the Klein Karoo Arts Festival have reached enormous popularity and draws people from all over the country. Focus has been placed on the unique agriculture industry in the region and ostrich farming is now synonymous with the Karoo region. In addition, the hop plantations in the Waboomskraal Valley are just as unique and contribute to a specific landscape character.

The study area consists of many different landscape types, each with its unique character and areas of very high scenic quality. The natural pristine mountain ranges provide a picturesque backdrop to almost every view. Even the furthest northern part of the study area still enjoys views of the Swartberg Mountains in the distance, or the mountains in the Karoo National Park, north of Beaufort West.

The transmission line is considered a large-scale project and will be in contrast with the existing landscape characters that have been identified in each landscape type. This can potentially impact on the tourism industry and affect observers' perceptions of the study area. It can be expected that a 400 kV transmission line, which traverses the Nama Karoo landscape and Swartberg Mountains will cause

a significant visual impact. Once in place the power line will have an aesthetic/visual impact, which can only be mitigated through careful route selection.

The construction activity will cause a negative effect on observers that are close-by, as the construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. A very low viewer incidence is expected due to the sparse population distribution and road network. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.

During the operation of the project, a new transmission line will be added to the visual environment. It will be highly visible up to 5 km far it, although those closer will be most significantly affected. Viewer incidence is expected to be medium due to a low overall population density and the proximity to a national road. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. The industrial character will contrast with the generally natural character of the landscape and will intrude on the observer's visual experience.

A new transmission line will add to the visual dominance of the existing electrical infrastructure, and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the uniform landscape, and disrupt the desolate identity of the Groot Karoo. It will blemish the natural character of the wide open plains and the uninterrupted views stretching up to the horizon. Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the desolate character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.

Construction activity could cause a negative effect, primarily on the natural vegetation, but also on the desolate sense of place of the Karoo landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the normal farming activities and the spacious Karoo plains. It is considered incompatible with the prevailing character of some areas. Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.

Mountainous terrain limits visual exposure and inter-visibility within the study area, but the towers will be clearly visible when exceeding the horizon. The alignment is often positioned in a valley parallel to the N9, which allows distant views of the valley. Viewer incidence is expected to be high due to the proximity to a national road and also to the extended farming community. Uniondale is a concentration of residents and will also be affected. The industrial character will contrast with the generally natural character of the landscape and the prevailing small-scale farming activities. It will intrude on the observer's visual experience. Highly scenic views of the mountains and valleys will be affected. A medium risk of cumulative impacts exists as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are present along a section of the corridor.

Scenic views can be experienced along the N9, and distant views to the Kammanassie and Swartberg Mountains are also possible. The quality of these scenes will be negatively impacted by the presence

of a high voltage power line. A medium risk of cumulative impacts exists as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are present along a section of the corridor.

Viewer incidence is expected to be high due to the proximity to national roads and the extended rural community in Waboomskraal. Visual exposure will be limited due to the mountainous terrain, but Waboomskraal is in an open valley with high visual exposure. Visual intrusion will occur due to the effects on scenic views of the unique agricultural practices in Waboomskraal and the spectacular mountainous backdrop. The Waboomskraal valley is an open agricultural area with particularly scenic views. Viewer incidence is expected to be high due to the proximity to national roads and the extended rural community in Waboomskraal. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. Visual intrusion will occur due to the effects on scenic views of the unique agricultural practices in Waboomskraal and the spectacular mountainous backdrop. The inherent visual harmony will be further disrupted.

Visual changes will occur as a result of a new transmission line in the Langkloof valley that is currently free of high voltage power lines, and also because of the increased dominance of electrical infrastructure through Waboomskraal and over the Outeniqua Mountains. Visual intrusion will occur due to the effects on scenic views of the unique and visually harmonious agricultural practices and the spectacular mountainous backdrop. The inherent visual harmony will be disrupted. Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 2 through Waboomskraal. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural and unique agricultural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure. A medium risk of cumulative impacts exists through Langkloof as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are present along a section of the corridor.

6.9 Possible Tourism and Economic Impact

6.9.1 Tourism impact

The impact of the proposed transmission lines on the tourism areas was assessed by the specialists (EMS, see Appendix 4.9) within the context of “sense of place” taking into consideration the visual impact (and visual impact study). It seems as if most tourists visiting the study area will either do so

from the N1 in the North, from Beaufort West or Prince Albert or from the South from George (either via the airport, or via the N2 (east or west)).

One of the reasons tourists' visit the Great Karoo is for the "wide open horizons" and "rural lifestyle" to "escape from the city life"⁷. Given the "sense of place", it could be considered from a tourism point of view, to keep the selected route as far as possible along the existing transmission lines or other man-made corridors, like the N12 (Alternative 1). The visual impact study can also provide important insight with respect to this. A concern with Alternative 1 could be crossing of the Groot Swartberg Nature Reserve and it is advised to get insight from the Heritage impact assessment study on this. The visual impact study can also provide important insight with respect to this issue.

The George municipal area is part of the Garden Route with scenic mountains, farms, forests and valleys. Tourists also visit the Groot and Klein Karoo area to experience the rural lifestyle and open spaces without the visual interference of transmission lines. Results from the visual impact study can be used to limit the impacts of the transmission lines. One of the ways can be to let the major section of the transmission lines run parallel to N12 (Alternative 1). This is also the shortest route.

The Baviaanskloof World Heritage Site and Wilderness area is to the east of the proposed Alternative 2, but is in relative close proximity of the towns of Rietbron and Willowmore. As an example, the Keurfontein Country House is situated on the N9 between Willowmore and Uniondale. The facility has two dams that are fed from a fountain in the mountain, and it's marketing strategy for tourism is that "Guests will enjoy the clean Karoo air, stary nights and mountain views". The visual impact of any proposed power line in close vicinity to this and other similar establishments would need to be minimised.

6.9.2 **Economic impact** (included in specialist Socio-Economic study in **Appendix 4.9**)

The impact of the construction of the transmission lines on the economy includes the impact of the construction cost, the operational expenditure and the impact on the broader economy (by allowing the power to be delivered to the existing grid). Capital expenditure data could not be obtained from Eskom to quantify any impacts, but a number of expenditure categories are discussed. A number of components will have to be imported from other provinces into this region, like steel structures, cables, hardware, insulators and cement. This will generate economic activity and employment opportunities in those provinces. A local procurement policy can also be considered by Eskom (where possible and if not already standard practice) on activities like site clearance, road building and assembling to maximize the economic and job creation impact on the local municipalities.

⁷ MasterQ Research, (Petrich, 1993).

The transmission lines will have some, although a limited impact on the agricultural activity, given the grazing capacity and that grazing can continue under the transmission lines. The operational expenditure will have limited opportunity for employment creation. From an economic point of view, with cost savings in mind, the shortest route, i.e. Alternative 1 can be recommended.

From a practical point of view, it should be noted that Meiringspoort is subject to regular flooding during rainy seasons (winter months) which could impact on any vehicles transporting material to the sites for the construction of the Alternative 1 alignment. Meiringspoort is characterised by ravines, narrow river passages with a winding road that would make it impossible for heavy vehicles to transport materials on without impacting on traffic flow.

The direct operational expenditure of the transmission lines will mainly include the maintenance of infrastructure and access roads to the transmission lines. This will potentially have very limited employment creation opportunities in the local area as existing operational teams can typically pass through once a year to inspect the infrastructure and perform maintenance where needed. Given the low rainfall in the Groot Karoo sections, access roads will only need maintenance on an ad-hoc basis. Local teams can be used for this. Maintenance on Alternative 1 will also be easier given that it is a shorter route and that the larger section of this route is parallel with the N12. This is compared to Alternative 2 where the section from the N9 to Droërvier (about 114 km) is not close to any major routes.

From an economic point of view, Alternative 1 will be preferred given that this is the shortest option and least expensive option to build and maintain. It will also have the least impact on agricultural activities. However, as mentioned earlier, a concern with Alternative 1 can be the crossing of the Groot Swartberg Nature Reserve (a World Heritage Site) and it is advised to get insight from the Heritage Impact Study on this.

6.10 Potential socio-economic impacts (see specialist study in Appendix 4.4)

According to Kevin Leask⁸, “The most economical way to build power transmission infrastructure is in a straight line from the source of the power to those who need it”. However, it is important to “...take account of social, environmental and heritage concerns”.⁹

According to Eskom (2014), it costs about **R2.8 million per km** for a 400 kV transmission line (depending on terrain, types of structures required, etc). As a result a transmission line of 178 km can cost about R498 million compared to a line of 270 km that will be about R756 million.

⁸ Eskom chief engineer for transmission planning

⁹ CSIR, 2014

The impact of the construction of the transmission lines can be subdivided in two categories. One is the impact of the construction cost, purchasing of servitude and operational expenditure of the transmission lines on the surrounding local municipalities and secondly the impact on the broader economy by strengthening the power availability to a growing economy. It is expected that the construction of the proposed transmission lines and the upgrading to the existing substation can take up to 24 months. No potential average construction cost or potential land value information was available at the time of this study and as such no potential impacts could be quantified. Potential costs categories that are encountered during the construction phase (capital expenditure period) are:

- Civil engineering costs (including access roads);
- Earth works (site clearances, foundations, etc);
- Structures (cement foundations, steelworks, electric cables, substations, electrical equipment, etc);
- Line material (hardware, insulators, conductors, earth wire, etc);
- Transport of material and workers;
- Purchasing of servitude area.

Major upstream categories include:

- Manufacturing of structural steel for pylons and cables;
- Manufacturing of cement.



Figure 10. During construction of new infrastructure (Gyed V-pylons)¹⁰

¹⁰ Photo: Eskom Transmission Development Plan 2015-2024

The estimated cost of the proposed Droërivier-Narina-Gourikwa 400 kV Transmission Power Line is R 1 429 743 066¹¹. This project for the section between Droërivier and Narina substations, forms approximately 80% of this budget (200km of the total 260km). Some of the capital equipment including steel structures, cables, hardware, insulators, etc. and cement for the foundations will be manufactured outside the study area in places like Gauteng, Western Cape and Coega and this will support economic activity and employment in those areas. Where possible, local suppliers will be used.

It can be advised that Eskom gives preference to local procurement where possible to enhance the positive impact on the local area, although it needs to be taken into consideration that certain skill or certificate will be required in specialist areas and phases. It could also be considered to provide the necessary training in cases where applicable to share skills and experience with the local committee.

The local economy will also benefit through aspects like accommodation, retail, entertainment, etc. Money can also be injected into the pockets of the landowners by buying the servitude area for the transmission line. This will depend on which alternative transmission line option is used and on the land value per ha for the region. **Table 14** shows average farm prices for a selection of properties in George, Oudtshoorn/De Rust, Prince Albert, Uniondale and Beaufort West area.

Prices vary vastly depending on factors like infrastructure (including houses, wineries, guesthouses, etc), water and boreholes (and water rights), fencing, game, proximity to cities, etc. Results show on average much smaller farms for George at much higher prices per hectare. The average price per hectare for George is R287 698 compared to R2 766 for Beaufort West, R14 059 for Oudtshoorn and De Rust, R6 864 for Prince Albert, R4 429 for Uniondale and R3 355 for Willowmore.

Table 14: Average farm prices for a selection of farm properties¹²

	Average farm size, ha (> R5 million)	Average price per ha	Min price per ha	Max price per ha	Sample size
George	188	R287 698	R42 474	R857 143	16
Oudtshoorn/De Rust	4 646	R14 059	R2 767	R26 190	11
Beaufort West	6 314	R2 766	R1 591	R3 929	10
Prince Albert	4 352	R6 864	R1 035	R21 066	11

¹¹ Eskom Transmission Development Plan 2015-2024

¹² Source: Selected farms from safarmtraders.co.za (May 2015)

Uniondale	4 997	R4 429	R1 899	R8 480	10
Willowmore	3 428	R3 355	NA	NA	1

Potential economic losses will be limited in the Klein and Groot Karoo sections where animals can still graze the land under the transmission lines and as such no real loss in farming activity and production is expected¹³. There are sections in the Klein Karoo in the Oudtshoorn Municipality where some economic losses could occur. Also see Agricultural specialist report in Appendix 4.6 of the FEIAR.

The proposed Alternative 1 crosses the Olifantsriver just south of the N12 with some prime irrigation land that may be impact on. However, the prime irrigation section is only about 2.3 km long and there is an existing transmission line. Another prime agricultural section that may be impacted is just west of the Kammanassie Dam. This is about 1.3 km wide. It is expected that most of the ostrich, small stock farming activities and cattle will be able to continue unhindered by the transmission lines.

Looking at Alternative 2, potential economic losses will be limited in the Groot Karoo sections where animals can still graze the land under the transmission lines and as such no real loss in farming activity. However, the proposed transmission line Alternative 2 crosses a section of about 65 km in the George Municipality parallel to the N9 that has mixed farming activities. Although the majority of this section includes grazing of small and large stock, dry land and irrigated fields are clearly visible. As a result the economic impact of productive agricultural land lost with Alternative 2 will be higher compared to Alternative 1.

The farms of this area are located within a sheep farming agricultural region of the Central Karoo. Cultivation is limited because of the severe climate and soil conditions, and viable agricultural land use is limited to grazing of small stock or game.

As an example, the Boeteka Karoo Padstal and Farm is located next to N12 en route to Oudtshoorn/George (Alternative 1). The Boeteka Karoo Padstal is situated next to an olive tree orchid. During the time of construction, this facility could be impacted upon by the visual disturbance, noise and dust that may result from activities related to the proposed 400kV line.

6.11 Possible Social Impacts (see SIA specialist study in Appendix 4.8)

The project can deliver many benefits in the long term for communities in the Western Cape and Eastern Cape. Potential negative impacts are also anticipated in the short, which can be reduced or avoided with management measures. It is anticipated that the project has the potential to realise the following positive social impacts:

- Improved quality of life, through
 - Creation of jobs ;

¹³ This is for example in contrast to transmission lines that need to go through plantations.

- Increased procurement opportunities;
- Increased reliability of energy services; and
- Improved community health from the introduction and maintenance of safer sources of energy

The project can possibly also introduce negative social impacts, including:

- Loss of assets and disruption in people's lives because of physical displacement, which can arise if residences are located in the same path as the power infrastructure.
- Loss of livelihood from economic displacement, which can arise when:
 - Agricultural or other commercial activities are disrupted in the short or long term;
 - Tourist or holiday facilities become less appealing because of visual intrusion from the power infrastructure;
 - Loss of economic value of properties such as private residential estates because of visual intrusion.
- Increased community health risks from possible increased exposure to HIV/AIDS; and
- Increased community safety risks from increased direct exposure to electrical hazards, if there is tampering with power infrastructure.
- There is also a perception that the electromagnetic fields from power lines will have a negative impact on health of children. The potential of this impact will also be discussed.

6.11.1 Potential Construction Phase Impacts

The anticipated impacts associated with the construction phase of the project are of a short duration, temporary in nature, but could have long term effects on the surrounding environment. The following impacts are anticipated during the construction of the proposed transmission line:

Impact on job opportunities

Power line construction does not create large scale job opportunities. Limited opportunities for local labour are expected as the majority of the construction activities would be undertaken by specialist contractors, which are invariably from the larger population centres. The short term benefits in this regard are thus deemed to be of a low significance.

It is expected that contractors will bring their own workers and will be required by Eskom to employ local people. Jobs therefore will be created for locals and at a national level. Jobs are a source of livelihoods and can therefore improve the quality of life for those who work. Increased procurement during construction will largely sustain jobs. There may also be some jobs created during this time if the levels of procurement justify them. Procurement is expected to benefit companies on a national scale, and to a lesser extent, companies locally. Potential sensitive environment and receptors and how they may be affected: Unemployment rates are higher in the Oudsthoorn, Beaufort West and Baviaans Local Municipalities, when compared with Prince Albert and George Local Municipalities. However, it also noted that there has been an in migration of people looking for jobs in George. Employment therefore will be welcomed in all municipalities. Jobs could be of significance in areas such as Baviaans and Beaufort West LMs as dependency ratios are high. It is, however, expected that local employment will be for a short duration at best (2-5 years) and mainly for unskilled positions. The consequence therefore for locals may be low. It could also have a non-cumulative impact at this scale, as jobs are scarce. On a national scale, the impact will be also for a short duration but could be cumulative for contract workers as it may mean continuation of work. The consequence for these workers could be high as they will be remunerated for semi-skilled and skilled work. This is expected for both direct project employment and jobs through procurement.

Influx of Workers

An influx of workers from outside the study area could negatively impact on the daily living and quality of life of the property owners whose properties are affected by the transmission line alignment. This would mostly only materialise during the intermittent periods when the construction activities are taking place on those properties.

Influx of Jobseekers

An influx of jobseekers is possible, although the rural, remote and sparsely populated study area makes the gathering of large numbers of jobseekers at the construction areas unlikely.

Construction camp impacts

Projects of this nature sometimes involve the development of a construction camp(s) where the temporary construction workers are accommodated. This in itself could impact on the daily living and movement patterns of those living in close proximity to such a facility. Cumulative impacts include misbehaviour of construction workers at the construction camp and mismanagement which could result in safety and security concerns, social conflict and environmental problems. The exact location of a construction camp would determine the intensity of the impact.

Impacts on daily living and movement patterns

Construction related activities could impact on the daily living and movement patterns of the locals e.g. increased construction vehicle activity on the local roads and possible construction of new access roads. This would especially be evident in the agricultural areas where numerous gravel roads connect to tarred roads. Where construction work has to be undertaken on private properties it could also have a negative impact on those owners' daily living and movement patterns.

Impacts on daily living and movement patterns also refer to the increased noise pollution during construction activities, especially where construction would take place in close proximity to dwellings situated in low ambient noise areas (agricultural land). Right-of-way clearing and construction activities, however, will be short term. Noise will thus only be temporary generated and if construction activities adhere to all relevant legislation in this regard and limit construction activities to normal working hours, the impact is anticipated to be minimal.

Disturbance of infrastructure and services

The proposed routes intersect or are not in close proximity to existing infrastructure services such as telecommunication and railway lines. Road crossings are limited. Many rain harvesting features such as berms are evident in the area and great care should be taken to avoid placing towers or construction roads within these structures

Impact on Land use

The proposed alternatives traverse agricultural land. Commercial small stock farming is the predominant land use and it is expected that the impact will be limited and small stock farming could continue undisturbed.

Health related impacts

Health related impacts during the construction phase of the proposed project refer to the spread of sexually transmitted diseases such as HIV/AIDS between workers (usually outsiders) and the local population. The impact of HIV/AIDS on productivity in the study area is already a source of concern. Specific concerns relate to possible promiscuous activities at construction camps if these are located in close proximity to existing settlements and towns.

On the positive side, community health could improve from the introduction and maintenance of safer sources of energy. This is an indirect impact that is expected to persist in the long-term during operations. Candles can be a safety hazard, and inhalation of some particulates emitted by burning wood over a protracted period of time can contribute towards respiratory illnesses. Communities that currently use less safe sources of energy such as candles and wood in internal environments will benefit more from the provision of electricity. These communities, if targeted as beneficiaries, will benefit immensely. It is expected that a small proportion of vulnerable households will benefit from supply, as the improved supply must support a range of development and economic activities. For the health and safety impact to be realised, management measures therefore must be directed towards benefitting as many households as possible using unsafe sources of energy

Safety and Security Impacts

Safety and security impacts include construction related risks and accidents, uncontrolled vehicular access, the perceived increase in crime as a result of outsiders being in the area. Whether real or perceived, these risks would need to be assessed. Increased community safety risks from increased direct exposure to electrical hazards, if there is tampering with power infrastructure including sub stations. It is also hazardous to use helicopters in an area with 400kV pylons. This is a direct impact with potential immediate and long term impacts. The impacts will be experienced during the operations phase. Tampering with or flying into power infrastructure can lead to serious bodily harm, and even death.

