ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
FINAL EIA REPORT

SALDANHA BAY NETWORK STRENGTHENING PROJECT, WESTERN CAPE PROVINCE

MARCH 2017

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PROJECT DETAILS

DEA Reference No.	:	14/12/16/3/3/2/926
Title	:	Saldanha Bay Network Strengthening Project, Western Cape Province
Authors	:	Savannah Environmental (Pty) Ltd Jo-Anne Thomas
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Project Developer	:	Eskom Holdings SOC Ltd
Report Status	:	Final EIA Report for authority review

When used as a reference this report should be cited as: Savannah Environmental (2017) Revised EIA Report: Saldanha Bay Strengthening Project

PURPOSE OF THE EIA REPORT

Eskom Holdings SOC Ltd (to be referred to as Eskom hereafter) is proposing the Saldanha Bay Network Strengthening Project which involves the proposed construction of a new Distribution substation (Dx), decommissioning of the Blouwater Substation, construction of a new Transmission substation (Tx), 2X 400kV Power Lines and associated upgrade and extension of the Aurora Substation. The proposed Saldanha Bay Network Strengthening is located in the Saldanha Bay area, approximately 130km north west of Cape Town, in the Western Cape Province. The closest towns to the study area are Saldanha Bay, Langebaan and Vredenburg.

The EIA process is being undertaken in accordance with the requirements of the National Environmental Management Act (NEMA; Act No. 107 of 1998). The nature and extent of the proposed facility, as well as potential environmental impacts associated with the construction, operation and decommissioning phases of a project of this nature are explored in detail in this Environmental Impact Assessment Report. Site specific environmental issues are considered within specialist studies in order to test the environmental suitability of the identified alternatives for the proposed development, delineate areas of sensitivity within the site, and ultimately inform the recommendation of preferred alternatives for implementation.

The EIA Report consists of the following sections:

» **Chapter 1** provides background to the proposed project and associated infrastructure, and the environmental impact assessment.
» **Chapter 2** describes project details as well as the site selection process for the project.
» **Chapter 3** outlines the process which was followed during the Scoping and EIA Phase of the process and outlines the regulatory and legal context.
» **Chapter 4** describes the existing biophysical and socio-economic environment affected by the proposed project.
» **Chapter 5** provides an assessment of the impacts associated with the power lines and substations.
» **Chapter 6** presents the conclusions and recommendations of the EIA.
» **Chapter 7** provides references used to compile the report.

The Scoping Phase of the EIA process identified potential issues associated with the proposed project, and defined the extent of the studies required within the EIA Phase. The EIA Phase addresses those identified potential environmental impacts and benefits associated with all phases of the project including design,

construction and operation, and recommends appropriate mitigation measures for potentially significant environmental impacts. The EIA report aims to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project.

The release of an EIA Report for public review and comment provides stakeholders with an opportunity to verify that the issues they have raised to date have been captured and adequately considered within the study. The Final EIA Report will incorporate all issues and responses prior to submission to the National Department of Environmental Affairs (DEA), the decision-making authority for the project

REGULATORY AND DEA REQUIREMENTS

Table 1: Items in terms of Scoping Acceptance Requirements

DEA Ref. #	Requirement	Report Reference
	Please ensure that comments from all relevant stakeholders are submitted to the Department with the Environmental Impact Report (EIR). Proof of correspondence with the various stakeholders must be included in the Final EIR. Should you be unable to obtain comments, proof should be submitted to the Department of the attempts were made to obtain comments.	Appendix C
	In addition, the following amendments and additional information are required in the EIR:	
a)	The No-go option is mandatory and must be investigated and assessed and be included in the EIR	Section 5.9
b)	Details of future plans for the site and infrastructure after decommissioning in 20-30 years and the possibility of upgrading the proposed infrastructure to more advanced technologies.	Chapter 2
c)	Should a Water Use License be required, proof of application for a license must be submitted.	A General Authorisation will be applicable in terms of Notice 509 OF 2016. This GA will be registered once the final design of the project is completed and the location of infrastructure defined.
d)	Possible impacts and effects of the development on the surrounding industrial area	Chapter 5, Section 5.7 and 5.8
e)	Possible impacts and effects of the development and comparison of all power line alternative and provide clear motivation to the preferred power line alternative and substation site alterative as to why it proves to be the preferred as compared to other sites and routes	Chapter 5
f)	Clear project description and location of the project must be included in the EIR. Furthermore, co-ordinates of all power line alternatives (especially the preferred power	Chapter 2, Section 6.2.9.

DEA Ref. #	Requirement	Report Reference
	line alternative) must be included in the EIR.	
	The applicant is hereby reminded to comply with the requirements of Regulation 45 with regard to the period allowed for complying with the requirements of the Regulations. Please ensure that the Final EIR includes at least one A0 regional map of the area and the locality maps included in the final EIR illustrate the different proposed alignments and above ground storage of fuel. Google maps will not be accepted. The maps must be of acceptable quality and as a minimum, have the following attributed: • Maps are relatable to one another • Cardinal points and co-ordinates • Legible legends • Indicate alternatives • Latest land cover and vegetation types of the study area • A3 size locality map	Requirements are noted. An A0 map will be included in the Final EIR as required.
	Further, it must be reiterated that, should an application for Environmental Authorisation be subject to the provisions of Chapter II, Section 3 of the NHRA, then this Department will require a letter from the pertinent heritage authority categorically stating that the application fulfils the requirements of the relevant heritage resources authority as described in Chapter II, Section 38(8) of the NHRA.	Heritage Western Cape is included as a commenting authority on the project. Comments on the EIA have been requested and will be included in the final EIR.

Table 2: Requirements in terms of Appendix 3 of 2014 EIA Regulations

Requirement	Relevant Section
3(a) the details of the EAP who prepared the report and (ii) the expertise of the EAP, including a curriculum vitae.	Section 1.3
3(b) the location of the activity including (i) the 21 digit Surveyor General code of each cadastral land parcel, (ii) where available the physical address and farm name and (iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties.	Section 6.2.9
3(c) a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken	Section 6.2.9 and Figure 6.3
3(d)(ii) a description of the proposed activity, including a description of the associated structures and infrastructure related to the development.	Chapter 2
3(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.	Section 2.1
3(g) a motivation for the preferred development footprint within the approved site.	Sections 5.10 and 6.2.9
3(h)(i) details of the development footprint considered.	Section 2.2
3(h)(vii) 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.	Chapter 5 and Appendix D - K
3(h)(ix) if no alternative development locations for the activity were investigated, the motivation for not considering such.	Not applicable
3(h)(x) a concluding statement indicating the preferred alternative development	Sections 5.10 and 6.2.9

Requirement	Relevant Section
location within the approved site.	
3(e) a description of the policy and legislative context within which the development is located and an explanation of how the proposed development complies with and responds to the legislation and policy context.	Section 2.2 and 3.5
3(d)(i) a description of the scope of the proposed activity, including all listed and specified activities triggered and being applied for.	Chapter 2 and Section 3.1
3(h)(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs.	Section 3.4.2
3(h)(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.	Appendix C
3(h)(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks.	Section 3.4.1
3(p) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed.	Section 3.4.3
3(h)(iv) the environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Chapter 4
3(h)(v) the impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts (aa) can be reversed, (bb) may cause irreplaceable loss of resources, and (cc) can be avoided, managed or mitigated.	Chapter 5 and Appendix D - K
3(h)(viii) the possible mitigation measures that could be applied and the level of residual risk.	Chapter 5 and Appendix L
3(i) a full description of the process	Chapters 3 and 5

Requirement	Relevant Section
undertaken to identify, assess and rank the impacts, the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including (i) a description of the 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,.	
3(m) based on the assessment, and where applicable, recommendations from the specialist reports, the recording of proposed impact management objective and, the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions for authorisation.	Chapter 5 and Appendix L
3(j) an assessment of each identified potentially significant impact and risk, including (i) cumulative impacts, (ii) the nature, extent, 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 mitigated.	Chapter 5 and Appendix L
3(k) where applicable, a summary of the findings and recommendations of 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 assessment report.	Chapter 6
3(l) 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	Section 6.3 and Figure 6.1

Requirement	Relevant Section
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.	
3(n) the final proposed alternatives which respond to the impact management measures, avoidance and mitigation measures identified through the assessment.	Sections 5.10 and 6.2.9
3(o) 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.	Section 6.4
3(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 6.3

PUBLIC REVIEW OF EIA REPORT

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 for a 30-day period from 18 November 2016 to 09 January 2017[1]. During the review period, Savannah Environmental received comments from CapeNature dated 20 December 2016. To meet the requirements stipulated in the above-mentioned letter, a number of changes were required and new information was included in the EIAr prior to submission of this report to the DEA. The revised report was made available for an additional 30 days public review from 27 January – 27 February 2017 at the following venues:

» Vredenburg Public Library (School Street, Vredenburg)
» Hopefield Public Library (Oak Street, Hopefield)
» Langebaan Public Library (Cnr. Oostewal & Bree Street, Langebaan)
» Saldanha Public Library (Berg Street, Saldanha)

All comments received are included within this Final EIA Report, which is submitted to the DEA for review and decision-making.

[1] Note that this 30-day review period excludes the days of reckoning from 15 December 2016 – 5 January 2017 as per Regulation 3(2) of the EIA Regulations

EXECUTIVE SUMMARY

Background and Project Overview

Eskom Holdings SOC Ltd (to be referred to as Eskom hereafter) is proposing the Saldanha Bay Network Strengthening Project which involves the proposed construction of a new Distribution substation (Dx), Transmission substation (Tx), 2X 400kV Power Lines and associated upgrade and extension of the Aurora Substation. The proposed Saldanha Bay Network Strengthening is located in the Saldanha Bay area, approximately 130km north west of Cape Town, in the Western Cape Province. The closest towns to the study area are Saldanha Bay, Langebaan and Vredenburg.