An increased community health risk is possible if workers' camps do not have access to basic services such as clean water and adequate sanitation and waste removal. This impact can potentially be introduced during construction. This impact could be realized along the construction route of the power line. This is a direct impact for workers and an indirect impact for the community. It can have an immediate impact on the workers, and longer term impacts for workers and the community if not managed appropriately. If workers' camps do not have access to appropriate technologies for basic services such as water, sanitation and waste removal, there is a likelihood that they will introduce health hazards into the environment. This will affect their own health and any community members exposed to the hazards. Children and the aged are the most susceptible. Medical care may also be difficult to access for remote communities.

Traffic Impact

During construction, the project will inevitably result in disruption of traffic on local, regional and National Roads, but to varying degrees. The severity of the impacts will depend on the order of the road (how many lanes, width, length, turns, etc), the receiving environment and vicinity of land uses and towns.

Meiringspoort is the main problem area and vehicles carrying abnormal loads should be avoided at all cost. Regular flooding during rainy seasons (winter months) will impact on any vehicles transporting material to the sites for the construction of the Alternative 1 alignment. Meiringspoort furthermore has narrow river passages with a winding road that would make it impossible for heavy vehicles to transport materials on without impacting on traffic flow. Alternative 2 would avoid this problem, but in the northern section (where it turns away from the N9 and passes Willowmore and Rietbron) the roads are mostly farm roads and not designed for heavy vehicles.

6.11.2 Potential Operational Phase Impacts

The operational phase of power lines is a long term process. The impacts usually associated with this phase are therefore perceived by affected parties to be more severe, although not necessarily the

case as transmission power lines could be referred to as a “dormant operation”. Maintenance undertaken during the operational phase is however also expected to have some short-term impacts. The following impacts are anticipated to occur during the operational stages of the proposed project:

Impact on Job Opportunities

It could be expected that existing Eskom Employees will be responsible for the maintenance of the line and servitude, although some temporary maintenance work could be undertaken by locals, such as repairing damaged roads or fences. The management of the substation and wind farm would be also be managed by Eskom, potentially not resulting in additional Employment opportunities.

Impacts on daily living and movement patterns

Maintenance activities would be undertaken only when required. The impacts on the daily living and movement patterns of affected residents are thus expected to be limited.

Impact on regional and local economy

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 proposed wind farm will feed into the National Electricity grid, managed by Eskom Transmission. The local electricity distribution is managed by Eskom Distribution and the status quo of local electricity service delivery might not change.

Property values

Potential devaluation of properties would depend on the exact location of the line on each property, the land-use, visual impact and possible negative impact on the overall sense of place

The following specific issues were raised by the public during the participation process (also see the Issues and Response Report attached in the PPP Report):

Table 15: Issues raised during the PPP

Change in social aspect	Nature of impact
Visual	Visual changes will result in changes in the character of properties. This will have a negative economic impact. Property values and prices will drop. There will be reduced interest in tourism as the nature of the landscape will be affected from a reduction in the quality of the landscape for photography, birding and nature hikes. The planned line will also pass in front of some holiday homes, disrupting the view, and possibly leading to a reduction in property value.
Farming activities disturbed	Farming activities will be disturbed. Irrigation farmers are specifically worried about areas under centre pivot irrigation, with many channels, roads and irrigation lines that will be disrupted or cease to function.
Development Plans disturbed	Future development planning for, for example, wind and solar plants planned for the area, housing developments will have to be accommodated
No Eskom project	Social impacts if the line is not constructed
Poor project management for construction, environmental management and	Employees were poorly skilled and management was poor as well. Eskom has no record of environmental management. No attempt was made to rehabilitate or reimburse owners for damage suffered. We can only hope that the project is given to a suitably

Change in social aspect	Nature of impact
compensation	qualified and competent private enterprise firm to construct
Security	Eskom does not regularly remove vegetation from its servitudes. This presents unsightly areas where illegal squatters tend to live, posing a security risk to residents.
Noise	Existing power lines are noisy
Radiation	Radiation from lines is a concern.
Mining areas	Mining explorations are located in close vicinity to the two alternatives for the 400kV Transmission Power Line project: The potential mining infrastructure at Rystkuil seems not to be a problem for Alternative 2, as it seems as though the lines would cross the underground operational area. Although Alternative 1 transects the Lombaardskraal area, the latter is a long term project that is not foreseen to realise within the next 10-15 years. .

6.12 Possible impact on Agriculture

A EIA phase study was conducted by Terrasoils (see report as Appenidx 4.6 of the FEIAR). The construction of a transmission line has only isolated impacts on the soil resource, due to the relatively small, separated footprints of the pylons. However, if an access road is constructed, especially in steeper areas or where erodible soils occur, the possibility of accelerated soil erosion is a reality.

Specific soil conservation measures, such as contouring, culverts and diversion channels would need to be considered in susceptible areas. In addition, regular monitoring of such roads would need to be carried out. Regarding cultivation and agricultural potential, the main susceptible areas would be areas of irrigation, such as where the transmission line crosses rivers. Here, care should be taken to avoid any areas where irrigation is currently being practiced.

During the Public Participation Process, it came to light that many farmers on the southernmost section of the line (George to Klaarstroom) are concerned about the impact of the project on their existing and planned pivot point irrigation systems. Farmers were concerned about the impact on Karoo vegetation that is used for grazing and may be damaged by vehicles during construction. Renosterveld recovers relatively quickly after disturbance but other veld types take years to recover during which time stock will have to forage elsewhere. Farmers were worried that the project will “sterilise” some camps or reduce the carrying capacity.

Relevant to the study area is the Uniondale Asbos-Renosterveld where Renosterbos (*Elytropappus rhinocerotis*) is dominant on south facing slopes and Asbos (*Pteronia incana*) on north facing slopes. Succulent species (*Aloe ferox*, *Aloe microstigma*, *Bulbine frutescens*, *Gasteria brachyphylla*, *Glottiphyllum depressum*, etc.) were observed

It should be noted that the *Aloe ferox* is harvested for its medicinal and cosmetic uses and that destruction of these plants during construction of the proposed power lines could lead to a loss of income for some communities. Fortunately, the *Aloe* can be transplanted with ease, and it is recommended that the plants are harvested in the servitude, and replanted where they will not be damaged by construction vehicles or bush clearing.

6.13 Roads and Traffic

An increase in traffic can be expected during the construction phase. The movement of machinery and vehicles will constitute an additional source of noise to the study area. However, this will be limited to the period of construction and mitigation can involve the use of equipment fitted with noise abatement technology (where possible) and the restriction of construction to certain days and times.

A number of components will have to be transported from other provinces into this region, which may temporarily add traffic (heavy vehicles) to roads in the region. Meiringspoort is subject to regular flooding during rainy seasons (winter months) which could impact on any vehicles transporting material to the sites for the construction. Meiringspoort is characterised by ravines, narrow river passages with a winding road that would make it impossible for heavy vehicles to transport materials on without impacting on traffic flow.

6.14 GAPS, Limitations and Assumptions of the study

A number of limitations and assumptions, as described below, are noted for this environmental impact assessment.

- Due to the vast area covered by this linear project and time limitations, individual properties could not be inspected. Use was made of a desktop assessment by examining the projected transmission line routes that were mapped onto Google Earth. Comments from the public participation process provided details of the concerns on the affected properties which were investigated by means of interviews, focus group meetings and consultation.
- Although various methods of communication were used to inform IAPs of the project and the EIA process, it should be understood that participation is a voluntary involvement and that communities are not equally mobilised or comfortable to attend public forums or communicate via modern technologies such as e-mail, sms, the internet or fax.
- Many of the impacts are linked or inter-related. There are therefore areas of overlaps between the specialist reports, and **similarities in the Scoping Report and the EIA Report**. In order to minimise duplication and prevent reader fatigue but still provide the information required by the EIA Regulations, the focus was placed on those issues that were identified as potential risks. The PP process has guided the areas of detail studies to a large extent.
- Certain issues such as the loss of livelihood and residential status on farms, related to loss of jobs due to a reduction in farming activity, or reduction of property values could not be assessed within the scope of the **EIA process**. Physical displacement as a result of loss of household assets if residences are located in the same path as the power infrastructure could not be assessed as a 2km width has been provided in the line alignment, to allow for flexibility when siting the towers and the 55 metre servitude required for the infrastructure. It is not possible to quantify the impacts on agriculture and tourism unless the exact alignment and position of the tower structures are known. When that information is available it will have to be combined on a micro level for each farm, type of farming activity and potential impact per farm. It will have to determine what activities can and cannot continue under the lines, and whether current economic activities can be replaced with other activities that can also have an economic contribution. The current scope of the study does not allow for such a detailed study.
- The impact on tangible heritage resources could not be accurately predicted, as many of the objects are obscured along the route and may only be uncovered during construction.

Intangible resources are even more problematic to identify, as are traditional areas that have not yet been documented for protection.

- Another potential impact that could not be assessed is the health impacts from electromagnetic fields (EMFs). This study however acknowledges that was raised as a concern for stakeholders.
- The specialists could only work with the information that was available at the time of their appointment and within the time frame for the **EIA phase** of the project.

7 ASSESSMENT

7.1 Description of the Need and Desirability

The Guideline On Need And Desirability published by the Western Cape Department of Environmental Affairs & Development Planning¹⁴ (DEA&DP), lists 14 questions to determine the need and desirability. 16 (below) includes answers relevant to the proposed project.

Table 16. Need and Desirability

NEED ('Timing'):
<p>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).</p> <p>Answer: Yes The IDP¹⁵ document for Beaufort West makes mention of further job creation (Local Economic Development) in the region. The project will provide jobs to local communities.</p>
<p>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?</p> <p>Answer: No, the infrastructure is mostly located outside of the town areas.</p>
<p>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)</p> <p>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 Western and a Southern Cape areas.</p>
<p>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?</p> <p>Answer: Yes The existing infrastructure will be used by the proponent for the proposed project. This Scoping & EIR will determine if additional infrastructure such as roads will be require for the development.</p>
<p>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</p>

¹⁴ DEA&DP (2010) *Guideline on Need and Desirability, EIA Guideline and Information Document Series*. Western Cape Department of Environmental Affairs & Development Planning (DEA&DP).

¹⁵ Beaufort West Municipality DRAFT IDP 2012-2017

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 Blanco – Droërvier 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: To be determined by EIR

The specialist studies to be conducted during the EIR phase of the project will give a clear indication of environmental options.

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 Blanco – Droërvier 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, livestock and game grazing and wild animals will continue in the power line servitude.

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

Answer: Yes The objective of this project is to connect the proposed Narina Transmission Substation to the Droërvier Transmission Substation and the National electricity grid. Specialist studies, such as a Visual Impact Assessment to be conducted during the EIR phase, will determine the most practical and environmentally preferable placement of the lines.

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

Answer: This EIR process will determine the potential impact on the environment and if negative impacts are identified, mitigation measures will be proposed.

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: No negative impacts are anticipated regarding noise or odours during the operational phase of the project. Visual character and sense of place impacts are anticipated and the EIAR will determine the extent of impacts and propose mitigation measures if required. Socio-economic benefits are likely to result from the proposed project and might include job creation. Impact on tourism facilities is an issue that has been raised during the PP process and will be investigated during the EIA phase of the project.

Question 13: Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?

Answer: No

The project area is of linear nature and the primary land use will continue as is.

Question 14: Will the proposed land use result in unacceptable cumulative impacts?

Answer: The EIAR will determine the full extent of impacts and propose mitigation measures if required.

At the end of the review periods of the FEIAR, all comments/input from stakeholders and I&AP's will be captured in the Issues and Response Report (IRR) which formed part of the Final EIA Report.

7.2 Route Alternative Evaluation

It was clear that both the Preferred Alternative 1 as well as Alternative 2 will create impacts. The magnitude of the impacts and the type of environment that will be influenced must be comparatively evaluated in order to recommend an option and focus the specialist studies. The specialist studies focus must be to fully understand the nature of the impacts and develop mitigation options for the recommended route.

A comparative table has been drawn up where the various environments as well as the impact of the activity on those environments where classified in a simplistic way in order to establish an option with

- a) the least possible impacts
- b) avoidance of impacts
- c) manageable impacts
- d) mitigation possibility

However, as impacts are unavoidable with both alternatives, unpopular choices need to be established in order for the national energy supply grid to function in a developmental society.

These choices need to be influenced by empirical evaluation and not emotional or singular individual objections. The choices need also be influenced by the mitigation hierarchy that applies to environmental impact assessments methodology. The rationale behind the scoring method for the table is that avoidance takes precedent followed by minimisation, management and mitigation.

A further empirical evaluation must be influenced by the type of environment that is being impacted upon e.g. wetlands are heavier weighted environments with more sensitive elements than a broad expanse of Karroo Vegetation. However if avoidance can be implemented in a wetland then the impact value is zero. Similarly avoidance of heritage and Unesco sites (e.g. Swartberg Nature Reserve) are weighted as zero but crossing of the sites has an international impact which is also heavier weighted apart from the impacts that will occur on the bio-physical environment. Visual impacts in a touristic area will also have heavier consideration so the option should fall on the route less travelled.

These issues were investigated in more detail in the EIA phase and the attached specialist reports contain findings and recommendations for mitigation.

7.3 Impact Evaluation methodology

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The **duration**, wherein it will be indicated whether:
 - very short duration (0–1 years) – assigned a score of 1;
 - short duration (2-5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5
- The **consequences (magnitude)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where:
 - 1 is very improbable (probably will not happen),
 - 2 is improbable (some possibility, but low likelihood),
 - 3 is probable (distinct possibility),
 - 4 is highly probable (most likely) and
 - 5 is definite (impact will occur regardless of any prevention measures).

The potential impacts have been assessed in terms of the following factors:

Probability	Duration
1. Very improbable	1. A of very short duration (0-1 year)
2. Improbable (low likelihood)	2. Short duration (2-5 years)
3. Probable (distinct possibility)	3. Medium term (5-15 years)
4. Highly probable (most likely)	4. Long term (>15 years)
5. Definite (regardless of measures to prevent)	5. Permanent(or ongoing during lifetime)
Extent	Magnitude
1. Limited to the site	0. Small or no effect
2. Limited to the local area	2. Minor or no impact on processes
3. Limited to the region	4. Low, with slight impact on processes
4. National	6. Moderate (processes continue but modified)
5. International	8- high (processes altered and stop temporarily)
	10. Very high and destructive of patterns with processes permanently stopping

Magnitude + Duration + Extent x Probability = Significance Score

- the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- the **status**, which will be described as either positive, negative or neutral.
- the degree to which the impact can be **reversed** (low, moderate, high).
- Whether the impact may cause **irreplaceable loss of resources** (Yes/No).
- Whether the impact can be **mitigated**.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- 8** < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 9** 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- 10** > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of impacts will be summarised in the following table format. The rating values as per the above criteria are included **In some instances the impact will be similar for all alternatives, but a distinction will be made between impacts that are pertinent for a particular Alternative. The No Go Option will be included in the assessment.**

7.4. **Assessment Tables**

The most important issues that were raised are included in the tables below are:

- Visual impact (servitude widths, B&Bs, natural areas)
- Health issues (electro-magnetic fields)
- Maintenance and rehabilitation
- Ecology: Disturbance of natural areas & Impact on birds
- Economic issues - loss of **farming** infrastructure, mining and land
- Social Issues – impact on tourism (B&B facilities) and way of life
- Heritage artefacts (Khoi San paintings, graves, old buildings)

These particular issues were investigated in more detail during the EIA Phase. Specialist studies included reference to the issues that have been raised by the public and stakeholders during the Scoping Phase.

7.4.1. **Vegetation Impacts Assessment**

Both **Alternative 1** and **Alternative 2** are comparatively assessed in the tables below.

ALTERNATIVE 1

1. Activity: Construction of a power line and access road in a World Heritage Site (Groot Swartberg Nature Reserve)		
Environmental Aspect: Removal of / or excessive damage to vegetation due to the construction of a power line, an access road and the clearing of shrubs to prevent fires near the power line.		
Environmental impact: Alternative 1 goes also through an UNESCO-listed World Heritage Site. The implication of this is that the Swartberg Nature Reserve might lose its World Heritage Status if another power line and its associated infrastructure is being constructed through this nature reserve. Furthermore the regular cutting of the fynbos to maintain a low fuel-load under the power line is another impact which could jeopardise the international status of this reserve.		
	Without mitigation	With mitigation
Extent (E)	International (5)	International (5)
Duration (D)	Long-term (5)	Long-term (5)
Magnitude (M)	Moderate (6)	Moderate (6)
Probability (P)	Definite (5)	Definite (5)
Significance (S = E+D+M)*P	High (80)	High (80)
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Highly Probable	Highly Probability
Can impacts be mitigated?	No	
Mitigation:		
<ul style="list-style-type: none"> The only option to prevent the impact is to omit this alternative 		
Cumulative impacts:		
<p>There is an existing power line through the nature reserve. With an extra power line the following could occur:</p> <ul style="list-style-type: none"> The bush clearing activities would double the footprint of the cleared area. The lack of fire would cause a change in the species composition of the fynbos because fynbos are fire dependent to ensure seed germination and to maintain the vigour of the plant species 		
Residual impacts:		
<ul style="list-style-type: none"> Altered micro-habitats. Altered vegetation composition. 		
2. Activity: Construction and operation of power line in Critical Biodiversity Areas (CBAs), Ecological support areas (ESAs) and protected areas (PAs)		
Environmental Aspect: Removal of / or excessive damage to vegetation in CBAs, ESAs and Protected Areas.		
Environmental impact: CBAs & ESAs are sensitive areas which support ecosystems and unique habitats. The loss of vegetation and/or species of conservation concern, loss of and alteration of microhabitats, altered vegetation cover, site-specific altered distribution of rainfall and resultant runoff patterns, general increase in runoff from hard		

surfaces and/or bare areas and associated accelerated erosion, reduction of habitat and resource availability for terrestrial fauna, possible increase of detrimental effects during periods of extreme weather events, e.g. increased flooding, severe erosion or dust due to lower buffering capacity of sparser vegetation		
	Without mitigation	With mitigation
Extent (E)	Local (2)	Local (1)
Duration (D)	Long-term (5)	Long-term (3)
Magnitude (M)	Moderate (6)	Low (4)
Probability (P)	Definite (5)	Definite (5)
Significance (S = E+D+M)*P	High (65)	Medium (40)
Status (positive, neutral or negative)	Positive	Positive
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Highly Probable	Highly Probability
Can impacts be mitigated?	Reasonably	
<p>Mitigation:</p> <ul style="list-style-type: none"> • After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows. • Protected plant species must be relocated if possible. • Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor. • Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area. • Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMP, if possible. • Remove all invasive vegetation before and after construction and continuously up to decommissioning. • If filling material is to be used, this should be sourced from areas free of invasive species. • Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil. • Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan. • Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly. • Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind. • Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed 		
<p>Cumulative impacts:</p> <p>If mitigation measures are not strictly followed the following could occur:</p> <ul style="list-style-type: none"> • erosion of areas and continued erosion of the development area with associated siltation and/or erosion of lower-lying wetlands located outside of the project site. • contamination of drainage lines, lower-lying rivers or wetlands located outside of the project site. • alteration of occupancy by terrestrial fauna beyond the project site, possible reduction of available habitat and food availability to terrestrial fauna. 		

<ul style="list-style-type: none"> spread and establishment of invasive species.
<p>Residual impacts:</p> <ul style="list-style-type: none"> Altered topsoil characteristics. Altered vegetation composition.