The nature and extent of this proposed project, as well as potential environmental impacts associated with its construction, operation and decommissioning are explored in more detail in this EIA Report.

Eskom Holdings SOC Ltd is responsible for the provision of reliable and affordable power to its consumers in South Africa. Electricity from non-renewable sources cannot be stored and therefore must be used as it is generated. It is, therefore, required that electricity must be efficiently transmitted from the point of generation to the end user.

If Eskom is to meet its mandate and commitment to supply the ever-increasing needs of end-users, it has to plan, establish and expand its infrastructure of generation capacity and transmission power lines on an on-going basis. As part of the envisaged developments in the Saldanha Bay area, Eskom has been prompted to re-assess the capability of the existing electricity network in the area in order to meet the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and also to facilitate the integration of renewable generation. Power to the Saldanha Bay area is supplied from Aurora Substation which is located 28km east of Saldanha Bay. Aurora Substation supplies Blouwater, Saldanha Steel and Smelter distribution Substations. From the load forecast for the area, it is evident that there will be a constraint at Aurora Substation in the next five year period. The projected new load of approximately 200 MVA that will be realised in the area together with the natural load growth will increase Aurora Substation demand from 517 MVA to approximately 890 MVA in year 2030. The firm capacity in the area will be exceeded in 2018 if the additional loads are to be supplied from Aurora Substation. The transformation capacity is also insufficient to evacuate all of the potential renewable generation planned in the area, amounting to 2 885 MW.

Eskom is therefore proposing the Saldanha Bay network strengthening project, which includes the following:

» Construction of a new 400/132kV Transmission Substation in the Saldanha Bay area with a planned capacity of 3 x 500 MVA transformers. The transmission substation footprint will be 600m x 600m.
» Construction of a new 132/66/11kV Distribution Substation near the current Blouwater Substation in the Saldanha Bay area and decommissioning of the existing Blouwater Substation. The new substation footprint will be 160m x 300m.
» The construction of two 400kV power lines (approximately 35 - 40 km) from the Aurora Substation to the new proposed distribution and transmission substations. A servitude of 55m is required for each power line.
» Three 132kV servitudes (31m each) are required to integrate the new 132/66/11kV substation into the proposed 400/132kV main transmission station.
» 132kV and 66kV servitudes are required to integrate the high voltage lines into the new proposed 132/66/11kV substation.
» Replacing two of the four existing 250 MVA 400/132kV transformers at Aurora Substation with 2 x 500 MVA transformers.
» Establishing 2 x 132 kV feeder bays at Aurora Substation.
» The development and/or widening of access roads.

The purpose of the proposed project is to:

» Improve the reliability of the existing network within the Saldanha area
» Ensure that transmission capacity keeps up with both electricity generation capacity and electricity demand within the area
» Create additional Transmission network capacity to be able to supply the increasing electricity demand.

Technically feasible **alternative substation (Dx & Tx) positions and transmission power line alignments** have been identified for investigation within a broader study area during this EIA process. These are reflected in Figure 1. Through the EIA process, preferred transmission power line corridors and substation positions will be nominated for consideration in the decision-making process by the National Department of Environmental Affairs (DEA), as competent authority for this project. Should the proposed Saldanha Bay Network Integration project be authorised, Eskom will then enter into negotiation process with each affected landowner. This negotiation process is independent of the EIA process.

Evaluation of the Proposed Project

The assessment of potential environmental impacts presented in this report is based on an understanding of the infrastructure proposed as part of this project (i.e. for the TX lines, TX substation, DX

power lines and DX substation) provided by Eskom. Alternative power line corridors and substation sites have been considered and comparatively assessed. Environmental impacts of the proposed project are expected to be associated with construction, operation and decommissioning activities. The majority of the environmental impacts associated with the facility will occur during the construction phase. Environmental issues associated with construction and decommissioning activities of the proposed infrastructure are similar and include, among others:

» Impact on ecology (flora, fauna and avifauna) and loss of protected species.
» Potential soil loss and change in land-use.
» Impact on heritage resources.
» Social impacts (positive and negative).
» Visual impacts.

Environmental issues specific to the operation include, among others:

» Visual impacts (intrusion, negative viewer perceptions and visibility of the facility).
» Avifaunal Impacts (fatalities due to the collision with the power line).
» Social impacts (positive and negative).

These and other environmental issues were originally identified through a scoping evaluation of the proposed project. Potentially significant impacts have now been assessed during this EIA Phase. This EIA process has involved key input from specialist consultants, the project developer, and from key stakeholders and interested and affected parties.

No environmental fatal flaws were identified to be associated with any of the alternatives considered, although some land use conflicts were identified influencing the technical feasibility in some areas. The environmental sensitivities identified during the EIA phase have informed recommendations made regarding preferred alternatives for implementation. The final placement of infrastructure within the preferred power line corridor and substation sites must be informed by technical criteria and environmental sensitivities.

Environmental (natural environment, economic and social) costs can be expected to arise from the project proceeding. This could include:

» Direct loss of biodiversity, flora and fauna due to the clearing of land for the construction and utilisation of land for the project (limited to the substation footprint and power line towers). The cost of loss of biodiversity is expected to be high at a local level in areas where natural vegetation remains, but limited as a result of the high levels of disturbance already experienced in the area.
» Impacts on avifauna. The cost of any long-term significant impacts on avifaunal species within the

study area is expected to be low due to the current agricultural, industrial and power line developments present within the study area.

» Visual impacts associated with the proposed infrastructure. The cost of loss of visual quality to the area is expected to be low as a result of the location of the proposed development in relation to sensitive visual receptors, as well as the already highly compromised nature of the landscape within and around the study area.
» Change in land-use and loss of land available for agriculture on the development footprint. The cost in this regard is expected to be limited due to the limited footprint of the proposed infrastructure, the low agricultural potential of the area and the fact that current agricultural activities can continue during construction and operation. Any potential conflicts with existing and planned land use can be minimised through the implementation of the nominated preferred alternatives.

These costs are expected to occur at a local and site level and are considered acceptable provided the mitigation measures as outlined in the EMPr are adhered to. No fatal flaws associated with the proposed project have been identified.

The positive implications of establishing the Saldanha Network Strengthening project within the nominated preferred alternatives include:

» The project will result in socio-economic benefits at the local and regional scale through job creation, procurement of materials and provision of services and provision of power to the Saldanha Bay area, thereby enabling future development. These will persist during the construction and operational phases of the project.
» The project provides vital services required to support the National, Provincial and Local goals for the development within the area as outlined in the Saldanha Bay SDF.
» The project is located within an area already largely transformed by similar developments (i.e. industrial type developments, substations and power lines). The location is therefore considered desirable.

The benefits of the project are expected to occur at a national, regional and local level. As the costs to the environment at a site specific level have been largely limited through the identification of the most appropriate alternatives for implementation and recommendation of required mitigation measures, the expected benefits of the project are expected to partially offset the localised environmental costs of the project.

Nomination of Preferred Alternatives

There are varying conclusions from the specialist studies undertaken. The majority of specialists nominated Corridor 3 and Transmission

Substation Site A as the preferred alternative. However based on discussions with landowners in the area held during the EIA-phase, Mulilo confirmed that Site A is not suitable due their planned OCGT plant in the vicinity of Site A. Various other landowners (including Arcelor-Mittal and Gavin Stigling) also commented that Site A would not be suitable from a technical feasibility perspective. Transmission Substation Site F with Transmission Line Corridor 6 are both nominated as the second preferred option. Based on environmental and technical considerations, **Transmission Substation Site F with Transmission Line Corridor 6** are therefore recommended as the preferred option for implementation.

Distribution Substation Site A an associated 132kV power lines was nominated as the preferred option from all the specialist studies and is therefore selected as the preferred site for the distribution substation. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

Conclusions and Recommendations

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:

- Substation Site A is not considered to be technically feasible. This is based on the land use conflicts identified though consultations with stakeholders and landowners during the EIA phase.
- **Corridor 6** with **Transmission Substation Site F** is considered to be the second **preferred option** from the conclusions of the majority of the specialist studies undertaken. Based on environmental and technical considerations, this is therefore considered to be the **preferred overall alternative** for the transmission line corridor and TX substation site.
- **Distribution Substation Site A** and associated 132kV power lines is considered to be the **preferred alternative** for the distribution substation. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.
- No issues of high significance were identified to be associated with the new double circuit 132kV power lines.
- Although some impacts of potential significance are associated with the proposed project, there are no environmental fatal flaws that should prevent the project infrastructure from being constructed within the nominated preferred alternatives, provided

that the recommended mitigation measures are implemented.

» The significance levels of the majority of identified negative impacts can be minimised by implementing the recommended mitigation measures.

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 substations and power lines, 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 application for the proposed Saldanha Bay Strengthening Project be authorised by the DEA to include the following:

» Construction of a new 400/132kV Transmission Substation at **Site F** in the Saldanha Bay area with a planned capacity of 3 x 500 MVA transformers. The transmission substation footprint will be 600m x 600m.
» Construction of a new 132/66/11kV Distribution Substation at **Site A** near the current Blouwater Substation in the Saldanha Bay area. The distribution substation footprint will be 160m x 300m.
» The construction of three double-circuit 132kV power lines (31m each) to integrate the new 132/66/11kV substation at DX site A into the proposed 400/132kV main transmission station to be located at TX Site F.
» The construction of two 400kV power lines (approximately 20 km in length) from the Aurora Substation to the new proposed distribution and transmission substations. The power lines should follow **Corridor 6**.
» Replacement of two of the four existing 250 MVA 400/132kV transformers at Aurora Substation with 2 x 500 MVA transformers.
» Establishment of 2 x 132 kV feeder bays at Aurora Substation.
» Decommissioning of the existing Blouwater Substation.