3. Activity: Construction and operation of power line

Environmental Aspect: Removal of / or excessive damage to vegetation, compaction of topsoil, creation of runoff zone, redistribution and concentration of runoff from surfaces, displacement of terrestrial vertebrates, reduced buffering capacities of the landscapes during extreme weather events.

Environmental impact: Loss of vegetation and/or species of conservation concern, loss of and alteration of microhabitats, altered vegetation cover, site-specific altered distribution of rainfall and resultant runoff patterns, general increase in runoff from hard surfaces and/or bare areas and associated accelerated erosion, reduction of habitat and resource availability for terrestrial fauna, possible increase of detrimental effects during periods of extreme weather events, e.g. increased flooding, severe erosion or dust due to lower buffering capacity of sparser vegetation

	Without mitigation	With mitigation
Extent (E)	Local (1)	Local (1)
Duration (D)	Long-term (5)	Long-term (5)
Magnitude (M)	Moderate (4)	Low (4)
Probability (P)	Definite (5)	Definite (5)
Significance (S = E+D+M)*P	Medium (55)	Medium (50)
Status (positive, neutral or negative)	Positive	Positive
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Highly Probable	Highly Probability
Can impacts be mitigated?	Reasonably	

Mitigation:

- After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.
- Protected plant species must be relocated if possible.
- Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.
- Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.
- Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMPr, if possible.
- Remove all invasive vegetation before and after construction and continuously up to decommissioning.
- If filling material is to be used, this should be sourced from areas free of invasive species.
- Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of

<p>topsoil.</p> <ul style="list-style-type: none"> Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan. Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly. Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind. Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed
<p>Cumulative impacts:</p> <p>If mitigation measures are not strictly followed the following could occur:</p> <ul style="list-style-type: none"> erosion of areas and continued erosion of the development area with associated siltation and/or erosion of lower-lying wetlands located outside of the project site. contamination of drainage lines, lower-lying rivers or wetlands located outside of the project site. alteration of occupancy by terrestrial fauna beyond the project site, possible reduction of available habitat and food availability to terrestrial fauna. spread and establishment of invasive species.
<p>Residual impacts:</p> <ul style="list-style-type: none"> Altered topsoil characteristics. Altered vegetation composition.

<p>4. Activity: Transport of materials to site, movement of vehicles on site during construction and operation.</p>		
<p>Environmental Aspect: Compaction of soils, possible contamination by oils or fuels, possible introduction and spread of weeds and alien invasive species, temporary disturbance of terrestrial fauna.</p>		
<p>Environmental impact: Loss of vegetation, increase in runoff and erosion, disturbance or possible mortality incidents of terrestrial fauna, possible contamination of soil and groundwater by oil- or fuel spillages, possible establishment and spread of undesirable weeds and alien invasive species that could further damage ecosystem functionality.</p>		
	Without mitigation	With mitigation
Extent (E)	Regional (1)	Local (1)
Duration (D)	Long-term (5)	Short term (2)
Magnitude (M)	Moderate (6)	Small (4)
Probability (P)	Definite (5)	Highly Probable (4)
Significance (S = E+D+M)*P	High (60)	Low (28)
Status (positive, neutral or negative)	positive	neutral
Reversibility	Partially reversible	Reversible
Irreplaceable loss of resources?	Probable	Not likely
Can impacts be mitigated?	Reasonably	
<p>Mitigation:</p> <ul style="list-style-type: none"> Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may 		

<p>be allowed.</p> <ul style="list-style-type: none"> • Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur. • Strict speed limits must be set and adhered to. • Driving between dusk and dawn should be permissible to emergency situations only. • Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution. • Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment.
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • Possible pollution of surrounding areas if no mitigation is implemented. • Compaction of soil • Contamination of groundwater which is an extremely important source of water supply for the region. • Possible spread of alien invasive species beyond the site if no mitigation is implemented.
<p>Residual impacts:</p> <ul style="list-style-type: none"> • Related to access roads and internal maintenance tracks only.

<p>5. Activity: Impacts on natural vegetation and ecosystems by invasive alien species.</p>		
<p>Environmental Aspect: Compaction of soils, possible contamination by oils or fuels, possible introduction and spread of weeds and alien invasive species, temporary disturbance of terrestrial fauna.</p>		
<p>Environmental impact: : A decline in ecosystem functionality of natural vegetation could be the result of disturbance of the natural vegetation which create opportunities for alien invasive species to invade because of the lack of competition</p> <p>Direct and Indirect impacts on the se natural ecosystems may include the following:</p> <ul style="list-style-type: none"> » Once established the invasion of alien species could spread and put the natural vegetation under pressure » Alien invasive species could alter the habitat to suit them better than the natural species » Alien invasives produce high amounts of seed and these seeds could stay for long in the seedbank and when conditions are suitable they will germinated in high numbers » disturbance to processes maintaining biodiversity and ecosystem goods and services, and; » a local loss of ecosystem goods and services 		
	Without mitigation	With mitigation
Extent (E)	Local (1)	Local (1)
Duration (D)	Long-term (4)	medium-term (2)
Magnitude (M)	Moderate (6)	Low (4)
Probability (P)	Definite (5)	Highly Probable (4)
Significance (S = E+D+M)*P	Medium (55)	Low (28)
Status (positive, neutral or negative)	positive	positive
Reversibility	Partially reversible	Reversible
Irreplaceable loss of resources?	Probable	Not likely
Can impacts be mitigated?	Reasonably	
Mitigation:		

<ul style="list-style-type: none"> Do regular monitoring for alien species infestations Determine the best practice to eradicate alien species Restrict the spread of alien species by eradicate them before they form seed
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> There could be some areas where alien invasives already occur and when the corridor under the conductors are being cleared it could create an ideal habitat for the invaders to spread Possible damage to indigenous species by the incorrect use of herbicides.
<p>Residual impacts:</p> <ul style="list-style-type: none"> Herbicide may remain in the soil and prevent the colonization of indigenous species

<p>6. Activity: Impacts on ephemeral streams and drainage lines.</p>		
<p>Environmental Aspect: The power line route cross many streams and wetlands. An accociated access road could cause impacts to these streams. Compaction of soils, possible contamination by oils or fuels, possible introduction and spread of weeds and alien invasive species, temporary disturbance of terrestrial fauna.</p>		
<p>Environmental impact: Loss of vegetation (bush clearing), increase in runoff and erosion, possible contamination of surface and groundwater by oil- or fuel spillages, possible establishment and spread of undesirable weeds and alien invasive species that could further damage ecosystem functionality.</p>		
	<p>Without mitigation</p>	<p>With mitigation</p>
<p>Extent (E)</p>	<p>Local (1)</p>	<p>Local (1)</p>
<p>Duration (D)</p>	<p>Long-term (4)</p>	<p>Medium-term (2)</p>
<p>Magnitude (M)</p>	<p>Moderate (6)</p>	<p>Low (4)</p>
<p>Probability (P)</p>	<p>Definite (5)</p>	<p>Highly Probable (4)</p>
<p>Significance (S = E+D+M)*P</p>	<p>Medium (55)</p>	<p>Low (28)</p>
<p>Status (positive, neutral or negative)</p>	<p>positive</p>	<p>positive</p>
<p>Reversibility</p>	<p>Partially reversible</p>	<p>Reversible</p>
<p>Irreplaceable loss of resources?</p>	<p>Probable</p>	<p>Not likely</p>
<p>Can impacts be mitigated?</p>	<p>Reasonably</p>	
<p>Mitigation:</p> <ul style="list-style-type: none"> Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed. Avoid pylon positions within streams or on stream banks Stream crossings must be constructed in such a way that not bank erosion occur. Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution. Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment. 		
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> Possible pollution of surrounding areas if no mitigation is implemented. 		

- Compaction of soil
- Contamination of surface and/or groundwater which is an extremely important source of water supply for the region.
- Possible spread of alien invasive species beyond the site if no mitigation is implemented.

Residual impacts:

- Related to access roads and internal maintenance tracks only.

Assessment of Cumulative Impacts

1. Nature: Reduced ability to meet conservation targets

Environmental Aspect: Reduced ability to meet conservation targets of the province

Environmental impact: The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. The area is not included within a National Protected Areas Expansion Strategy focus area, and falls outside any threatened and or endangered ecosystem type / vegetation type. Although the vegetation type in the study area are classified as Least Threatened, it is poorly protected and certain habitats or communities may be subsequently affected.

	Overall impact of the proposed project considered in isolation	Cumulative Impact of the project and other projects in the area
Extent (E)	Local (1)	Local (1)
Duration (D)	Long-term (4)	Long-term (4)
Magnitude (M)	Low (3)	Low (3)
Probability (P)	Probable (3)	Probable (3)
Significance (S = E+D+M)*P	Low (24)	Low (24)
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Partially reversible	Low reversibility
Irreplaceable loss of resources?	Not Likely	Probable
Confidence in finding	High	

Mitigation:

- Implementation of the required mitigation measures for all developments within the area.
- Preconstruction walk-through to ensure that sensitive habitats are avoided.
- Minimise the development footprint as far as possible.

ALTERNATIVE 2

1. Activity: Construction and operation of power line in Critical Biodiversity Areas (CBAs), Ecological support areas (ESAs) and protected areas (PAs)

Environmental Aspect: Removal of / or excessive damage to vegetation in CBAs, ESAs and Protected Areas.

Environmental impact: CBAs & ESAs are sensitive areas which support ecosystems and unique habitats. The loss

of vegetation and/or species of conservation concern, loss of and alteration of microhabitats, altered vegetation cover, site-specific altered distribution of rainfall and resultant runoff patterns, general increase in runoff from hard surfaces and/or bare areas and associated accelerated erosion, reduction of habitat and resource availability for terrestrial fauna, possible increase of detrimental effects during periods of extreme weather events, e.g. increased flooding, severe erosion or dust due to lower buffering capacity of sparser vegetation		
	Without mitigation	With mitigation
Extent (E)	Local (2)	Local (1)
Duration (D)	Long-term (5)	Long-term (3)
Magnitude (M)	Moderate (6)	Low (4)
Probability (P)	Definite (5)	Definite (5)
Significance (S = E+D+M)*P	High (65)	Medium (40)
Status (positive, neutral or negative)	Positive	Positive
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Highly Probable	Highly Probability
Can impacts be mitigated?	Reasonably	
<p>Mitigation:</p> <ul style="list-style-type: none"> • After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows. • Protected plant species must be relocated if possible. • Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor. • Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area. • Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMP, if possible. • Remove all invasive vegetation before and after construction and continuously up to decommissioning. • If filling material is to be used, this should be sourced from areas free of invasive species. • Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil. • Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan. • Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly. • Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind. • Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed 		
<p>Cumulative impacts:</p> <p>If mitigation measures are not strictly followed the following could occur:</p> <ul style="list-style-type: none"> • erosion of areas and continued erosion of the development area with associated siltation and/or erosion of lower-lying wetlands located outside of the project site. • contamination of drainage lines, lower-lying rivers or wetlands located outside of the project site. 		

- alteration of occupancy by terrestrial fauna beyond the project site, possible reduction of available habitat and food availability to terrestrial fauna.
- spread and establishment of invasive species.

Residual impacts:

- Altered topsoil characteristics.
- Altered vegetation composition.

2. Activity: Construction and operation of power line

Environmental Aspect: Removal of / or excessive damage to vegetation, compaction of topsoil, creation of runoff zone, redistribution and concentration of runoff from surfaces, displacement of terrestrial vertebrates, reduced buffering capacities of the landscapes during extreme weather events.

Environmental impact: Loss of vegetation and/or species of conservation concern, loss of and alteration of microhabitats, altered vegetation cover, site-specific altered distribution of rainfall and resultant runoff patterns, general increase in runoff from hard surfaces and/or bare areas and associated accelerated erosion, reduction of habitat and resource availability for terrestrial fauna, possible increase of detrimental effects during periods of extreme weather events, e.g. increased flooding, severe erosion or dust due to lower buffering capacity of sparser vegetation

	Without mitigation	With mitigation
Extent (E)	Local (1)	Local (1)
Duration (D)	Long-term (5)	Long-term (5)
Magnitude (M)	Moderate (4)	Low (4)
Probability (P)	Definite (5)	Definite (5)
Significance (S = E+D+M)*P	Medium (55)	Medium (50)
Status (positive, neutral or negative)	Positive	Positive
Reversibility	Non-reversible	Non-reversible
Irreplaceable loss of resources?	Highly Probable	Highly Probability
Can impacts be mitigated?	Reasonably	

Mitigation:

- After the final layout has been approved, conduct a thorough footprint investigation to detect and map (by GPS) any protected plant species and active animal burrows.
- Protected plant species must be relocated if possible.
- Animal burrows must be monitored by the ECO prior to construction for activity/presence of animal species. If detected, such animals must be removed and relocated by a qualified professional/contractor.
- Keep areas affected to a minimum, strictly prohibit any disturbance outside the demarcated footprint area.
- Clear as little indigenous vegetation as possible, aim to maintain vegetation where it will not interfere with the construction or operation of the development, rehabilitate an acceptable vegetation layer according to rehabilitation recommendations of the relevant EMP, if possible.
- Remove all invasive vegetation before and after construction and continuously up to decommissioning.
- If filling material is to be used, this should be sourced from areas free of invasive species.

- Topsoil (the upper 25 cm of soil) is an important natural resource; where it must be stripped, never mix it with subsoil or any other material, store and protect it separately until it can be re-applied, minimise the handling of topsoil.
- Temporarily stored topsoil must be re-applied within 6 months, topsoil stored for longer need to be managed according to a detailed topsoil management plan.
- Monitor the area regularly after larger rainfall events to determine where erosion may be initiated and then mitigate by modifying the soil micro-topography and revegetation or soil erosion control efforts accordingly.
- Prevent leakage of oil or other chemicals, and strictly prohibit littering of any kind.
- Monitor the establishment of all invasive species and remove as soon as detected, whenever possible before regenerative material can be formed

Cumulative impacts:

If mitigation measures are not strictly followed the following could occur:

- erosion of areas and continued erosion of the development area with associated siltation and/or erosion of lower-lying wetlands located outside of the project site.
- contamination of drainage lines, lower-lying rivers or wetlands located outside of the project site.
- alteration of occupancy by terrestrial fauna beyond the project site, possible reduction of available habitat and food availability to terrestrial fauna.
- spread and establishment of invasive species.

Residual impacts:

- Altered topsoil characteristics.
- Altered vegetation composition.

3. Activity: Transport of materials to site, movement of vehicles on site during construction and operation.

Environmental Aspect: Compaction of soils, possible contamination by oils or fuels, possible introduction and spread of weeds and alien invasive species, temporary disturbance of terrestrial fauna.

Environmental impact: Loss of vegetation, increase in runoff and erosion, disturbance or possible mortality incidents of terrestrial fauna, possible contamination of soil and groundwater by oil- or fuel spillages, possible establishment and spread of undesirable weeds and alien invasive species that could further damage ecosystem functionality.

	Without mitigation	With mitigation
Extent (E)	Regional (1)	Local (1)
Duration (D)	Long-term (5)	Short term (2)
Magnitude (M)	Moderate (6)	Small (4)
Probability (P)	Definite (5)	Highly Probable (4)
Significance (S = E+D+M)*P	High (60)	Low (28)
Status (positive, neutral or negative)	positive	neutral
Reversibility	Partially reversible	Reversible
Irreplaceable loss of resources?	Probable	Not likely
Can impacts be mitigated?	Reasonably	

Mitigation:

- Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.
- Parking areas should be regularly inspected for oil spills and covered with an impermeable or absorbent layer (with the necessary storm water control) if oil and fuel spillages are highly likely to occur.
- Strict speed limits must be set and adhered to.
- Driving between dusk and dawn should be permissible to emergency situations only.
- Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.
- Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment.

Cumulative impacts:

- Possible pollution of surrounding areas if no mitigation is implemented.
- Compaction of soil
- Contamination of groundwater which is an extremely important source of water supply for the region.
- Possible spread of alien invasive species beyond the site if no mitigation is implemented.

Residual impacts:

- Related to access roads and internal maintenance tracks only.

4. Activity: Impacts on natural vegetation and ecosystems by invasive alien species.

Environmental Aspect: Compaction of soils, possible contamination by oils or fuels, possible introduction and spread of weeds and alien invasive species, temporary disturbance of terrestrial fauna.

Environmental impact: : A decline in ecosystem functionality of natural vegetation could be the result of disturbance of the natural vegetation which create opportunities for alien invasive species to invade because of the lack of competition

Direct and Indirect impacts on the se natural ecosystems may include the following:

- » Once established the invasion of alien species could spread and put the natural vegetation under pressure
- » Alien invasive species could alter the habitat to suit them better than the natural species
- » Alien invasives produce high amounts of seed and these seeds could stay for long in the seedbank and when conditions are suitable they will germinated in high numbers
- » disturbance to processes maintaining biodiversity and ecosystem goods and services, and;
- » a local loss of ecosystem goods and services

	Without mitigation	With mitigation
Extent (E)	Local (1)	Local (1)
Duration (D)	Long-term (4)	medium-term (2)
Magnitude (M)	Moderate (6)	Low (4)
Probability (P)	Definite (5)	Highly Probable (4)
Significance (S = E+D+M)*P	Medium (55)	Low (28)
Status (positive, neutral or negative)	positive	positive
Reversibility	Partially reversible	Reversible
Irreplaceable loss of resources?	Probable	Not likely
Can impacts be mitigated?	Reasonably	

<p>Mitigation:</p> <ul style="list-style-type: none"> • Do regular monitoring for alien species infestations • Determine the best practice to eradicate alien species • Restrict the spread of alien species by eradicate them before they form seed
<p>Cumulative impacts:</p> <ul style="list-style-type: none"> • There could be some areas where alien invasives already occur and when the corridor under the conductors are being cleared it could create an ideal habitat for the invaders to spread • Possible damage to indigenous species by the incorrect use of herbicides.
<p>Residual impacts:</p> <ul style="list-style-type: none"> • Herbicide may remain in the soil and prevent the colonization of indigenous species

5. Activity: Impacts on ephemeral streams and drainage lines.

Environmental Aspect: The power line route cross many streams and wetlands. An associated access road could cause impacts to these streams. Compaction of soils, possible contamination by oils or fuels, possible introduction and spread of weeds and alien invasive species, temporary disturbance of terrestrial fauna.

Environmental impact: Loss of vegetation (bush clearing), increase in runoff and erosion, possible contamination of surface and groundwater by oil- or fuel spillages, possible establishment and spread of undesirable weeds and alien invasive species that could further damage ecosystem functionality.

	Without mitigation	With mitigation
Extent (E)	Local (1)	Local (1)
Duration (D)	Long-term (4)	Medium-term (2)
Magnitude (M)	Moderate (6)	Low (4)
Probability (P)	Definite (5)	Highly Probable (4)
Significance (S = E+D+M)*P	Medium (55)	Low (28)
Status (positive, neutral or negative)	positive	positive
Reversibility	Partially reversible	Reversible
Irreplaceable loss of resources?	Probable	Not likely
Can impacts be mitigated?	Reasonably	

Mitigation:

- Restrict all movement of vehicles and heavy machinery to permissible areas, these being designated access roads, maintenance roads, turning points and parking areas. No off-road driving beyond designated areas may be allowed.
- Avoid pylon positions within streams or on stream banks
- Stream crossings must be constructed in such a way that not bank erosion occur.
- Prevent spillage of any, oils or other chemicals, strictly prohibit other pollution.
- Monitor the establishment of invasive species and remove as soon as detected, whenever possible before regenerative material can be formed, destroy all material to prevent re-establishment.