The following conditions of this recommendation must be included within the authorisation issued:

» All mitigation measures detailed within this report and the specialist report contained within Appendices D to L must be implemented.
» The Environmental Management Programme (EMPr) as contained within Appendix L of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed project, 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 to be key in achieving the appropriate environmental management standards as detailed for this project.
» An independent Environmental Control Officer (ECO) should be

appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.

» Once the substation site and power line tower positions have been selected and pegged, a site visit must be conducted by a suitably qualified botanist to determine the presence of Red Listed and Endemic species within the site footprint, prior to the commencement of any construction and construction related activities. Any bulbs and red listed plant species must be immediately translocated to an undisturbed area outside of the development footprint.

» An ornithologist must identify the exact power line spans requiring marking in order to minimise the risk of collision of birds with the earth wire. Recommendations must be made regarding the installation of Bird Guards on all self-supporting towers according to the existing Eskom guidelines. This will prevent birds from perching in high risk areas on the towers directly above live conductors.

» The EMPr for construction must be updated to include site-specific information and specifications resulting from the final walk-though surveys. This EMPr must be submitted to DEA for approval prior to the commencement of construction.

» Monitoring must be conducted on an ad hoc basis by the palaeontologist at times when suitable holes are exposed. The environmental officer (EO) and project staff should also be appropriately briefed beforehand to ensure that they are able to recognise and rescue any fossils found during excavations.

» During construction, unnecessary disturbance to habitats should be strictly controlled and the footprint of the impact should be kept to a minimum.

» Areas disturbed during construction should be rehabilitated as quickly as possible and an on-going monitoring programme should be established to detect and quantify any alien species.

» A study must be undertaken by the applicant to determine whether the Blouwater substation site could potentially be significantly contaminated prior to decommissioning activities being undertaken.

» Applications for all other relevant and required permits required to be obtained by Eskom must be submitted to the relevant regulating authorities.

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APPENDICES

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.
☐**Direct impacts:** Impacts that are caused directly by the activity and generally **Direct impacts:** Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;

ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management plan: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and Affected Party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
GDACE	Gauteng Department of Agriculture, Conservation and Environment
DEA	National Department of Environmental Affairs
DME	Department of Minerals and Energy
DOT	Department of Transport
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
LUPO	Rezoning and Subdivision in terms of Land Use Planning Ordinance, Ordinance 15 of 1985
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework
SIA	Social Impact Assessment
ZVI	Zone of visual influence

INTRODUCTION CHAPTER 1

Eskom Transmission (a division of Eskom Holdings SoC Limited; be referred to as Eskom hereafter) is proposing the development of the Saldanha Bay Network Strengthening Project. This project involves the construction of a new Distribution substation (Dx) close to the existing Blouwater Substation, a new Transmission substation (Tx), 2 X 400kV power lines and associated upgrade and extension of the Aurora Substation. The proposed Saldanha Bay Network Strengthening is located in the Saldanha Bay area, approximately 130km North West of Cape Town, in the Western Cape Province. The closest towns to the study area are Saldanha Bay, Langebaan and Vredenburg.

The nature and extent of this proposed project, as well as potential environmental impacts associated with its construction, operation and decommissioning are explored in more detail in this Draft EIA Report.

1.1. Project Overview and Purpose

Eskom Holdings Ltd is responsible for the provision of reliable and affordable power to its consumers in South Africa. Electricity cannot be stored and therefore must be used as it is generated. It is, therefore, required that electricity must be efficiently transmitted from the point of generation to the end user.

If Eskom is to meet its mandate and commitment to supply the ever-increasing needs of end-users, it has to plan, establish and expand its infrastructure of generation capacity and transmission power lines on an on-going basis. As part of the envisaged developments in the Saldanha Bay area, Eskom has been prompted to re-assess the capability of the existing electricity network in the area in order to meet the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and also to facilitate the integration of renewable generation within the region. Power to the Saldanha Bay area is currently supplied from Aurora Substation which is located 28km east of Saldanha Bay. Aurora Substation supplies Blouwater, Saldanha Steel and Smelter distribution Substations. From the load forecast for the area, it has become evident that there will be a constraint at Aurora Substation in the next five year period. The projected new load of approximately 200 MVA that will be realised in the area together with the natural load growth will increase Aurora Substation demand from 517 MVA to approximately 890 MVA in year 2030. The firm capacity in the area will be exceeded in 2018 if the additional loads are to be supplied from Aurora Substation. The transformation capacity is also insufficient to evacuate all of the potential renewable generation planned in the area, amounting to 2 885 MW.

Eskom is therefore proposing the Saldanha Bay Network Strengthening Project, which includes the following:

» Construction of a new 400/132kV Transmission Substation in the Saldanha Bay area with a planned capacity of 3 x 500 MVA transformers. The transmission substation footprint will be 600m x 600m.
» Construction of a new 132/66/11kV Distribution Substation near the current Blouwater Substation in the Saldanha Bay area and decommissioning of the existing Blouwater Substation. The new substation footprint will be 160m x 300m.
» The construction of two 400kV power lines (approximately 20km in length) from the Aurora Substation to the new proposed distribution and transmission substations. A servitude of 55m is required for each power line.
» Three 132kV servitudes (31m each) are required to integrate the new 132/66/11kV substation into the proposed 400/132kV main transmission station. These will be double circuit lines.
» Replacing two of the four existing 250 MVA 400/132kV transformers at Aurora Substation with 2 x 500 MVA transformers.
» Establishing 2 x 132kV feeder bays at Aurora Substation.
» The development and/or widening of access roads.

The purpose of the proposed project is to:

» Improve the reliability of the existing network within the Saldanha area
» Ensure that transmission capacity keeps up with both electricity generation capacity and electricity demand within the area
» Create additional Transmission network capacity to be able to supply the increasing electricity demand.

Technically feasible **alternative substation (Dx & Tx) positions and transmission power line corridors** and have been identified for investigation within a broader study area during the EIA process. These are reflected on Figure 1.1 and are described in Chapter 2. Through the EIA process, preferred transmission power line corridors and substation positions will be nominated for consideration in the decision-making process by the National Department of Environmental Affairs (DEA), as competent authority for this project. Should the proposed Saldanha Bay Network Strengthening project be authorised, Eskom will then enter into negotiation process with each affected landowner to determine the final servitude placement. This negotiation process is independent of the EIA process.

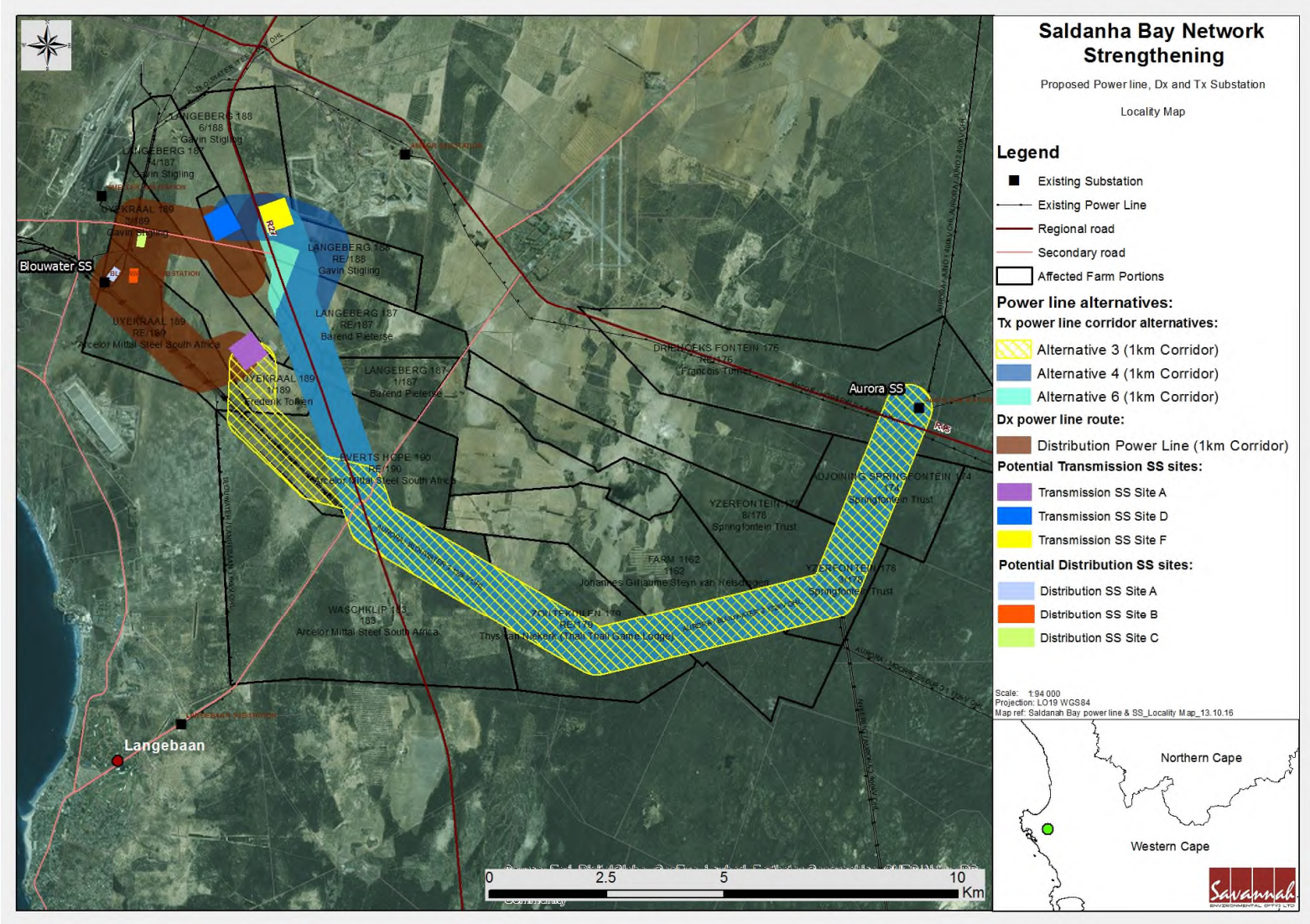

Figure 1.1 Locality Map showing the alternative substation (Dx & Tx) positions and transmission power line corridors identified for consideration in the EIA process

The scope of the Saldanha Bay Strengthening Network project, including details of all elements of the project (for the construction, operation and decommissioning phases) is discussed in detail in Chapter 2.