Cumulative impacts:

- Possible pollution of surrounding areas if no mitigation is implemented.

- Compaction of soil
- Contamination of surface and/or groundwater which is an extremely important source of water supply for the region.
- Possible spread of alien invasive species beyond the site if no mitigation is implemented.

Residual impacts:

- Related to access roads and internal maintenance tracks only.

Assessment of Cumulative Impacts

1. Nature: Reduced ability to meet conservation targets

Environmental Aspect: Reduced ability to meet conservation targets of the province

Environmental impact: The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. The area is not included within a National Protected Areas Expansion Strategy focus area, and falls outside any threatened and or endangered ecosystem type / vegetation type. Although the vegetation type in the study area are classified as Least Threatened, it is poorly protected and certain habitats or communities may be subsequently affected.

	Overall impact of the proposed project considered in isolation	Cumulative Impact of the project and other projects in the area
Extent (E)	Local (1)	Local (1)
Duration (D)	Long-term (4)	Long-term (4)
Magnitude (M)	Low (3)	Low (3)
Probability (P)	Probable (3)	Probable (3)
Significance (S = E+D+M)*P	Low (24)	Low (24)
Status (positive, neutral or negative)	Negative	Negative
Reversibility	Partially reversible	Low reversibility
Irreplaceable loss of resources?	Not Likely	Probable
Confidence in finding	High	

Mitigation:

- Implementation of the required mitigation measures for all developments within the area.
- Preconstruction walk-through to ensure that sensitive habitats are avoided.
- Minimise the development footprint as far as possible.

7.4.2. Avifauna Impact Assessment

The two alternatives are comparatively assessed in the assessment tables below, where applicable, the differences in impacts are highlighted in red for Alternative 2.

Nature: Loss of Bird Habitat

Construction: There will be some loss of bird habitat through the clearing of vegetation for service/access roads and the construction of pylon bases. The extent of habitat loss will be dependent on how many new service/access roads need to be made and the number of pylon bases required. This is usually a loss of vegetation (plant communities) that supply food and shelter, but may include abiotic features such as the loss of

temporary wetlands, caves or rocky outcrops, which provide suitable nesting or roosting sites.

Alternative 1: This route will pass through the Outeniqua and Swartberg Mountains IBAs. As the Swartberg Mountains are classified as a UNESCO World Heritage Site, the destruction of habitat within the Swartberg classifies the impact as having an 'international' extent..

Alternative 2: This route will pass the most eastern section of the Swartberg Mountains IBA and intersect the Kouga-Baviaanskloof Complex IBA.

Operation: During operation there will be the need to keep the area beneath the power lines clear which will involve grass cutting and shrub clearance where necessary. The creation of new roads may provide access to new areas which may increase poaching rates or natural resource use.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	5 - Definite (regardless of measures to prevent)	5 - Definite (regardless of measures to prevent)
Duration	2 – Short Duration (1-2 years)	1 – Very Short Duration (0-1 years)
Extent	5 – International 3 - Regional	5 – International 3 - Regional
Magnitude	4 – Low , with slight impact on processes	4 - Low , with slight impact on processes
Significance	55 (Medium) 45 (Medium)	50 (Medium) 40 (Medium)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	3 - Probable (distinct possibility)	3 - Probable (distinct possibility)
Duration	5 - Permanent (ongoing during lifetime)	5 - Permanent (ongoing during lifetime)
Extent	1 - Limited to the site	1 - Limited to the site
Magnitude	0 - Small or no effect	0 - Small or no effect
Significance	18 (Low)	18 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	

Mitigation:

Construction Phase:

- **Alternative 2:** The route should be manipulated to avoid the Swartberg Mountains IBA and the Kouga-Baviaanskloof Complex IBA.
- Where access roads and/or pylon bases do need to be located within any of the highly sensitive areas identified above then there should be further ground-truthing by an avifaunal specialist to determine exact road routes and pylon base locations so to, where possible, avoid site specific sensitive areas such as nests and roosts
- **All bird nest/roost sites encountered should be considered “No-Go” areas for any pylon hardstands or the construction of access roads.**
- Wherever possible existing service/access roads should be used.
- Clearing of vegetation should be kept to a minimum and all rocky outcrops and wetlands must be avoided.

<ul style="list-style-type: none"> • Construction areas should be demarcated with hazard tape and no clearing to occur outside of these areas. Laydown areas and construction camps must be located in areas of low sensitivity. Where this is not feasible then in areas of medium sensitivity. • An ECO must be employed to monitor the clearing for roads and hardstands. <p>Operation Phase:</p> <ul style="list-style-type: none"> • Clearing of vegetation for maintenance of the servitude should be kept to a minimum. • Access to all access/service roads should be limited by having locked gates. <p>Cumulative impacts: The erection of addition power lines will further fragment natural habitats along the route option; including IBAs and the Swartberg Mountains (UNESCO World Heritage Site).</p> <p>Residual Risks: Maintenance of new service/access roads will prevent habitat regeneration.</p>

Nature: Disturbance and Displacement of Birds

Construction: Birds will be disturbed by the powerline construction activities (e.g. noise, dust, operation of heavy machinery, anthropogenic activities). There is the potential for some nesting birds to be displaced (particularly breeding eagles) during construction activities where service/access roads and pylon bases are located within a close proximity to nesting sites. **Alternative 1:** This impact will have a regional extent due to the number of bird SCC, including Verreaux's Eagle (*Aquila verreauxii*), which inhabit both the Outeniqua and Swartberg Mountain ranges.

Operation: Birds will utilise pylons to construct nests or to use as roosts. There will be continued disturbance during the operation of the powerline due to maintenance activities. The powerline infrastructures can also act as a barrier for birds in flight, and can influence flight paths of migratory species. **Alternative 2:** As there is no existing powerline along this route option, the barrier effect will be greater than alternative 1 as birds will not be accustomed to powerlines along the route. This barrier separates three IBAs (Swartberg, Outeniqua, and Kouga-Baviaanskloof Complex). The migration of bird SCC (particularly raptors) between these IBAs is highly likely.

	Without mitigation	With mitigation
Construction Phase		
Probability	4 - Highly Probable (most likely)	3 - Probable (distinct possibility)
Duration	2 - Short Duration (2-5 year)	1 - Very Short Duration (0 -1 year)
Extent	3 - Regional	2 - Limited to local area
Magnitude	4 - Low , with slight impact on processes	2 – Minor or no impact on processes
Significance	36 (Medium)	15 (Low)
Status (positive or negative)	Negative	Negative
Operation Phase		
Probability	3 - Probable (distinct possibility)	3 – Probable (distinct possibility)
Duration	5 - Permanent (ongoing during lifetime)	5 - Permanent (ongoing during lifetime)
Extent	3 - Regional	2 - Limited to local area
Magnitude	2 - minor and will not result in an impact on processes 6 – Moderate (processes continue but modified)	2 - minor and will not result in an impact on processes 4 – Low , with slight impact on processes
Significance	30 (Medium) 42 (Medium)	27 (Low) 30 (Medium)
Status (positive or negative)	Negative	Negative

Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	YES	YES
Mitigation:		
<ul style="list-style-type: none"> • All bird nest/roost sites encountered should be considered “No-Go” areas for any pylon hardstands or the construction of access roads. • An avifaunal specialist should be employed during the pre-construction and construction phases to ground-truth the proposed pylon hardstand areas. • Any nests of raptors of SCC encountered during ground-truthing should be avoided – no construction activities must take place within a 500m radius of these areas. • Any birds encountered should be allowed to move away from the construction area. • Driving should be restricted to day-light hour. Driving before sunrise and after sunset should be restricted to emergencies only. • Wherever possible existing service/access roads should be used. • Bird friendly line and pole design must be used – along with industry standard insulation of all conductors and line-pylon attachment infrastructures. • Bird nests on pylon infrastructures must not be removed during the breeding season. 		
Cumulative impacts: There will be a cumulative disturbance due to the additional anthropogenic activities associated with constructing and maintaining an additional powerline along the route. There will be an additional barrier for birds in flight/migratory species.		
Residual Risks: The presence of power lines will remain a risk to birds.		

Nature: <u>Loss of Bird Diversity and Species of Conservation concern.</u>		
<p>Construction: Some birds, particularly nocturnal species such as owls and night-jars may be killed on the roads if there is an increase in the number of project vehicles using roads at night.</p> <p>Operation: The main issue during the operation phase is the possibility of bird species colliding with the power lines while in flight or being electrocuted by contacting live parts of the system. As there are numerous bird species of conservation concern which inhabit the project area, the likelihood of collision is high and the potential impact is significant. The length of the power line and the abundance of habitats associated to different bird species compositions further exacerbate the potential impact. Alternative 2: Although proposed route Alternative 2 avoids bisecting the Swartberg Important Bird Area (IBA) it does boarder the Kouga-Baviaanskloof Complex IBA. The proposed Alternative 2 is substantially longer than proposed Alternative 1 and so has more power lines for birds to encounter. During the field survey flocks of over 50 of the globally Vulnerable Blue Crane (<i>Anthropoides paradiseus</i>) were observed utilising the agricultural lands which run along the northern perimeter of the Outeniqua Mountain Range.</p>		
	Without mitigation	With mitigation
Construction Phase		
Probability	3 - Probable (distinct possibility)	2 - Improbable (low likelihood)
Duration	1 - Very Short Duration (0 -1 year)	1 - Very Short Duration (0 -1 year)
Extent	2 - Limited to the local area	2 - Limited to the local area
Magnitude	4 - Low , with slight impact on processes	4 - Low , with slight impact on processes
Significance	21 (Low)	14 (Low)
Status (positive or negative)	Negative	Negative
Operation Phase		
Probability	5 - Definite (regardless of measures to prevent)	4 - Highly Probable (most likely)
Duration	5 - Permanent (ongoing during	5 - Permanent (ongoing during

	lifetime)	lifetime)
Extent	3 - Regional	3 - Regional
Magnitude	6 – Moderate (processes continue but modified)	4 – Low, with slight impact on processes
Significance	70 (High)	48 (Medium)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	YES	-
Mitigation:		
<ul style="list-style-type: none"> • During the construction phase there should no construction during the hours of darkness. • Speed restrictions for all project vehicles (40km/h is recommended) should be in place to reduce the impact of birds being killed on the project roads. • Wherever possible existing service/access roads should be used. • Bird flight diverters must be attached to power lines in areas where they pass through IBAs and highly sensitive areas which include the Swartberg Mountains and Outeniqua Mountains – the spacing intervals must be a minimum of 5m apart in these areas (see sensitivity map). • The spacing intervals must be decided by an avifaunal specialist following ground-truthing of the final route - a minimum of 5m apart in is suggested. • All areas defined as having a medium avifaunal sensitivity must have bird diverters installed (spacing to be determined following ground-truthing). These areas include suitable habitat for numerous powerline priority species (e.g. cranes, bustards, and storks). Alternative 2: Furthermore, as there is no existing power line along the proposed alternative birds are less likely to be cautious of large infrastructures in this area. • The power line should be constructed in close proximity to the existing power line as many birds will be aware of the existing infrastructure which may reduce collisions in low visibility conditions. 		
<p>Cumulative impacts: Alternative 1: The erection of addition power lines will further increase the chances of bird collisions in the area. Alternative 2: The construction of service/access roads may provide access to previously remote areas which could cause an increase in anthropogenic activities and impacts within the area.</p>		
<p>Residual Risks: The presence of power lines will remain a risk to flying birds.</p>		

7.4.3. Freshwater Resources (Wetlands and River courses) impact assessment:

The two alternative powerline do not differ in any significant way as far as the impacts on freshwater resources is concerned. In most part the two alternatives are not comparatively assessed in the assessment tables below. Where applicable, the **differences in impacts are highlighted in red for Alternative 2.**

Nature: Modification of freshwater habitat, water quality impacts and possibly impedance of flow at river crossings

Construction: Approximately 250km of 400kV power line is being considered from the proposed new Blanco Substation and the Droërvier Substation. Activities that would be associated with the construction activities would include the installation of foundations and pylons.

Activities during the construction phase of the project could be expected to result in some shorter term disturbance of stream/riverine and wetland associated vegetation cover and to the bed and banks of the freshwater features where access for the construction works associated with the line may need to cross freshwater features.

The major impacts associated with the establishment of the service road along the line relate to the potential loss of habitat within wetland areas and the rivers/streams, invasive alien plant growth, flow and water quality impacts and erosion of drainage channels/stream or river banks.

Operation: Some disturbance of the freshwater features in the area of the constructed power line could be expected over the longer term that would be associated with the maintenance activities for the project.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Improbable (2)
Duration	Short-term (2)	Very short-term (1)
Extent	Local (2) Regional (3)	Site (1) Local (2)
Magnitude	Low (4)	Minor(2)
Significance	24 (Low) 27 (Low)	8 (Low) 12 (Low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Long-term (4)	Long-term (4)
Extent	Local (2) Regional (3)	Site (1) Local (2)
Magnitude	Minor(2)	Small (1)
Significance	16 (Low) 32 (Moderate)	12 (Low) 14 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	High
Irreplaceable loss of resources?	Moderate	Low
Can impacts be mitigated?	Yes, Impacts can be mitigated to a certain extent during the construction phase, but due to the fact that the line will need to cross the lower reaches of the rivers with their wide associated floodplain wetlands, the probability that there will be some loss or modification of aquatic habitat that is more sensitive is greater. Little mitigation is possible during the operational phase. The impacts during this phase are however also minimal.	
Mitigation:		
<ul style="list-style-type: none"> • <u>Construction</u> activities should as far as possible be limited to the area outside the proposed buffer zones. It is recommended that a buffer of 50 from the top of the river banks ; approximately 100m from the edge of the wetland areas and 500m from the pans be allowed for as a development setback for the construction of the pylons. Neither the pylons nor the anchors should be constructed within the proposed buffer zones. The power lines may cross over the buffer zones for the wetlands, pans and watercourses as the limitations are not applicable to overhead infrastructure. • With regards to the temporary crossings over the watercourses required for the construction phase, existing access should be used as far as possible. Where this is unavoidable, the disturbance to the watercourse should be minimised as far as possible and wetland areas should be avoided. The disturbed areas should be rehabilitated as soon as possible after construction is complete by reshaping and revegetating the disturbed areas with suitable indigenous vegetation (replace indigenous riparian and instream vegetation where possible). Any invasive alien plants that currently exist within the immediate area of the construction activities should also 		

be removed. To reduce the risk of erosion, run-off over the exposed areas should be mitigated to reduce the rate and volume of run-off and prevent erosion occurring within the freshwater features.

- Contaminated runoff from the construction sites should be prevented from entering the rivers/streams and wetland areas. All materials on the construction sites should be properly stored and contained. Disposal of waste from the sites should also be properly managed. Construction workers should be given ablution facilities at the construction sites that are located at least 50m away from the river/stream systems and wetland areas and regularly serviced. These measures should be addressed, implemented and monitored in terms of the EMP for the construction phase.
- Operation: Maintenance of the power lines should only take place via the designated access routes. The establishment of alien vegetation in the riparian zones along the transmission line route should specifically be prevented, and controlled if it does occur.

Cumulative impacts: Most of the freshwater features within the proposed corridors are already in a modified ecological state as a result of the existing land use activities. The proposed lines are in general proposed along routes where there are already power lines in place. Provided the new lines are constructed close to these lines such that the associated access roads can be shared, the cumulative impacts are likely to be low. Erosion and sedimentation from the project activities, together with invasive alien plant growth and the possible modification of surface water runoff and water quality may lead to additional impacts on the freshwater habitats within the study area. In general, by selecting the route with the least impact, one can prevent any unacceptable impacts, particularly over the longer term, from taking place within the freshwater features within the study area. These impacts are likely to be of a low significance and can be monitored and easily mitigated. The proposed mitigation measures are largely intended to minimise the impacts that may occur within the construction phase when the potential impact is the greatest.

Residual Risks: Residual risks are associated with the need to access and maintain the power lines that require ongoing disturbance to aquatic features along the transmission line route that will need to take place for the lifetime of the project

7.4.4. Heritage & Archaeology Impacts Assessment

The two alternative powerline do not differ in any significant way as far as the impacts on heritage is concerned. In most part the two alternatives are not comparatively assessed in the assessment tables below. Where applicable, the **differences in impacts are highlighted in red for Alternative 2.**

Nature: Impact on Pre-Colonial Archaeology

Negative impacts to archaeological material which may include caves with rock art and archaeological deposit as well as scatters of archaeological material.

Since heritage sites, such as archaeological sites, are non-renewable, it is important that they are identified and their significance assessed prior to development.

The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The significance of an archaeological site is highly dependent on its geological and spatial context. Even though excavations for tower footings tend to be relatively small and shallow, they may expose buried archaeological sites and artefacts. These artefacts are relatively meaningless once removed from the area in which they were found. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the project.

This report has highlighted the distinct possibility that caves with rock paintings may occur in the mountains along either powerline alternative. It is not anticipated that the tower footings will be placed on top of caves and rock shelters, thereby resulting in their destruction. However, if towers are placed in proximity to rock art sites, they will be more vulnerable to vandalism from construction crews and may become more easily accessible to the public too.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Improbable (2)

Duration	Long-term (4)	Long-term (4)
Extent	Local (2)	Site (1)
Magnitude	Low (4) Moderate (5)	Minor (2)
Significance	30 (Moderate) 33 (Moderate)	14 (low)
Status (positive or negative)	Negative	Neutral
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Long-term (4)	Long-term (4)
Extent	Local (2)	Site (1)
Magnitude	Minor (2)	Minor (2)
Significance	24 (Low)	14 (low)
Status (positive or negative)	Neutral	Neutral
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Walk down of certain areas along the selected route, targeting koppies, river banks and rugged topography where the possibility of caves/rock shelters may exist. Micro-siting of pylons to avoid impacts.		
Cumulative impacts: Low		
Residual Risks: None anticipated		

Nature: <u>Impact on Colonial Period</u>		
The construction of pylons in close proximity to farmsteads may result in the destruction of historic rubbish dumps (middens), old kraals or the ruins of old dwellings.		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Improbable (2)
Duration	Long-term (4)	Long-term (4)
Extent	Local (2)	Site (1)
Magnitude	Low (4)	Minor (2)
Significance	30 (Moderate)	14 (low)
Status (positive or negative)	Negative	Neutral
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Long-term (4)	Long-term (4)
Extent	Local (2)	Site (1)
Magnitude	Minor (2)	Minor (2)
Significance	24 (Low)	14 (low)
Status (positive or negative)	Neutral	Neutral
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: A targeted walk-down of the line will be required after the final powerline route has been decided. The walk down would concentrate on areas immediately around farm buildings and structures.		
Cumulative impacts: Low		

Residual Risks: None anticipated

Impact on Graves

Nature: Impacts will be through possible direct impacts on local historic cemeteries (near settlements and farms) as well as individual graves.

While large cemeteries in proximity to villages and on farms are generally fenced and easy to identify, isolated graves may occur in apparently random locations. They are often unfenced and may not have headstones, making them difficult to identify. Sometimes they are only visible because they are covered in cairns of unshaped stones. It is these graves which are most at risk from construction crews. Human remains are the most complicated aspects of heritage to mitigate since they require their own public participation process (See Section 36 of the NHRA) before they can be exhumed. In the event of human bones being found on site, WC must be informed immediately and the remains removed by an archaeologist under an emergency permit. This process will incur some expense as removal of human remains is at the cost of the developer. Time delays may result while application is made to the authorities and an archaeologist is appointed to do the work.

CONSTRUCTION PHASE

Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Improbable (2)
Duration	Long-term (4)	Short-term (1)
Extent	Regional (3)	Local (2)
Magnitude	Moderate (6)	Low (4)
Significance	39 (Moderate)	14 (low)
Status (positive or negative)	Negative	Neutral
OPERATIONAL PHASE		
Probability	Probable (3)	Improbable (2)
Duration	Long-term (4)	Long-term (4)
Extent	Local (2)	Site (1)
Magnitude	Low (3)	Minor (2)
Significance	27 (Low)	14 (low)
Status (positive or negative)	Neutral	Neutral
Reversibility	Reversible	Reversible
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	No	Yes

Mitigation: Walk down of selected sections of the line near farmsteads where graves may be expected to occur. A protocol for dealing with the discovery of human remains during construction.

Cumulative impacts: None anticipated

Residual Risks: None anticipated

7.4.5. Soil, Land Use & Agricultural Impacts Assessment

The development areas of the two alternative powerline do not differ in any significant way as far as the impacts soil and agricultural potential is concerned. Therefore, there is no significant difference in the potential impacts associated with the alternatives, and the impacts for the two alternatives are not comparatively assessed in the assessment tables below.

Nature: Construction activities (pylons / power lines, Vehicle operation on site, Dust generation) and Loss of agricultural land in areas of LOW intensity agriculture or land use pylon footprint		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Definite (5)	Definite (5)
Duration	Short-term (2)	Short-term (2)
Extent	Site (2)	Site (2)
Magnitude	Minor (2)	Minor (2)
Significance	16 (Low)	16 (Low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Definite (5)	Definite (5)
Duration	Short-term (2)	Short-term (2)
Extent	Site (2)	Site (2)
Magnitude	Minor (2)	Minor (2)
Significance	16 (Low)	16 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	No	
Mitigation:		
<ul style="list-style-type: none"> Pylon footprints and infrastructure are permanent and the pylons cannot be mitigated 		
Cumulative impacts: Pylon footprints are limited in spatial extent and once in place do not lead to additional spatial or land use impacts.		
Residual Risks: None anticipated		

Nature: Construction activities (pylons/power lines, Vehicle operation on site, Dust generation) and Loss of agricultural land in areas HIGH intensity agriculture or land use pylon footprint		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Definite (5)	Definite (5)
Duration	Short-term (2)	Short-term (2)
Extent	Site (1)	Site (1)
Magnitude	Very High (10)	Very High (10)
Significance	80 (high)	80 (high)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Definite (5)	Definite (5)
Duration	Short-term (2)	Short-term (2)
Extent	Site (1)	Site (1)
Magnitude	Very High (10)	Very High (10)
Significance	80 (high)	80 (high)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low

Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	No	
Mitigation:		
<ul style="list-style-type: none"> Pylon footprints and infrastructure are permanent and the pylons cannot be mitigated 		
Cumulative impacts: Pylon footprints are limited in spatial extent and once in place do not lead to additional spatial or land use impacts.		
Residual Risks: None anticipated		

7.4.6. Visual Impacts assessment

The two alternative powerline do not differ in any significant way as far as the impacts on the visual is concerned. In most part the two alternatives are not comparatively assessed in the assessment tables below. Where applicable, the **differences in impacts are highlighted in red for Alternative 2.**

Nature: Visual impacts on GROOT KAROO landscape type - Observers

The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively.

Viewer incidence for **Alternative 1** is expected to be medium due to the proximity to a national road, although the overall population density is very low. For **Alternative 2**, a very low viewer incidence is expected due to the sparse population distribution and road network.

A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.

Operation: A new transmission line will be added to the visual environment. It will be highly visible due to the low VAC and observers up to 5 km may be exposed to it, although those within the ZMVE will be most significantly affected. Viewer incidence is expected to be medium due to a low overall population density and the proximity to a national road. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. The industrial character will contrast with the generally natural character of the landscape and will intrude on the observer's visual experience.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Highly probable (4) Probable (3)	Highly probable (4) Probable (3)
Duration	Very short term (1)	Very short term (1)
Extent	Regional (3)	Local (2)
Magnitude	Low (5) Low (4)	Low (4) Minor(2)
Significance	36 (moderate) Low (27)	28 (Low) Low (21)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Highly probable (4)	Highly probable (4)

	Probable (3)	Probable (3)
Duration	Long short term (4)	Long short term (4)
Extent	Regional (4)	Regional (4)
Magnitude	Moderate (6) Low(4)	Low (5) Minor(2)
Significance	56 (moderate) 36 (moderate)	52 (Moderate) 30 (moderate)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Impacts can be mitigated with limited effectiveness, as very little can be done to reduce the visibility of the power line, unless major design changes are incorporated.	
Mitigation:		
<ul style="list-style-type: none"> • Avoidance: Complete avoidance of the impacts is a function of either not proceeding with the proposed project or relocating the project to an alternative site. This is often the most effective mitigation strategies but within the constraints of economics and available land it is not necessarily possible or feasible. • Reduction: Where negative impacts cannot be avoided it should be considered how to reduce the impact as much as possible. Different projects require different solutions but scaling down or limiting disturbances are some of the options. • Remediation: Remediation mitigation relies on add-on or cosmetic measures to “soften” the impact to a degree. This is often associated with screening or camouflage treatment to avoid or limit intrusive views. • Compensation: Where a negative impact cannot be mitigated adequately, other compensatory measures may offset the residual effects. This requires a thorough understanding and assessment of the environment in order to provide equivalent compensation. This may require extensive public consultation, especially if the impacts lean towards sentimental issues or personal values and perceptions. • Enhancement: Enhancement aims to manage certain changes and impacts by enhancing the quality of the environment for local people. This requires the exploring of opportunities in the proposed project to contribute positively to the landscape and its experience. Enhancement may take many forms but could include preservation of ecosystems, proper land management, and restoration of habitats or historic landscapes. 		
<p>Cumulative impacts: Cumulative impacts are <u>highly likely</u> due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the desolate character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.</p>		
<p>A <u>low risk of cumulative</u> impacts exists due to the fact that no high voltage power lines occur along Alternative 2.</p>		
<p>Residual Risks: Residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.</p>		

Nature: Visual impacts on GROOT KAROO landscape type – Visual resource

The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the desolate sense of place of the landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the normal farming activities. It is considered incompatible with the prevailing character.

Operation: A new transmission line will add to the visual dominance of the existing electrical infrastructure, and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the uniform landscape, and disrupt the desolate identity of the Groot Karoo.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Probable (3)

Duration	Very short term (1)	Very short term (1)
Extent	Regional (3)	Local (2)
Magnitude	Low (4)	Low (3) Minor(2)
Significance	24 (Low)	18 (Low) 15 (Low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Probable (3) Highly Probable (4)	Probable (3) Highly Probable (4)
Duration	Long term (4)	Long term (4)
Extent	Regional (4)	Regional (4)
Magnitude	Moderate (6) High (9)	Low (4) High (9)
Significance	Medium (42) High (68)	Medium (36) High (68)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low-Medium
Can impacts be mitigated?	Impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.	
Mitigation:		
<ul style="list-style-type: none"> • Avoidance: Complete avoidance of the impacts is a function of either not proceeding with the proposed project or relocating the project to an alternative site. This is often the most effective mitigation strategies but within the constraints of economics and available land it is not necessarily possible or feasible. • Reduction: Where negative impacts cannot be avoided it should be considered how to reduce the impact as much as possible. Different projects require different solutions but scaling down or limiting disturbances are some of the options. • Remediation: Remediation mitigation relies on add-on or cosmetic measures to “soften” the impact to a degree. This is often associated with screening or camouflage treatment to avoid or limit intrusive views. • Compensation: Where a negative impact cannot be mitigated adequately, other compensatory measures may offset the residual effects. This requires a thorough understanding and assessment of the environment in order to provide equivalent compensation. This may require extensive public consultation, especially if the impacts lean towards sentimental issues or personal values and perceptions. • Enhancement: Enhancement aims to manage certain changes and impacts by enhancing the quality of the environment for local people. This requires the exploring of opportunities in the proposed project to contribute positively to the landscape and its experience. Enhancement may take many forms but could include preservation of ecosystems, proper land management, and restoration of habitats or historic landscapes. 		
<p>Cumulative impacts: Cumulative impacts are <u>highly likely</u> due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the desolate character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.</p> <p>A <u>low risk of cumulative</u> impacts exists due to the fact that no high voltage power lines occur along Alternative 2.</p>		
<p>Residual Risks: Residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.</p>		

Nature: Visual impacts on SWARTBERG MOUNTAINS landscape type - Observers

For the construction of **Alternative 1** No viewer groups are expected to be affected by the transmission line construction in these LS as it is completely inaccessible by vehicle and no residents are present. Glimpses of a section of the power line may be visible to individual farm residents on either side of the Swartberg Mountains. Viewer incidence is expected to be insignificantly low.

The construction activity of **Alternative 2** will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. Observers exposed to the construction activity will be limited to motorists passing on the N9, possibly catching a glimpse through the hilly terrain, and a few farm residents residing along the foothills of the mountains. Viewer incidence is expected to be medium due to the proximity to a national road and the medium VAC. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.

Operation: A new transmission line will be added to the visual environment. It will be moderately visible from viewpoints on the southern side of the Swartberg Mountains as it crosses over the mountainous terrain. The new transmission line will blemish the natural character and cause a visual intrusion on the affected observers. Viewer incidence is expected to be medium due to the proximity to a national road.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Very improbable (1) Improbable (2)	Very improbable (1) Improbable (2)
Duration	Very short term (1)	Very short term (1)
Extent	Site (1) Local (2)	Site (1) Local (2)
Magnitude	Small (1) Minor(2)	Small (1)
Significance	Very low (3) Low (10)	Very low (3) Low (8)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Very improbable (1) Probable (3)	Very improbable (1) Probable (3)
Duration	Long short term (4)	Long short term (4)
Extent	Site (1) Local (2)	Site (1) Local (2)
Magnitude	Small (1) Low(4)	Small (1) Low (3)
Significance	Very low (3) 30 (moderate)	Very low (3) 27 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Moderate	Moderate
Can impacts be mitigated?	Alternative 1 : Impacts can be mitigated during the construction phase to minimise impacts on the visual resource, although no major viewer groups will be affected. For Alternative 2 , impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.	
Mitigation:		
<ul style="list-style-type: none"> Avoidance: Complete avoidance of the impacts is a function of either not proceeding with the proposed project or relocating the project to an alternative site. This is often the most effective mitigation strategies but within the constraints of economics and available land it is not necessarily possible or feasible. 		

- Reduction: Where negative impacts cannot be avoided it should be considered how to reduce the impact as much as possible. Different projects require different solutions but scaling down or limiting disturbances are some of the options.
- Remediation: Remediation mitigation relies on add-on or cosmetic measures to “soften” the impact to a degree. This is often associated with screening or camouflage treatment to avoid or limit intrusive views.
- Compensation: Where a negative impact cannot be mitigated adequately, other compensatory measures may offset the residual effects. This requires a thorough understanding and assessment of the environment in order to provide equivalent compensation. This may require extensive public consultation, especially if the impacts lean towards sentimental issues or personal values and perceptions.
- Enhancement: Enhancement aims to manage certain changes and impacts by enhancing the quality of the environment for local people. This requires the exploring of opportunities in the proposed project to contribute positively to the landscape and its experience. Enhancement may take many forms but could include preservation of ecosystems, proper land management, and restoration of habitats or historic landscapes.

Cumulative impacts:

Alternative 1: Cumulative impacts are unlikely due to the insignificantly low viewer incidence and visual exposure to sensitive viewers. A low risk of cumulative impacts exists due to the fact that no high voltage power lines occur along **Alternative 2**.

Residual Risks:

Alternative 1: Residual risks are very low due to the insignificantly low viewer incidence and visual exposure to sensitive viewers.

For **Alternative 2** residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.

Nature: Visual impacts on SWARTBERG MOUNTAINS landscape type – Visual Resource

The construction activity will cause a negative effect, primarily on the natural vegetation, but also on the wilderness landscape character. For the duration of the construction phase machinery, material and workforce will be uncharacteristic to the visual resource and will contrast with the conservation land use. It is considered incompatible with the prevailing character.

Operation: A new transmission line will add to the visual dominance of the existing electrical infrastructure and will increase the visual clutter created by the conductors and intricate steel lattice towers. The complex industrial character of the towers will contrast with the conservation status and the wilderness character of the region. The spectacular scenic quality will be blemished even further with the presence of more power lines.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Highly probable (4)	Highly probable (4)
Duration	Very short term (1)	Very short term (1)
Extent	Local (2)	Site (1)
Magnitude	Low (4)	Low (3)
Significance	Low (28)	Low (20)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Definite (5)	Definite (5)
Duration	Long short term (4)	Long short term (4)
Extent	Local (2)	Local (2)
Magnitude	High (8)	High (8)
Significance	High (70)	High (70)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of	Moderate	Moderate

resources?		
Can impacts be mitigated?	<p>Alternative 1: impacts can be mitigated with limited success unless major design changes are considered. For Alternative 2, impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.</p>	
<p>Mitigation:</p> <ul style="list-style-type: none"> • Avoidance: Complete avoidance of the impacts is a function of either not proceeding with the proposed project or relocating the project to an alternative site. This is often the most effective mitigation strategies but within the constraints of economics and available land it is not necessarily possible or feasible. • Reduction: Where negative impacts cannot be avoided it should be considered how to reduce the impact as much as possible. Different projects require different solutions but scaling down or limiting disturbances are some of the options. • Remediation: Remediation mitigation relies on add-on or cosmetic measures to “soften” the impact to a degree. This is often associated with screening or camouflage treatment to avoid or limit intrusive views. • Compensation: Where a negative impact cannot be mitigated adequately, other compensatory measures may offset the residual effects. This requires a thorough understanding and assessment of the environment in order to provide equivalent compensation. This may require extensive public consultation, especially if the impacts lean towards sentimental issues or personal values and perceptions. • Enhancement: Enhancement aims to manage certain changes and impacts by enhancing the quality of the environment for local people. This requires the exploring of opportunities in the proposed project to contribute positively to the landscape and its experience. Enhancement may take many forms but could include preservation of ecosystems, proper land management, and restoration of habitats or historic landscapes. 		
<p>Cumulative impacts:</p> <p>Alternative 1: Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural character of the study area, thereby causing a loss in visual value. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the loss in visual value is considered less than in an area with no electrical infrastructure.</p> <p>A <u>low risk of cumulative</u> impacts exists due to the fact that no high voltage power lines occur along Alternative 2.</p>		
<p>Residual Risks:</p> <p>Residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.</p>		

<p>Nature: <u>Visual impacts on KLEIN KAROO MOUNTAINS landscape type - Observers</u></p>		
<p>The <u>construction activity</u> will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. It is possible that higher growing vegetation will be removed in the corridor to adhere to safety regulations. As the towers gain height, the visibility and visual exposure will increase progressively. Viewer incidence is expected to be low due to the few roads and sparsely distributed rural population. Visual exposure will also be limited due to the low inter-visibility within the study area and the generally high VAC. A visual change will occur and will become progressively more substantial as the power line nears completion. It will cause a visual intrusion due to the disturbance of the natural vegetation and the uncharacteristic activities in the study area.</p>		
<p><u>Operation:</u> new transmission line will be added to the visual environment. The mountainous terrain limits visual exposure and inter-visibility within the study area, but the towers will be clearly visible when exceeding the horizon. Viewer incidence is expected to be low due to the few roads and sparsely distributed rural population. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. The industrial character will contrast with the generally natural character of the landscape and will intrude on the observer’s visual experience. Highly scenic views of the mountains and valleys will be affected.</p>		
<p>CONSTRUCTION PHASE</p>		
<p>Rating of Impacts</p>	<p>Without mitigation</p>	<p>With mitigation</p>

Probability	Improbable (2) Highly probable (4)	Improbable (2) Highly probable (4)
Duration	Very short term (1)	Very short term (1)
Extent	Local (2) Local (3)	Local (2)
Magnitude	Low (3) Local (4)	Low (3)
Significance	Low (12) Medium (32)	Low (10) Low (24)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Highly probable (4)	Highly probable (4)
Duration	Long term (4)	Long term (4)
Extent	Regional (3) Regional (4)	Regional (3) Regional (4)
Magnitude	High (8)	High (8)
Significance	Medium (60) High (64)	Medium (60) High (64)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Moderate	Moderate
Can impacts be mitigated?	<p>Alternative 1: Impacts can be mitigated during the construction phase to minimise impacts on the visual resource, although no major viewer groups will be affected. For Alternative 2, impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.</p>	
<p>Mitigation:</p> <ul style="list-style-type: none"> • Avoidance: Complete avoidance of the impacts is a function of either not proceeding with the proposed project or relocating the project to an alternative site. This is often the most effective mitigation strategies but within the constraints of economics and available land it is not necessarily possible or feasible. • Reduction: Where negative impacts cannot be avoided it should be considered how to reduce the impact as much as possible. Different projects require different solutions but scaling down or limiting disturbances are some of the options. • Remediation: Remediation mitigation relies on add-on or cosmetic measures to “soften” the impact to a degree. This is often associated with screening or camouflage treatment to avoid or limit intrusive views. • Compensation: Where a negative impact cannot be mitigated adequately, other compensatory measures may offset the residual effects. This requires a thorough understanding and assessment of the environment in order to provide equivalent compensation. This may require extensive public consultation, especially if the impacts lean towards sentimental issues or personal values and perceptions. • Enhancement: Enhancement aims to manage certain changes and impacts by enhancing the quality of the environment for local people. This requires the exploring of opportunities in the proposed project to contribute positively to the landscape and its experience. Enhancement may take many forms but could include preservation of ecosystems, proper land management, and restoration of habitats or historic landscapes. 		
<p>Cumulative impacts:</p> <p>Alternative 1: Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the natural and agricultural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.</p>		
<p>A <u>medium risk</u> of cumulative impacts exists as there is no high voltage power line infrastructure along Alternative 2.</p>		

but lower voltage power lines on gum pole structures are present along a section of the corridor.

Residual Risks:

Alternative 1: Residual risks are very low due to the insignificantly low viewer incidence and visual exposure to sensitive viewers.

For **Alternative 2** residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.

Nature: Visual impacts on OUTENIQUA MOUNTAINS landscape type - Observers

The construction activity will cause a negative effect on observers in the ZMVE as the initial construction activity will be limited to surface disturbances. As the towers gain height, the visibility and visual exposure will increase progressively. It is possible that higher growing vegetation will be removed in the corridor to adhere to safety regulations. For **Alternative 1**, viewer incidence is expected to be high due to the proximity to national roads and the extended rural community in Waboomskraal. Visual exposure will be limited due to the mountainous terrain, but Waboomskraal is in an open valley with high visual exposure. Visual intrusion will occur due to the effects on scenic views of the unique agricultural practices in Waboomskraal and the spectacular mountainous backdrop.

For **Alternative 2** Visual exposure will be limited due to the mountainous terrain, but the Waboomskraal and Langkloof valleys are open with high levels of visual exposure expected. Visual intrusion will occur due to the effects on scenic views of the harmonious agricultural practices and the spectacular mountain backdrop of the Outeniqua Mountains..