1.2. Requirement for an Environmental Impact Assessment Process

of the Environmental Impact Assessment Regulations (EIA Regulations) published in 2014 in terms of Section 24(5) of the National Environmental Management Act (NEMA, 1998, Act No 107). This section provides a brief overview of EIA Regulations and their application to this project.

NEMA is the national legislation that provides for the authorisation of 'listed activities'. In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these activities must be considered, investigated, assessed and reported on to the competent authority that has been charged by NEMA with the responsibility of granting environmental authorisations. As this is a proposed electricity transmission and distribution project and thereby considered to be of national importance, the National Department of Environmental Affairs (DEA) is the competent authority and the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) will act as a commenting authority.

An EIA is an effective planning and decision-making tool for the project developer as it allows for the identification and management of potential environmental impacts. It provides the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issues reported on in the Scoping and EIA Reports as well as dialogue with interested and affected parties (I&APs). The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided with an opportunity to consider the potential environmental impacts early in the project development process, and to ensure that environmental impacts are be minimised, avoided or mitigated to acceptable levels as far as possible.

Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project.

1.3. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was contracted by Eskom as the independent environmental consultants to undertake both Scoping and EIA processes for the

proposed Saldanha Bay Network Strengthening project. Neither Savannah Environmental nor any its specialist sub-consultants on this project are subsidiaries of or are affiliated to Eskom. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing holistic environmental management services, including environmental impact assessments and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental management tools. Savannah Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team has considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

- *Jo-Anne Thomas* - the principle Environmental Assessment Practitioner (EAP) for this project, is a registered Professional Natural Scientist and holds a Master of Science degree. She has 19 years of experience consulting in the environmental field. Her 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. She is currently responsible for the project management of EIAs for several energy generation and power line projects across the country.
- *Gabriele Wood* – Public Participation consultant, Gabriele Wood has 9 years of consulting experience in public participation and social research. She holds an Honours Degree in Anthropology and has successfully completed the International Association for Public Participation (IAP2) certificate programmes in Foundations, Planning and Techniques for Effective Public Participation. Her experience includes the design and implementation of public participation programmes and stakeholder management strategies for numerous integrated development planning and infrastructure projects. Her work focuses on managing the public participation component of Environmental Impact Assessments undertaken by Savannah Environmental.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Savannah Environmental has included the following specialist consultants to conduct specialist assessments:

- Avifauna – Craig Widdows (Afzelia Environmental Consultants (Pty) Ltd) and Robyn Phillips (independent ornithologist)
- Fauna – Craig Widdows (Afzelia Environmental Consultants (Pty) Ltd)
- Flora – Ronel Naude (Afzelia Environmental Consultants (Pty) Ltd)
- Wetlands – Rowena Harrison (Afzelia Environmental Consultants (Pty) Ltd)
- Heritage – Jayson Orton (ASHA Consulting (Pty) Ltd)
- Palaeontology – Graham Avery (Iziko Consulting)
- Soils and Agricultural Potential – Garry Paterson (ARC-Institute for Soil, Climate and Water)
- Social – Candice Hunter and Pamela Sidambe (Savannah Environmental) and Neville Bews (external reviewer)
- Visual – John Marshall (Afzelia Environmental Consultants and Environmental Planning and Design)
- Town Planning Study - Jan Visagie (Jan Visagie Consulting)

Curricula vitae for the environmental assessment practitioners from Savannah Environmental and the specialist consultants are included within Appendix A.

Eskom, as the primary supplier of electricity in South Africa, is currently responding to the growing electricity demand and predicted future demand within South Africa by proposing new generation and Transmission capacity building projects throughout the country over the next few years. Through the Integrated Strategic Electricity Planning (ISEP) process, Eskom continually assesses the projected demand for electricity within South Africa. By analysing usage patterns and growth trends in the economy, and matching these with the performance features of various generation technologies and demand side management options, ISEP identifies the timing, quantity and type (base load or peaking) of new generation capacity options required in the long-term (i.e. over the next 15–20 years). As part of this process, Eskom continues to investigate a variety of electricity generating options, strengthening and efficiency building options to improve Transmission efficacy.

As part of its capacity expansion and grid strengthening programme, Eskom is proposing the Saldanha Bay Network Strengthening Project, which includes the construction of a new Distribution substation (Dx), Transmission substation (Tx), 2 x 400kV power lines, 3 x 132kV double circuit power lines and associated upgrade and extension of the Aurora Substation. The two new 400kV power lines would be approximately 20 km in extent, depending on the final alignment of the power line. The 132kV lines would be 2 – 3km in length, depending on the final position of the distribution and transmission substations.