Operation: A new transmission line will be added to the visual environment. The mountainous terrain limits visual exposure and inter-visibility within the study area, but the towers will be clearly visible when exceeding the horizon. The Waboomskraal valley is an open agricultural area with particularly scenic views. Viewer incidence is expected to be high due to the proximity to national roads and the extended rural community in Waboomskraal. A visual change will occur as a result of the new transmission line and the increased dominance of electrical infrastructure in the study area. Visual intrusion will occur due to the effects on scenic views of the unique agricultural practices in Waboomskraal and the spectacular mountainous backdrop. The inherent visual harmony will be further disrupted.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Highly probable (4)	Highly probable (4)
Duration	Very short term (1)	Very short term (1)
Extent	Local (2) Local (3)	Local (2)
Magnitude	Low (4)	Low (3)
Significance	Low (28) Medium (32)	Low (24) Low (24)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Definite (5) Highly probable (4)	Definite (5) Highly probable (4)
Duration	Long term (4)	Long term (4)
Extent	Regional (3) Regional (4)	Regional (3) Regional (4)
Magnitude	High (8)	High (8)
Significance	High (75) High (64)	High (75) High (64)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of	Moderate	Moderate

resources?	
Can impacts be mitigated?	<p>Alternative 1: Impacts can be mitigated during the construction phase to minimise impacts on the visual resource, although no major viewer groups will be affected. For Alternative 2, impacts can be mitigated during the construction phase, but little can be done to mitigate the impacts during the operational phase, unless major layout or design changes are made to avoid the potential impacts.</p>
<p>Mitigation:</p> <ul style="list-style-type: none"> • Avoidance: Complete avoidance of the impacts is a function of either not proceeding with the proposed project or relocating the project to an alternative site. This is often the most effective mitigation strategies but within the constraints of economics and available land it is not necessarily possible or feasible. • Reduction: Where negative impacts cannot be avoided it should be considered how to reduce the impact as much as possible. Different projects require different solutions but scaling down or limiting disturbances are some of the options. • Remediation: Remediation mitigation relies on add-on or cosmetic measures to “soften” the impact to a degree. This is often associated with screening or camouflage treatment to avoid or limit intrusive views. • Compensation: Where a negative impact cannot be mitigated adequately, other compensatory measures may offset the residual effects. This requires a thorough understanding and assessment of the environment in order to provide equivalent compensation. This may require extensive public consultation, especially if the impacts lean towards sentimental issues or personal values and perceptions. • Enhancement: Enhancement aims to manage certain changes and impacts by enhancing the quality of the environment for local people. This requires the exploring of opportunities in the proposed project to contribute positively to the landscape and its experience. Enhancement may take many forms but could include preservation of ecosystems, proper land management, and restoration of habitats or historic landscapes. 	
<p>Cumulative impacts:</p> <p>Alternative 1: Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 1. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the natural and agricultural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure.</p> <p>Alternative 2: Cumulative impacts are highly likely due to the existing power lines that follow a similar corridor as Alternative 2 through Waboonskraal. An increased visual dominance of electrical infrastructure can be expected, which contrasts with the pristine natural and unique agricultural character of the study area, thereby causing a visual intrusion. However, it is considered more appropriate to contain power lines in one corridor. The visual dominance of power line infrastructure will be raised along the corridor, but the visual intrusion is considered less than in an area with no electrical infrastructure. A medium risk of cumulative impacts exists through Langkloof as there is no high voltage power line infrastructure along Alternative 2, but lower voltage power lines on gum pole structures are</p>	
<p>Residual Risks:</p> <p>Alternative 1: Residual risks will occur, as the visibility of the power line cannot be effectively reduced and therefore visual intrusion will remain an impacting factor for the lifetime of the project.</p> <p>For Alternative 2 residual risks will occur as the visibility of the power line cannot be effectively reduced, and therefore visual intrusion will remain an impacting factor for the lifetime of the project.</p>	

7.4.7. Social Impacts assessment

The development areas of the two alternative powerline do not differ in any significant way as far as the social impacts are concerned. Therefore, there is no significant difference in the potential impacts associated with the alternatives, and the impacts for the two alternatives are not comparatively assessed in the assessment tables below.

Nature: <u>Improved quality of life, through creation of jobs</u>		
It is expected that contractors will bring their own workers and will be required by Eskom to employ local people. Jobs therefore will be created for locals and at a national level. Jobs are a source of livelihoods and can therefore improve the quality of life for those who work. Increased procurement during construction will largely sustain jobs. There may also be some jobs created during this time if the levels of procurement justify them. Procurement is expected to benefit companies on a national scale, and to a lesser extent, companies locally.		
Rating of Impacts	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Definite (5)
Duration	Short-term (2)	Short-term (2)
Extent	Local (2)	Regional (3)
Magnitude	Low (4)	High (8)
Significance	24 (low)	65 (High)
Status (positive or negative)	Positive	Positive
OPERATIONAL PHASE		
It is expected that there will be limited opportunities for job creation during the operations phase, including for maintenance activities, at local and national/regional scales. This impact is therefore not assessed for the operations phase.		
Reversibility	Not applicable for this impact	Not applicable for this impact
Irreplaceable loss of resources?	Not applicable for this impact	Not applicable for this impact
Can impacts be mitigated?	This is a positive impact and should be promoted. From a developmental point of view, as far as possible local communities should benefit from the impact. Management measures are directed at increasing the likelihood that more eligible locals are employed.	
Mitigation/Enhancements:		
<ul style="list-style-type: none"> Eskom contract conditions should provide for at least unskilled labour to be sourced from the local municipal area affected. Contractors can be required to assess local applicants to identify those with potential to join the skilled and semi-skilled workforce. These workers can be put onto a regional database for contractors to draw their semi-skilled and skilled labour from, in the future. Where Eskom training schemes make provisions, locals with potential can be offered training opportunities. Eskom can identify as much procurement opportunity as possible at the local level to support businesses and job creation locally. 		
Cumulative impacts: there is a possibility that cumulative impact will be achieved at regional/national scale without management measures.		
Residual Risks: None, as project work will be on a contract basis.		

Nature: <u>Improved quality of life from increased reliability of energy services (during operations)</u>		
Currently, South Africa is not meeting its electricity demand to support economic growth rates it would like to see. Security of energy supply will therefore positively contribute towards stabilizing and perhaps also stimulating economic activities in the Western Cape. This can improve livelihoods through sustaining and possibly increasing the number of jobs available.		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
This impact is expected to be delivered after the construction phase.		
OPERATIONAL PHASE		
Probability	Probable (3)	Highly Probable (4)

Duration	Long-term (4)	Very Long-term (5)
Extent	Regional (3)	Regional (3)
Magnitude	High (8)	High (8)
Significance	45 (Medium)	72 (High)
Status (positive or negative)	Positive	Positive
Reversibility	Not applicable for this impact	Not applicable for this impact
Irreplaceable loss of resources?	Not applicable for this impact	Not applicable for this impact
Can impacts be mitigated?	This is a positive impact and should be promoted. If the development benefits many households, businesses and other development units within the municipal areas the infrastructure passes through, this may ease the negative impacts experienced. Management measures are therefore directed at increasing the likelihood that more people benefit from energy provision in these municipalities.	
Mitigation:		
<ul style="list-style-type: none"> Infrastructure will have to be maintained on an ongoing basis, to provide a permanent benefit for development. Where infrastructure has to be changed in the long term, for example, if there is a switch to environmentally friendly energy technology, this should be effected with little disruption. A large proportion of households in the area are unable to pay for services. For example, 12% of households in George do not have any income. While it is favourable that households move towards improving their income status so that they are able to pay for services in the long term, this outcome is very much out of the influence of Eskom. It is therefore recommended that Eskom also consider renewable energy sources especially for no and low income households. This can allow energy access at no cost for poor households and support their social and economic development activities. It can also reduce the burden on Eskom and government in the long term to maintain conventional infrastructure and provide free electricity for households unable to pay for services. 		
Cumulative impacts: improving security of supply will be cumulative to having access to electricity. For those who are receiving electricity for the first time and have been beneficiaries of other development measures such as the provision of water, the provision of secure electricity will be cumulative by improving their quality of life further.		
Residual Risks: access to secure sources of electricity can lead to many "downstream" development benefits.		

Nature: <u>Increased community safety risks from increased direct exposure to electrical hazards</u>		
Increased community safety risks from increased direct exposure to electrical hazards, if there is tampering with power infrastructure including sub stations. It is also hazardous to use helicopters in an area with 400kV pylons. This is a direct impact with potential immediate and long term impacts. The impacts will be experienced during the operations phase.		
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
This impact is expected to be delivered after the construction phase.		
OPERATIONAL PHASE		
Probability	Improbable (2)	Very Improbable (1)
Duration	Permanent (5)	Very short-term (1)
Extent	Site (1)	Site (1)
Magnitude	Permanent (10)	Low (4)
Significance	Medium (32)	Low (6)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources?	High	Low
Can impacts be mitigated?	If injury is reversible, then yes. In the case of death, no.	
Mitigation:		
<ul style="list-style-type: none"> Where there is a risk of tampering, access to infrastructure will have to be controlled. Infrastructure will also 		

<p>have to be monitored and maintained especially in populated areas so that people (or animals) are not exposed to hazardous conditions.</p> <ul style="list-style-type: none"> Infrastructure will have to be monitored and maintained especially in populated areas so that people (or animals) are not exposed to hazardous conditions. It is recommended that a rapid and appropriate procedure be put in place for stakeholders to identify report and manage damaged infrastructure. Workers and residents working in the vicinity of the power infrastructure must be informed about how to implement the procedure. They must be made aware of what should be done if someone is injured or killed because of exposure to electrical hazards.
Cumulative impacts: If damaged infrastructure is not repaired timeously, it can continue to be a health hazard
Residual Risks: If injury is severe, the impact will persist.

Nature: Increased pressure on local services		
Increased community health risks if workers' camps do not have access to basic services such as sanitation and waste removal. This impact can potentially be introduced during construction. This impact could be realized along the construction route of the power line.		
Rating of Impacts	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Highly Probable (4)	Improbable (2)
Duration	Medium-term (3)	Medium-term (3)
Extent	Regional (3)	Site (1)
Magnitude	Permanent (10)	Minor (2)
Significance	Medium (56)	Low (12)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
If risks are not managed appropriately during construction, hazardous conditions can persist into the operations phase. Risks can be introduced during construction and management measures must manage the risks during that phase		
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Moderate	Low
Can impacts be mitigated?	Yes	
Mitigation/Enhancements:		
<ul style="list-style-type: none"> Provide appropriate water, sanitation and waste management facilities. Provide education and awareness to workers about the need to keep the environment clean, and how human waste can create health hazards. Monitor the effectiveness of basic service facilities provided and behavior, and correct if necessary. 		
Cumulative impacts: Can be cumulative if not mitigated, for example, if there is poor waste management at the workers' camps.		
Residual Risks: Minimal if mitigated appropriately.		

Nature: Increased community health risks from possible increased exposure to HIV/AIDS		
Increased community health risks from possible increased exposure to HIV/AIDS. This is a direct impact caused by transmission of the disease.		
Rating of Impacts	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Highly Probable (4)	Improbable (2)
Duration	Permanent (5)	Very Short-term (1)

Extent	National (5)	National (5)
Magnitude	High (8)	Low (4)
Significance	High (72)	Low (20)
Status (positive or negative)	Positive	Positive
OPERATIONAL PHASE		
Likelihood of transmission during construction.		
Reversibility	Low	Low
Irreplaceable loss of resources?	High	Low
Can impacts be mitigated?	Yes	
Mitigation/Enhancements:		
<ul style="list-style-type: none"> Contractors must provide health awareness to their workers on the serious impacts of HIV/AIDS. Condoms must be provided to workers, as it is the most effective preventative measure. Contract workers must be allowed time off at regular intervals to visit their families. Workers must have access to recreational activities during their time off. These must be organized with them. 		
Cumulative impacts: HIV/AIDS Prevalence rates will increase		
Residual Risks: Once contracted, a person will have to most probably be on a lifelong course of Anti-Retroviral Therapy to manage the HIV/AIDS..		

7.4.8. Socio-economic & Tourism Impacts assessment

The two alternative powerline do not differ in any significant way as far as the impacts on socio-economic & tourism is concerned. In most part the two alternatives are not comparatively assessed in the assessment tables below. Where applicable, the **differences in impacts are highlighted in red for Alternative 2.**

Nature: Impact on agriculture (Socio-economic impact)

Alternative 1 is about 92 km shorter compared to Alternative 2, with the implication that it is has a smaller footprint. Both alternatives 1 and 2 traverse the Waboomskraal valley with intensive farming activities.

Not all farming activities will be lost as activities like sheep and ostrich farming can continue under the lines. Intensive farming like irrigated crops and fruit trees will be impacted the most although there is the risk of vegetation that will take time to re-establish if damaged during construction. **Alternative 2** will potentially impact on current and future game farming activities in Willowmore, Klipfontein, Volstruispoort and Bekkersvlei. Although it will not impact the game itself it can become dangerous for game capturing if helicopters are used.

There is also a risk of increased crime during the construction period. This can be mitigated through increased security during construction.

Rating of Impacts	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Definite (5)	Highly probable (4)
Duration	Very short-term (1)	Very short-term (1)
Extent	Local (2)	Local (2)
Magnitude	Moderate (6)	Minor (2) Low (4)
Significance	45 (Medium)	20 (low)

		28 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Definite (5)	Highly probable (4)
Duration	Permanent (5)	Permanent (5)
Extent	Site (1)	Site (1)
Magnitude	Moderate (6)	Low (4) Moderate (5)
Significance	60 (high)	40 (moderate) 44 (moderate)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Moderate	Low
Can impacts be mitigated?	Yes to some degree. Not all farming activities are lost, sheep and ostrich farming activities and most dry land farming can continue under the lines. Irrigated fields are at risk, especially pivot irrigation fields. The position of the pylons can carefully be planned to have the least impact.	
Mitigation:		
<ul style="list-style-type: none"> Mitigation includes detail planning of the exact position of the pylons and transmission lines in co-operation with the farmers to establish the optimal path that will limit losses in current and future agricultural production. Losses in agricultural land can also be as a result of the creation of access roads. Such impacts can also be limited by having a shorter option and keeping the transmission line as close to existing road infrastructure as possible. 		
Cumulative impacts: The overall loss of agricultural land in the region due to other developments		
Residual Risks: Overall loss of farmland, income and change in livelihood		

Nature: Provision of up to 225MW mid-merit electricity from Gourikwa (Economic impact)

Economic impact: Provision of up to 225MW mid-merit electricity from Gourikwa to the country by strengthening of existing network. This impact will be the same for Alternative 1 and 2. There will be savings by Eskom if Gourikwa Power Station is converted from a CCGT to an OCGT. Even though it is not exactly clear where the power from this proposed Gourikwa-Blanco transmission line will be used in the economy, it will benefit the economy, especially during peak electricity demand periods. Although additional 75MW additionally is small, it can be argued that if such a line is not built, the upgrade of Gourikwa Power Station will not happen and the generation cost will be higher. The strengthening of the transmission line will also ensure a much lower risk of electricity outages in the local area due to transmission line failure. According to the Department of Energy as input to the IRP 2010, the cost of un-served energy (COUE) is assumed as R75/kWh. This is an implied value to the economy, assuming the COUE value per kWh and 225MW of R16.9 million per hour.

Rating of Impacts	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Not relevant for this phase		
OPERATIONAL PHASE		
Probability	Highly probable (4)	Defintie (5)
Duration	Long-term (4)	Long-term (4)
Extent	Regional (4)	Regional (4)
Magnitude	Minor (2)	Minor (2)
Significance	40 (moderate)	45 (moderate)
Status (positive or negative)	Positive	Positive
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Moderate	Low
Can impacts be	Yes	

mitigated?	
Mitigation/Enhancements:	<ul style="list-style-type: none"> None anticipated
Cumulative impacts:	Contribution towards security of electricity supply
Residual Risks:	Contribution towards security of electricity supply

Nature: Contribution to local economy (employment, use of contractors and purchases of local goods and servitudes) (Economic impact)

Alternative 1 is shorter and will cost less. From an economic point of view, spending more money (i.e. say for example on a longer transmission line option compared to a shorter line) can result in a relative short term increase in job opportunities as more material (like steel and cables) are required as well as more workers during the construction of the lines. However, there is an opportunity cost involved. Higher spending can for example contribute to higher future tariff increases that can result in direct and indirect job losses in the economy. For this reason a shorter line is preferred.

Alternative 2 is longer and will cost more to build. From an economic point of view, spending more money (i.e. say for example on a longer transmission line option compared to a shorter line) can result in a relative short term increase in job opportunities as more material (like steel and cables) are required as well as more workers during the construction of the lines. However, there is an opportunity cost involved. Higher spending can for example contribute to higher future tariff increases that can result in direct and indirect job losses in the economy. For this reason a shorter line is preferred even though the scores are the same.

According to Eskom (2014, b), the estimated cost of the Gourikwa-Blanco 400kV and Blanco-Droërvier 400kV line is R1.6 billion. Installation of the transmission lines and manufacturing of materials need are capital intensive in nature.

Rating of Impacts	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Highly probable (4)
Duration	Very short-term (1)	Very short-term (1)
Extent	Local (2)	Local (2)
Magnitude	Minor (2)	Low (3)
Significance	15 (Low)	24 (low)
Status (positive or negative)	Positive	Positive
OPERATIONAL PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Probable (3)	Highly probable (4)
Duration	Long-term (4)	Long-term (4)
Extent	Site (1)	Site (1)
Magnitude	Small (1)	Small (1)
Significance	18 (Low)	24 (low)
Status (positive or negative)	Positive	Positive
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Moderate	Low
Can impacts be mitigated?	Most of the material will come from outside the area; limited economic opportunities will be available for the local area. Such opportunities can be increased by partially utilising domestic skills and providing opportunities to domestic businesses.	
Mitigation:		
<ul style="list-style-type: none"> The majority of the construction material will come from outside the study area. To increase the economic benefits for the local area, a percentage of workers from the local area can be trained and used during the construction period as well as during the operational period (maintenance like clearing under pylons). Other 		

services can also be provided like catering, transport, accommodation and entertainment. Local area employment opportunities are expected to be limited.

Cumulative impacts: Opportunity to upgrade and improve skills levels in the area and Opportunity for local employment opportunities

Residual Risks: Improved pool of skills and experience in the local area; Economic growth for small-scale entrepreneurs and Temporarily employment during construction phase will result in jobs losses and struggles for construction workers to find new employment opportunities

Nature: Tourism impact:

Highlands Lodge will be impacted by both Alternatives 1 and 2 and Avondrust Farm will be impacted by Alternative 1. There will be negative visual impacts of pylons and transmission lines. Although not always possible, there must be careful planning of the pylons and lines to try to minimise the impact on tourism facilities.

Alternative 1 is proposed to cross the Groot Swartberg Nature Reserve that is a World Heritage Site; impact must be obtained from the Heritage study on this. Suggestions must be taken from the visual impact study to limit the visual impact of the lines.

Alternative 2 will also potentially impact on current and future game farming activities in Willowmore, Klipfontein, Volstruispoort and Bekkersvlei. Negative visual impact of pylons and transmission lines, Alternative 2 has a larger footprint. Suggestions must be taken from the visual impact study to limit the visual impact of the lines.

Rating of Impacts	Without mitigation	With mitigation
CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Definite (5)	Highly probable (4)
Duration	Very short-term (1)	Very short-term (1)
Extent	Site (1)	Site (1)
Magnitude	Low (3)	Minor (2) Low (3)
Significance	25 (Low)	16 (low) 16 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Highly probable (4)	Probable (3)
Duration	Permanent (5)	Permanent (5)
Extent	Site (1)	Site (1)
Magnitude	Minor (2)	Minor (2)
Significance	36 (moderate)	24 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Moderate	Low
Can impacts be mitigated?	Yes to some extent	

Mitigation:

- Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the construction phase
- Construction sites should be fenced off to limit unauthorised entry and to limit negative visual impacts.
- Construction sites should be screened from the property owners and guests where possible.
- Stockpiling of soil should be as short as possible and construction debris should be removed as soon as construction activities allow.

- Construction sites should be rehabilitated as soon as planning allows
- Avoid placing the proposed distribution line in close view of the main activities at the tourism establishments.

Cumulative impacts: None anticipated

Residual Risks: Possible visual impact of pylons on properties used for tourism activities and accommodation

7.4.9. Traffic and local roads impact assessment

The two alternative powerline do not differ in any significant way as far as the impacts on traffic is concerned. In most part the two alternatives are not comparatively assessed in the assessment tables below. Where applicable, the **differences in impacts are highlighted in red for Alternative 2.**

Nature: Traffic Impact of Access to site for Narina (Blanco) to Droërvier

From a desktop study perspective, it seems that there are farm roads present over the section crossing the Swartberg Nature Reserve for **Alternative 1**. Even though the accessibility might be limited when compared to the preceding sections of the line, it is still very possible to construct the line over the mountain. For inaccessible areas over the mountain areas, which is estimated to be approximately 10 km in length, the towers will have to be constructed in sections where after they will need to be transported by means of a helicopter to the respective sites. Meiringspoort's pass, which is considered difficult for some to navigate, conforms to geometric standards and will not present any problems for the freight being delivered to site seeing that only normal freight is being utilised and not abnormal freight.

Alternative 2 is considered to be less viable than Alternative 1 from a transport perspective, due to the additional length required for construction resulting in additional construction time and material as well as the limited accesses for almost half of the Alternative 2 route (approximately 130 km).

It can therefore be stated that Alternative 1 will be the most viable option for this section from an access perspective. The significance of the impact can be seen in Table below.

CONSTRUCTION PHASE		
Rating of Impacts	Without mitigation	With mitigation
Probability	Improbable (2)	Very Improbable (1)
Duration	Short-term (2)	Short-term (2)
Extent	Region (3)	Region (3)
Magnitude	Minor (2)	Minor (2)
Significance	14 (low)	7 (low)
Status (positive or negative)	Negative	Negative
OPERATIONAL PHASE		
Probability	Very Improbable (1)	Very Improbable (1)
Duration	Medium-term (2)	Medium-term (2)
Extent	Region (3)	Region (3)
Magnitude	Minor (2)	Minor (2)
Significance	8 (low)	8 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Moderate	Moderate
Irreplaceable loss of resources?	Low	Low
Can impacts be mitigated?	Yes	

Mitigation:

- The impact can be mitigated to some extent by managing the traffic to and from site. Mitigation measure can include:
- Additional traffic control measures at the site access during higher demand periods

Cumulative impacts: N/a, negligible impact only short term.

Residual Risks: N/a, negligible impact only short term.

8. CONCLUSION

The previous chapters of this report together with the specialist studies contained within **Appendix 4** provide a detailed assessment of the potential impacts that may result from the proposed project. This chapter concludes the EIA Report for the proposed Blanco-Droerivier 400kV powerline by providing a summary of the conclusions of the assessment of the proposed powerline. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental specialist consultants and presents an informed opinion of the environmental impacts associated with the proposed project.

From the conclusions of the detailed EIA studies undertaken, sensitive areas within the development 2km corridor were identified and flagged for consideration and avoidance by the final alignment route (refer to **Appendix 1.2**). The most significant environmental impacts identified and assessed to be associated with the proposed Blanco-Droerivier 400kV powerline project include:

- Impacts on ecology (flora, fauna & avifauna) mainly through habitat loss and fragmentation
- Impacts on the local soils, land capability and agricultural potential of the site.
- Social impacts (positive)
- Visual impacts during the operational phase

Other impacts which could have an impact on the environment include:

- Impacts on the Wetlands & River Systems
- Impacts on heritage, archaeology and paleontological resources
- Socio-economic impacts
- Tourism
- Impacts on traffic

Potential impacts which could occur as a result of the proposed project are summarised in the sections which follow.

8.1. Summaries of findings

The specialist findings of the EIA phase are summarised as follows:

Vegetation Assessment:

A number of vegetation types in the project area are listed as Critical Biodiversity Areas (CBAs) and threatened ecosystems. The reasons why these vegetation types are listed as endangered ecosystems are because they have relatively high plant species diversity but due to human impacts, especially agricultural practices such as ostrich, sheep and goat farming as well as crop production, relatively few natural areas remain in these vegetation types.

Both powerline routes are along sections of existing powerlines which cut through the Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). In terms of the impacts on the plants and vegetation types which could be affected by the proposed power line both these two options will have relatively similar impacts, namely disturbance of natural vegetation (trampling, road construction, bush clearing) creation of disturbed habitats for alien invasives. However in the case of Alternative 1 the distance of affected areas in a particular CBA is relatively short because it crosses the CBAs and

ESAs in a perpendicular way. Alternative 1 goes also through an UNESCO-listed World Heritage Site. The implication of this is that the Swartberg Nature Reserve might lose its World Heritage Status if another power line and its associated infrastructure is being constructed through this nature reserve. Furthermore the regular cutting of the fynbos to maintain a low fuel-load under the power line is another impact which could jeopardise the status of this reserve. The absence of fire could also alter plant species composition in the long run because most fynbos species are dependent on frequent fires – something that ESKOM would try to prevent along the power line route. Alternative 2, along the N9 to Uniondale, the proposed power line runs parallel to the Langkloof Shale Renosterveld CBA (Status: Critically Rare)(width of impact zone ±60km). Although this CBA is in a highly transformed state due agricultural practices such as crop production, it is now an important habitat for Red Data birds such as Blue Cranes.

Fauna Assessment:

Consultation of historical records and species distribution data indicates a vast diversity of reptile, amphibian, bird and mammal species are likely to be found in a variety of habitats within the greater project area. Furthermore, all discussed faunal groups contain SCC which are likely to be found within the project area. Some of these species are restricted to isolated patches (most amphibian and reptile SCC), whilst others are widespread throughout the project area (most mammals and birds of SCC).
 Insight

Alternative 1 extends mostly through arid areas with limited habitats for amphibians, as it avoids major wetlands and SKEP identified Amphibian Hotspots/Priority Areas. The route traverses two Important Bird Areas, namely the Outeniqua Mountains IBA and the Swartberg Mountains IBA. Although the route crosses many perennial rivers south of the Swartberg, these rivers are all large and generally fast flowing. Therefore, it is unlikely that over-head power lines crossing the river will have a significant impact on amphibians. However, the route does cross through a reptile Priority Area identified by SKEP, and is also likely to have habitats suitable to the above mentioned reptiles of SCC. Furthermore, the route will also pass through habitats suitable for the Critically Endangered Riverine Rabbit (*Bunolagus monticularis*). Alternative 1 also crosses through a Formally Protected Area and several Critical Biodiversity Areas. However, following field observations, many of the areas classified as CBAs are not deemed to be sensitive from a faunal perspective. With careful pylon hardstand and access road planning, the majority of areas defined as highly sensitive can be avoided. (*Please refer to section 8.5 for recommended mitigation measures*)

Alternative 2 extends into the Eastern Cape, navigating around the Formal Protected Areas of the Swartberg region. The majority of the alternative route is likely to have a medium impact on reptiles as there is no existing powerline route along this alternative, and therefore no service roads – all infrastructures would need to be constructed. The Outeniqua range section of the proposed alternative route is likely to provide habitat for a high diversity of reptile species. The route crosses priority areas for amphibians according to SKEP, as well as many pristine wetlands and wetland clusters according to NFEPA, which provide suitable habitat for amphibians. This alternative route also runs through the Vetkuil Amphibian Hotspot to the south east of Beaufort West. The hotspot provides a highly isolated habitat required by numerous amphibian species, including the Near Threatened Giant Bullfrog (*Pyxicephalus adspersus*). This alternative option is likely to have a significant impact on amphibians without mitigation. The alternative avoids crossing any Formally Protected Area but it does cut across several Critical Biodiversity Areas. (*Please refer to section 8.5 for recommended mitigation measures*)

From a faunal perspective it is recommended that the **Blanco-Droerivier Alternative 1** is the preferred route option for the proposed power line. It is noted that Alternative 1 does traverse a UNESCO World Heritage Site (Swartberg Mountains) as well as a reptile hotspot. However, it is (i) the significantly shorter route option, ii) there is existing powerline infrastructure including service roads

and therefore the construction footprint will be smaller, and iii) it avoids the Vetkuil Amphibian Hotspot which provides a highly isolated habitat for numerous amphibian species including species of conservation concern.

Avifaunal Assessment:

Alternative 1: The power line route runs 178km between Blanco and Droerivier (following an existing power line). The route traverses two Important Bird Areas, namely the Outeniqua Mountains IBA and the Swartberg Mountains IBA. The Swartberg Mountains are classified as a UNESCO World Heritage Site. As the power line route follows an existing power line, access and barrier impacts are mitigated. *(Please refer to Avifauna Report – **appendix 4.3** for recommended mitigation measures)*

Alternative 2: This power line route is longer than Alternative 1 and runs for 270km initially east towards Uniondale before heading north at the eastern end of the Swartberg Nature Reserve. The route runs in between the Swartberg and Outeniqua IBAs, with the buffer intersecting the Kouga-Baviaanskloof Complex IBA and the most easterly section of the Swartberg IBA. Part of this route falls within the Eastern Cape Province. Large flocks of Blue Crane, numerous Bustards, and generally high diversity of birdlife was observed along this section of the powerline. As no existing large scale powerline infrastructure is found along most sections of this route it is likely that the impact on avifauna will be significant. *(Please refer to Avifauna Report – **appendix 4.3** for recommended mitigation measures)*

Based on the above, it is the specialist's opinion that the Blanco-Droerivier Alternative 1 would have less of an impact on avifauna than Alternative 2, providing the recommended mitigation measures are implemented. Although the preferred route bisects the Swartberg Mountains and Outeniqua Mountains IBAs, it is the significantly shorter of the two options, and there is existing powerline infrastructures which mitigates many of the impacts associated with birds and powerlines. The existing service roads (and shorter route option) will result in less bird habitat being destroyed or fragmented during the construction phase of the project. Furthermore, Alternative 2 separates three IBAs. There is likely to be regular migration of bird SCC (particularly raptors) between these mountainous areas. As there is no existing power line through these areas, birds are less likely to be cautious of large infrastructures in this area, which could lead to higher mortalities of SCC and powerline priority species due to collisions/electrocutions with powerline infrastructures.

Consultation

Freshwater Resources Assessment:

The wetland areas are predominantly valley bottom wetlands that are linked to the rivers with their ecological condition and importance directly linked to that of the rivers. Some smaller seeps are also located on the mountain slopes of the Outeniqua Mountains that are still in a natural condition. The pans along the Alternative 2 corridor near Beaufort West are considered to be in a largely natural ecological state.

The ecological importance and sensitivity of the rivers within the study area range from being of a medium to very high importance. The Olifants River in particular has been identified as FEPA river and a Fish Sanctuary Area as the river contains populations of an endangered fish species (Small-scale redfin *P. asper*).

With the potential impacts of the proposed activities, it is often the access roads associated with the transmission lines that are likely to have a greater impact on the freshwater features than the power lines themselves as the lines can usually span the freshwater features such that the pylons can be constructed outside of the rivers and wetland areas as well as their recommended buffer areas, whereas the roads need to be constructed through the freshwater features. It is thus often best if the

new power lines are placed adjacent to existing lines or roads where new roads do not need to be constructed as part of the project.

In terms of the selection of the route selection for the transmission lines, it is recommended that a buffer of 50 from the top of the river banks; approximately 100m from the edge of the wetland areas and 500m from the pans be allowed for as a development setback for the construction of the pylons.

The **alternative corridor with the least potential** impact on the freshwater features in the area is likely to be the more direct route (**Alternative 1**) as it would need to cross fewer rivers than the Alternative 2 route. In addition, it would avoid more sensitive areas crossed by the Alternative 2 corridor such as the many smaller tributaries and associated wetlands of the Kammanassie River in the Little Karoo as well as the large area of pans near Beaufort West. The alignment of the route within the corridor could also be determined to minimise the potential impact on the freshwater features within the study area. With mitigation, Alternative 1 is likely to have an impact of a very low significance on the freshwater features while Alternative 2 is likely to have an impact of a low impact.

Heritage Assessment:

With respect the potential impacts to **palaeontological resources**, the Baseline assessment produced by Almond (2015) notes: "A substantial proportion of proposed power-line sectors will cross formations that are conservatively regarded as moderate to high sensitivity". "In practice, however, the likelihood of significant negative impacts on fossil heritage on the ground is low over most sectors of these routes because the bedrocks here are often highly weathered, tectonically- deformed or covered by a substantial thickness of fossil-poor superficial deposits (scree, alluvium, soils, etc)".

Overall, the **heritage studies** have found **no anticipated fatal flaws** with regard the construction of the powerline for either of the alternatives; however Alternative 2 covers a longer distance and has the potential to impact on more artefacts. From an Archaeological and Cultural Landscape perspective, Alternative 1 is preferred because it is much shorter, and therefore the impacts are potentially less to heritage sites. From a visual impact assessment, the preferred route is also Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on cultural landscapes that are free of transmission lines, thereby spreading the impact.

Soil, Land use & Agricultural Potential Assessment:

During the EIA phase, the **agricultural** specialist (Terrasoil 2016) has found that the area north of the Outeniqua Mountains is characterised by low rainfall and agriculture is consequently practiced within drainage features or in areas where surface or borehole water is available. In general the agricultural potential is low except for the areas where water is available. All the corridors to the south and immediately within the Outeniqua Mountain area suffer the same limitation in the eastern section in that it traverses an area of high intensity agriculture. The impacts of power line construction are high and pylon placement will have to be negotiated with landowners on a site-specific basis. In this regard there is no preference for any alignment as the specific alignment to be accepted will depend on the degree and success of negotiation with landowners and users. In general the corridors to the north of the Outeniqua Mountains have lower impacts. Alternative 1 is preferred as it is shorter and has fewer agricultural impact areas immediately north of the N9/N12 intersection. In all cases existing power line alignments are preferred as the road infrastructure and access issues are established. In the case of new alignments new access points will have to be established and new vehicle impacts will be experienced.

Visual Assessment:

Both routes are proposed through areas that are considered highly scenic, either for its pristine natural character or for its unique agricultural activities. In most cases, the transmission line will impact on the visual quality of the visual resource by blemishing the natural character of the study area or interfering with unique and visually interesting land uses. Areas of high scenic value and visual quality have been identified as:

- The Groot Karoo that is valued for its desolate sense of place and uninterrupted panoramic views;
- The mountainous areas of the Swartberg and Outeniqua Mountains that are valued for exceptional scenic views and pristine natural environments;
- The Klein Karoo Mountains that offer scenic views of a mountainous landscape and visually pleasing farming practices in the valleys. Within this LT, the N9 is considered a scenic route, particularly in the area through Potjiesberg Pass;
- The Langkloof with visually pleasing views of the farming practices in the Langkloof valley; and
- Waboomskraal with the unique hops agricultural practices and highly scenic surroundings of the Outeniqua Mountains.

The study area is predominantly a rural area, with the exception of a few relatively small towns. The viewers that are mostly affected are motorists, tourists and farming communities. Overall, a relatively low to medium viewer incidence is expected apart from the areas where major transport routes are crossed or are running parallel to the proposed routes. Highly sensitive viewers and viewer groups occur all along the proposed routes. Concentrations of highly sensitive viewers have been identified as:

- Residents of Dysveldorp and Uniondale;
- Motorists on the scenic routes such as the N9 through Langkloof to Willowmore and on the N12 section through Waboomskraal; and
- Tourists visiting the tourist attractions and overnight facilities that are within the ZMVE;

This assessment has highlighted that **highly significant impacts** are expected in the Groot Karoo, Swartberg Mountains, Klein Karoo Mountains and Outeniqua Mountains LTs, and require major interventions to reduce the direct and cumulative impacts in particular. Authorisation of this project will result in significant losses in aesthetic value that will cause high levels of visual intrusion in some areas. The impact is only reversible with human intervention and stands a moderate risk of causing an irreplaceable loss in resources.

Social Impact Assessment

The social study has found that **Alternative 1** has been assessed to have the **least social impact**, as a smaller proportion of the line passes through agricultural activities. There is, however, intensive farming and large scale farming on this alignment and Eskom will have to negotiate careful placement of the line with farmers to ensure least disruption and economic loss. As there is a flexibility of 2km, it is assumed that structures on the farms such as dwellings can be avoided to prevent any physical displacement. If resident workers on these farms lose their jobs and have to leave the premises because of the loss of land under intensive agriculture, they will be both economically and physically displaced. Alternative 2 has more farms, including some with pivot irrigation systems that Eskom must negotiate to avoid. There is also a game farm on the alignment that is planning to extend its tourism attractions. The landowner has expressed concern that the visual and physical presence of the towers and line will reduce the tourist value on his game farm. Further, game on the farm is managed by a helicopter. The towers and line will therefore pose a safety hazard for flying a helicopter.

Cumulative impacts are a concern on **both alignments** as the proposed transmission line will add to existing lines on some properties.

Socio-Economic & Tourism Impact Assessment

The George municipal area is part of the Garden Route with scenic mountains, farms, forests and valleys. Tourists also visit the Groot and Klein Karoo area to experience the “wide open horizons” and “rural lifestyle” without the visual interference of transmission lines. The impact of the proposed transmission lines on the tourism industry will mainly affect lodges as well as the Witfontein Nature Reserve and will unfortunately have a visual impact in the context of the “sense of place”. Results from the visual impact study can also be used to limit the impacts of the transmission lines. One of the ways can be to let the major section of the transmission line (Alternative 1) run parallel to N12; this is also the shortest

Both alternatives will have an impact on agriculture but this will be limited in grazing areas where farming can continue under the transmission lines.

The impact of the construction of the transmission lines on the **economy** includes the impact of the construction cost, the operational expenditure and the impact on the broader economy by allowing the power to strengthen the existing grid and limit the impact of power outages in the area. Capital expenditure data could not be obtained to quantify any impacts, but a number of expenditure categories are discussed. A number of components will have to be imported from other provinces into this region, like steel structures, cables, hardware, insulators and cement. This will generate economic activity and employment opportunities in those provinces. A local procurement policy can also be considered by Eskom (where possible and if not already standard practice) on activities like site clearance, road building and assembling to maximize the economic and job creation impact on the local municipalities. The operational expenditure will have limited opportunity for employment creation. From a pure economic point of view, with cost savings in mind Alternative 1 can be recommended given that this is the option that is marginally shorter with the least number of bends. However, there is only a small marginal difference in cost given. The 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. A No GO Alternative would not bring about any of the socio-economic benefits that are likely to result from the proposed project.

Traffic Impact Assessment

It can therefore be stated that the construction traffic and the post construction traffic would be low without any significant impact on the existing traffic flows on the N2 or provincial roads. It will also have a negligible impact on the pavement structures. Furthermore, the impact of the traffic on the provincial gravel access roads will also be negligible with respect to service levels. When looking at the impact significance of the various phases, it can be concluded that all impacts will have a “Low” significance. According to the significance rating scale, a low significance can be defined as: “where this (low) impact would not have a direct influence on the decision to develop in the area” Other impacts having an effect on the possibility of the proposed development were identified and as:

- Road damage
- Social implications
- Energy consumption
- Vehicle Pollution and noise

These were considered to have little to no impact associated with them and were therefore not evaluated by means of an impact table.

Cumulative Impact Assessment:

Significant cumulative impacts that could result from the proposed line and other power line in the area include:

- **Avifauna:** The erection of addition power lines will further fragment natural habitats along the route option; including IBAs and the Swartberg Mountains (UNESCO World Heritage Site). In addition, there will be a cumulative disturbance due to the additional anthropogenic activities associated with constructing and maintaining an additional powerline along the route. There will be an additional barrier for birds in flight/migratory species.
- **Vegetation:** The loss of unprotected vegetation types on a cumulative basis from the broad area may impact the countries' ability to meet its conservation targets. The area is not included within a National Protected Areas Expansion Strategy focus area, and falls outside any threatened and or endangered ecosystem type / vegetation type. Although the vegetation type in the study area is classified as Least Threatened, it is poorly protected and certain habitats or communities may be subsequently affected.
- visual intrusion and change of character of the area; and
- destruction of heritage artefacts.

The proposed line is in general proposed along routes where there are already power lines in place. Provided the new lines are constructed close to these lines such that the associated access roads can be shared, the cumulative impacts are likely to be low. Considering the findings of the specialist assessments undertaken for the project, **cumulative impacts** range from a **low to moderate significance** (on a landscape level in this region of the Beaufort West to George areas). The use of the EMPr and mitigation measures would assist in mitigating these negative impacts to an acceptable level.

8.2. Comparison Assessment of Alternatives

8.2.1 Environmental considerations:

In terms of the specialist studies undertaken, Table 17 summarises that were made regarding the two alternative powerline routes

Table 17: Comparative Assessment of the alternatives

Aspect	Preferred Option	Comments
Vegetation	Alternative 2	Alternative 2 is regarded as the better route for the proposed power line because of the following: the proposed route through the Swartberg Nature Reserve might jeopardise its status as World Heritage Site. Furthermore Alternative 2 goes through large sections of transformed vegetation. Less Red Data shrubs species such as <i>Protea</i> , <i>Leucodendron</i> , <i>Erica</i> , <i>Brunia</i> occur along alternative 2.
Fauna	Alternative 1	From a faunal perspective it is recommended that the Blanco-Droerivier Alternative 1 is the preferred route option for the proposed

		power line as it is i) the significantly shorter route option, ii) there is existing powerline infrastructure including service roads and therefore a smaller footprint, iii) it avoids the Vetkuil Amphibian Hotspot which provides a highly isolated habitat for numerous amphibian species including species of conservation concern.
Avifauna	Alternative 1	According to the avifaunal specialist, the Blanco-Droerivier Alternative 1 would have less of an impact on avifauna than Alternative 2, providing the recommended mitigation measures are implemented. Although the preferred route bisects the Swartberg Mountains and Outeniqua Mountains IBAs, it is the significantly shorter of the two options, and there is existing powerline infrastructures which mitigates many of the impacts associated with birds and powerlines. The existing service roads (and shorter route option) will result in less bird habitat being destroyed or fragmented during the construction phase of the project. Furthermore, Alternative 2 separates three IBAs. There is likely to be regular migration of bird SCC (particularly raptors) between these mountainous areas. As there is no existing power line through these areas, birds are less likely to be cautious of large infrastructures in this area, which could lead to higher mortalities of SCC and powerline priority species due to collisions/electrocutions with powerline infrastructures.
Freshwater Resources	Alternative 1	The corridor with the least potential impact on the freshwater features in the area is likely to be the more direct route Alternative 1 as it would need to cross fewer rivers than the Alternative 2 route. In addition, it would avoid more sensitive areas crossed by the Alternative 2 corridor such as the many smaller tributaries and associated wetlands of the Kammanassie River in the Little Karoo as well as the large area of pans near Beaufort West.
Heritage and Palaeontology	Alternative 1	Alternative 1 is considered the preferred alternative merely because it is shorter, and therefore the impacts are potentially less to archaeological sites. Alternative 1 is associated with an existing line, and therefore a new access/service road to ensure maintenance of the line, will not be required.
Soil and agricultural impacts	Alternative 1	Alternative 1 is preferred as it is shorter and has fewer agricultural impact areas immediately north of the N9/N12 intersection
Visual	Alternative 1	The most preferred route is Alternative 1 as its impact is lower over its entire length than Alternative 2. The baseline environment is already impacted by electrical power line infrastructure, which lowers the sensitivity to some degree. It is generally more acceptable to have two power lines in one corridor and concentrating the impact in this corridor, than to impact on landscapes that are free of transmission lines, thereby spreading the impact. Empirical research has indicated that two parallel running power lines are considered below the visual tolerance threshold in most cases, but three or more power lines nears, or exceeds, the threshold, increasing cumulative impacts to

		unacceptable levels. This is especially relevant in landscapes with high scenic value or high tourist potential as is found in parts of the study area. Without drastic mitigation measures, these impacts will remain high.
Social	Alternative 1	It is the opinion of the social specialist that Alignment 1 that passes through a smaller proportion of agricultural land is the preferred option. However, there are specific farming and tourism activities on this alignment that requires careful planning with landowners to prevent significant economic and even physical displacement.
Socio-Economic & Tourism	Alternative 1	From a pure economic point of view, with cost savings in mind, the shortest route, i.e. Alternative 1 can be recommended. From a tourism point of view, Alternative 1 is recommended given that this option will have the least amount of negative impact on tourism activities. Lines already exist along most of Alternative 1 alignment, while for Alternative 2 large sections have a natural "Karoo landscape" that will be impacted upon negatively when the line is built in a predominantly rural area.
Traffic	Alternative 1	Alternative 1 is preferred for the section from Blanco to Droërvier from an access perspective due to the closer proximity of National and larger Provincial roads and also from a traffic perspective due to the shorter length and therefore least freight.

There are no impacts of unacceptably high significance associated with either alternative powerline assessed for this project, and both alternatives are acceptable. From an environmental perspective is, however, for the preference is for the Alternative 1 mainly due to its short distance which will imply fewer impacts compare to the longer option.

8.2.2 Technical considerations:

Eskom put together a report (refer to **Appendix 6.4**) that gives a **high level comparison** of all the various routes proposed for the proposed new Droerivier – Narina 400 kV and Gourikwa Narina 400 kV lines from a **technical perspective**. (NB: For more detailed study of the routes, conceptual profiles will be performed during the concept design stage of the project). A summary of the findings of this report are presented below in terms of the technical criteria considered:

Criterion	Alternative 1	Alternative 2
Length	178 km	270 km
Estimated No of Towers	600	900

Generally speaking, the longer the line the more the towers to be used. This also increases the length of the conductor to be used. Assuming that the terrain is fairly similar on both routes, Route 1 will be more preferred. Alternative 2 is 51% longer than route 1 and would require approximately 900 towers vs. 600 towers of the Alternative 1.

Criterion	Alternative 1	Alternative 2
No of Bends	45	46

The number of bends translates to the use of strain towers, which can cost up to 7 times more than the price of a typical 400 kV suspension tower (529A). In this case both routes are fairly even.

Criterion	Alternative 1	Alternative 2
Major Road Crossings	4	9

The longer the route, the higher the chances are of crossing more roads. Crossing over National roads also increases the costs as strain towers have to be introduced. This is both a safety issue and a construction requirement. It is very difficult to cross National roads during construction. Specific methods must be designed based on case per case basis. Since Route Alternative 1 tries to keep far away from the developed areas, crossings will be lower and hence Alternative 1 is preferred.

Criterion	Alternative 1	Alternative 2
Railway Crossings	2	1
Number of strain towers	4 extra	2 extra

The fewer the crossings the better in terms of safety and construction meaning that for this project, Alternative 2 is a better option. Alternative 1 would introducing 4 extra strain towers compared to 2 strain towers of Alternative 2.

Criterion	Alternative 1	Alternative 2
Power line crossings	5	5

The aim is to avoid crossing of power lines as far as possible as this escalates the costs and also pose a threat on the network, should one of the lines at the crossing collapse and affect the lines at the crossings.

Criterion	Alternative 1	Alternative 2
Elevation	Min 327 m Ave. 832 m Max 1655 m	Min 558 m Ave. 839 m Max 991 m

The steeper the terrain, the more difficult it will be to design for and construct the infrastructure. Both alternatives have sections that are located in mountainous areas. Alternative 1 has a higher altitude than Alternative 2 which is a snow area, and thus designs should be done as such to avoid any line faults. The shorter the mountainous route the better. Alternative 1 is therefore better, even though the maximum elevation is more than for Alternative 2.

8.3. Environmental Costs of the Project versus Benefits of the Project

Environmental (natural environment, economic and social) costs can be expected to arise from the project proceeding. This could include:

- Direct loss of biodiversity, flora, fauna and soils due to the clearing of land for the construction and operation of the proposed line, the cost of loss of biodiversity has been minimised through the careful location of the powerline tower to avoid key areas supporting biodiversity of particularly high conservation importance.

- The project will result in significant losses in aesthetic value that will cause high levels of visual intrusion in some areas
- Change in land-use and loss of high potential agricultural land and land available for grazing along the servitude

These costs are expected to occur at a local and site level and are considered acceptable so long as the mitigation measures as outlined in the EMP are adhered to.

Benefits of the project include the following:

- The project is needed to strengthen the existing transmission network so that it can evacuate the additional power generated at the Gourikwa power stations when they come on line. This will promote continuous power supply for the Western Cape region, particularly when there is a unit outage at Koeberg Nuclear Power Station.
- The project is poised to bring about important economic benefit at the local and regional scale through job creation, procurement of materials and provision of services and other associated downstream economic development. These will transpire during the preconstruction/ construction and operational phases.
- New business sales that will be stimulated as a result of the establishment of the project, albeit for a temporary period, will be lost. Some of the positive spin off effects that are to ensue from the project expenditure will be localised in the communities located near the site, such as Beaufort West and George.
- The local services sector and specifically the trade, transportation, catering and accommodation, renting services, personal services and business services are expected to benefit the most because of project activities during the construction phase.

The benefits of the project are expected to occur at a national, regional and local level. These benefits partially offset the majority of the localised environmental costs of the project

8.4. Conclusion (Impact Statement)

The project is needed to strengthen the existing transmission network so that it can evacuate the additional power generated at the Gourikwa power stations when they come on line. This will promote continuous power supply for the Western Cape region, particularly when there is a unit outage at Koeberg Nuclear Power Station. The positive impacts, however, must not be undone by the negative impacts associated with establishing and operating the transmission line. The project is intended to strengthen the network. With a No GO option, this will not be possible and the occurrence and frequency of power interruptions will be an increased risk. Not to construct a line in the area between Droërivier and Blanco will not be in line with the SIPS for the country. This is the main negative impact of a No Go Alternative. A No-Go alternative will have no change to the visual environment and will therefore not cause any negative impacts.

From the EIA phase findings, it is clear that the **Alternative 1** would be preferable by most specialists.. Technical challenges (e.g. mountains and water resources) can be overcome in the detail design phase and careful placement of tower structures. As was found in the Scoping phase, the **EIA phase specialist studies have confirmed that Alternative 1 is the preferred option** as shown in the comparison assessment table in section 8.2.1. **However CapeNature strongly object to Alternative 1 due to its crossing of the Swartberg Mountains (Unesco site) by Alternative 1 which would not be ideal due to increased risk of fires, Cape Nature therefore recommends Alternative 2 to avoid the**

Swartberg area. This issue was also taken into consideration, in particular since the longer line (i.e. Alternative 2) will have serious environmental, economic and practical consequences in terms of technical constraints discussed in section 8.2.2. In this regard, it was therefore recommended that Eskom (in consultation with Cape Nature) use every measure possible in the planning and detail design of the line to reduce the impacts of increased risk of fires along the preferred alternative route within the Swartberg area. The Vegetation report has taken the above comments from CapeNature into considerations, in agreement with Capenate, the report has concluded that Alternative 1 will have higher impacts on the flora in the region as it goes through an UNESCO-listed World Heritage Site. The implication of this is that the Swartberg Nature Reserve might lose its World Heritage Status if another power line and its associated infrastructure is being constructed through this nature reserve. Furthermore the regular cutting of the fynbos to maintain a low fuel-load under the power line is another impact which could jeopardise the international status of this reserve.

CapeNature objection of Alternative 1 has been noted and taken into consideration by all biodiversity specialist and Eskom technical team alike. It must be noted that the EIA study has been undertaken from an integrated approach whereby it considers the implication of the line on the biodiversity, water resources, social, visual and heritage perspective. And in this case, nine out of the 10 specialist studies that have been undertaken have recommended Alternative 1; this recommendation is also supported from a technical point of view. It is noted that Alternative 1 does traverse a UNESCO World Heritage Site (Swartberg Mountains), however, it is (i) the significantly shorter route option, ii) there is existing powerline infrastructure including service roads and therefore the construction footprint will be smaller. Ideally, the types of impacts that should be avoided would be those that cannot be mitigated with good result. Usually this would be the visual impacts and the heritage. Sensitive ecological features such as vegetation and fauna habitats could often be avoided during the detail design phase of the project, by careful placing of tower footprints. Proper implementation of mitigation measures can minimise some of the negative impacts of Alternative 1 as recommended by the specialists in the examples below:

- **Vegetation:** There should be a preconstruction walk-through of the development footprint/project site in order to assess the pylon footprint areas for Red Data species as well as sensitive ecosystems such as streams, wetlands, etc.. In addition, a search and rescue operation should be done to remove plant species which can be successfully transplanted
- **Landowners:** Careful planning and negotiations with land owners will be of crucial importance before finalising the exact placement of the pylons and 55m servitude within the 2 km corridor that was evaluated for this alternative. This will minimise the direct (mostly visual) impacts by investigating slight deviations in the route (within the approved corridor) as well as either avoiding impacts on production land or only causing temporary disturbance (during construction). An impact that should be limited is the necessity of creating new access routes (limiting additional bush cutting and clearance of potentially sensitive vegetation). By avoiding the identified sensitive areas, the future maintenance on the chosen route will be easier and create fewer impacts of significance, particularly on those features that have been identified during the Public Participation Process.

This Final EIA Report has been prepared to allow public review and so that comments (and responses thereon) can be included in the Final EIAR, to subsequently allow for informed decision making by the authorities regarding the approval or rejection of the project. It is the **opinion EAP that the project should be authorised**. The findings of the specialist studies undertaken within this EIA to assess both the benefits and potential negative impacts anticipated as a result of the proposed project conclude that there are **no environmental fatal flaws** that should prevent the proposed project from proceeding, provided that the recommended mitigation and management measures are implemented.

The significance levels of the majority of identified negative impacts have been reduced by implementing the mitigation measures recommended by the specialist team during the EIA process, and this specifically included the consideration of the facility layout in relation to sensitivities identified. The project has considered constraints, and is considered to meet the requirements of sustainable development. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Programme (EMPr) for the Blanco-Droerivier 400kV powerline included within **Appendix 7**.

Thus, after assessing all alternatives on EIA phase level, it was concluded that Alternative 1 would be the option through which better avoidance and minimisation of most impacts can be achieved and is also the **technically preferred** alternative as explained in section 8.2.2, therefore **Alternative 1** is recommended as the **preferred alternative**.

8.5. Recommendation

Based on the nature and extent of the proposed project, the local level of disturbance predicted as a result of the construction and operation of the powerline and its associated substation upgrades, the findings of the EIA, and the understanding of the significance level of potential environmental impacts, it is the opinion of the EIA project team that the impacts associated with the project can be mitigated to an acceptable level, in this regard **Alternative 1** is therefore recommended for Environmental Authorisation as the preferred route for the Blanco-Droerivier 400kV powerline subject to certain conditions. The following conditions would be required to be included within an authorisation issued for the project:

- Upon approval of the project, an important component of the project would be to fine-tune the 55m servitude design (placement of the footprints) in terms of the receiving environment in the approved corridor of 2km wide. This would require a walk-down of the line and subsequent negotiations with all land owners to ascertain how the impacts on their properties can be mitigated, e.g through relocation of infrastructure, compensation or other acceptable measures. Construction will not be possible before agreements have been reached with all land owners along the entire route.
- Refinement of the preferred option should be done during design phase of the project, in particular once placement of the tower structures is planned. Avoidance of sensitive areas remains the best mitigation, followed by, minimisation, management and mitigation to maximum affect. Main features that need to be taken into consideration during detail design phase (and ultimately deciding where to place the tower structures) are to in as far as possible:
 - Follow the alignment of infrastructure such as roads and existing power lines
 - Avoid the dams and wetland areas to avoid the impact thereon and mitigate the potential for water birds that concentrate around water bodies from flying into the lines
 - Avoid housing developments and intensive farming areas (in particular where pivot points and shade netting are used)
 - Avoid impacting on tourist facilities such as guesthouse, holiday resorts and eco-tourism areas, in particular regarding visual disturbances.
- All mitigation measures detailed within this report and the specialist reports contained within **Appendix 4** to be implemented.
- The draft Environmental Management Programme (EMPr) as contained within **Appendix 7** of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed powerline and substation upgrades and will be used to ensure compliance with environmental specifications and management measures. The implementation of this EMPr for all

life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed for this project.

- Eskom must measure the EMFs where stakeholders have requested it, particularly to address concerns about cumulative impacts of EMFs and impacts on vulnerable populations such as children.
- The relevant Water Use License for water uses to be obtained from DWS.
- Applications for all other relevant and required permits required to be obtained by Eskom must be submitted to the relevant regulating authorities. This includes permits for the transporting of all components (abnormal loads) to site, disturbance to any heritage sites, and disturbance of protected vegetation.
- **Vegetation: Southern slopes of the Outeniqua Mountains** to be treated as **No-Go areas**, Figure 8 of section 6.4.1 in this report indicates suggested line routes options which aim to avoid as much of the natural forest as possible for consideration during the finalising of the design. There should be a **preconstruction walk-through** of the development footprint/project site in order to assess the pylon footprint areas for protected and Red Data species as well as sensitive ecosystems. Where these cannot be totally avoided, a permit to be obtained for removal of protected trees (DAFF) and provincially protected flora that are affected.
- **Fauna:** Riparian areas between the Swartberg and Beaufort West where the Critically Endangered **Riverine Rabbit** (*Bunolagus monticularis*) may be found should be treated as “**No-Go**” areas for any pylon hardstands or the construction of access roads. Should construction activities be required in any of these riparian areas, a Riverine Rabbit ecological specialist must be appointed to conduct thorough ground-truthing prior to any construction to determine the presence or absence of Riverine Rabbits in the areas and then there must be a **50m (minimum) buffer** from all riparian habitats where rabbits exist.
- **Avifauna:** Where access roads and/or pylon bases need to be located within any areas defined as ‘highly sensitive’, further ground-truthing by an avifaunal specialist is required to determine exact road routes and pylon base locations so to, where possible, avoid nests and roosts of SCC. All bird nest/roost sites encountered must be considered “**No-Go**” areas for any pylon hardstands or the construction of access roads. No construction works must take place within 500m of nests of large raptors and other SCC. Bird flight diverters must be attached to power lines in areas where they pass through IBAs and highly sensitive areas which include the Swartberg Mountains and Outeniqua Mountains – the spacing intervals must be a **minimum of 5m** apart in these areas. All areas defined as having a medium avifaunal sensitivity must have bird diverters installed (spacing to be determined following ground-truthing). These areas include suitable habitat for numerous powerline priority species (e.g. cranes, bustards, and storks). Bird diverters should also be considered for perianal river/stream crossings as these watercourses provide isolated refuge for numerous bird species, especially in arid areas of the Karroo and Little Karroo.
- **Freshwater Resources:** It is recommended that a **buffer of 50m from the top of the river banks and/or approximately 100m from the edge of the wetland areas** be allowed for as a development setback for the construction of the pylons.
- **Heritage:** A survey should be conducted during the walk-down phase around farmsteads in order to ensure that graves area avoided; **a buffer of at least 15 m** should be maintained around the perimeter of any **farm graveyards** to ensure that they are not damaged during construction.
- **Agriculture:** The placement of power line pylon on **high intensity agriculture** will have to be **negotiated with landowners** on a site-specific basis.