2.1. The Need for the Proposed Project

2.1.1. Transmission Planning

Over the past few years Eskom has been experiencing a primary energy constraint to be able to meet its obligation to supply the load requirements of South Africa. The electricity load is expected to continue growing placing increased strain on the supply of electricity. The forecast for the Western Grid is based on assumption of constant growth of the existing load plus some new development in certain areas. Growth in this region can be considered to fall within and envelop of 2%-3% per year and as part of the envisaged developments in the Saldanha Bay area, Eskom has been prompted to re-assess the capability of the existing electricity network in the area in order to meet the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and also to facilitate the integration of renewable generation. Power to the Saldanha Bay area is currently supplied from Aurora Substation which is located 28km east of Saldanha Bay. Aurora

Substation supplies the Blouwater, Saldanha Steel and Smelter Substations. From the load forecast, it is evident that there will be a constraint at Aurora Substation in the future. The projected new load of approximately 200 MVA that will be realised in the area together with the natural load growth will increase Aurora Substation demand from 517 MVA to approximately 890 MVA in year 2030. The firm capacity in the area will be exceeded in 2018 if the additional loads are to be supplied from Aurora Substation. The transformation capacity is also insufficient to evacuate all of the potential renewable generation planned in the area, amounting to 2 885 MW.

Eskom Transmission has taken measures to get the most out of the existing Transmission system in the area so that the construction of new lines will occur only when needed. These measures include:

» Comprehensive checks on the existing lines to ensure that they are within the legal clearance for overhead lines. Lines sag when placed under heavy load conditions, due to heating of the conductors.
» Installation of line monitoring devices that measures the atmospheric conditions prevailing. This allows Eskom Transmission to decide whether the lines can cope with more loading (e.g. on a cold day the line can be loaded to more than usual levels since the lines cool down and they do not sag as much).
» Installation of new infrastructure.
» Demand side management.
» The best reinforcement options are selected to ensure that an optimised mix of cost, technical benefit and environmental impact was achieved.

As all options for optimisation of the existing infrastructure have already been studied and implemented within the study area, new Transmission power lines and substation will be required to be constructed to meet the increasing power demand. The new Transmission lines and substation are proposed to be brought into operation at the time when the load growth and demand exceeds the supply. It is therefore necessary to secure the necessary servitude timeously, to ensure this will be possible.

A definite twofold need for a new Transmission power lines and substation has therefore been identified:

» to optimise the existing system; and
» to increase line capacity in the Transmission system.

By increasing the supply into the Transmission system, the foreseen load growth can be addressed in a suitable and economical way. Optimisation of the current system is currently underway, and would alleviate some problems in the system.

The existing Blouwater Substation is reaching the end of its life-cycle and needs to be decommissioned. The new distribution substation is therefore proposed to replace this existing substation.

2.1.2. Town and Regional Planning

The Saldanha Bay SDF promotes the upgrading of services to accommodate the development of industrial activities within the Saldanha Bay Industrial Corridor. In terms of the SDF, the area and the future planning is described as follows:

"Situated approximately 120 km North West of Cape Town, with its natural deep water harbour and its associated development potential, Saldanha has been identified as a Presidential Development Growth Node. This view is strengthened by the principles contained in the National Spatial Development Perspective and reinforced by the approved Provincial Spatial Development Framework.

Leveraging the deep-water port, its proximity to Cape Town and large tracts of relatively cheap land, Saldanha is in a prime position to attract industry to the region. Already Saldanha is home to a large-scale mining concern, steel manufacturing and beneficiation plants and an oil and gas services fabrication yard financed through the national counter trade programme.

In realising its economic potential, services and infrastructure provision in Saldanha need to be planned, and then aligned and implemented in a manner that will facilitate the optimal development of the area's potential as a manufacturing and import / export destination.

Saldanha Port and the 'Back of Port' area are regarded as critical for the growth of the region and seen as major economic growth point in the Western Cape Province. The Port itself falls under the jurisdiction of the National Ports Authority, and as such is planned and managed by this authority.

Major provision has been made for the expansion of the port and in this regard, an extensive Port Development Framework has been prepared.

As an economic spin off from the proposed upgrading and expansion at the Saldanha Bay Port, major industrial development is anticipated within the Back of Port area. The industrial expansion is considered a catalyst for the growth of a major industrial corridor which is envisioned to link the southern part of Saldanha Bay with the Port and the Port with the south-western section of Vredenburg.

A major obstacle in realising the development potential of the Back of Port industrial corridor area is the provision of sufficient service infrastructure. Service

infrastructure is regarded as a key investment which is of utmost importance as the availability and provision thereof can be the mechanism to unlock the development potential of the Back of Port area."

The project would provide the required electricity to the area to facilitate the planned development. The project will therefore support the development objectives and plans of the area.

2.2. Description of Alternatives

The following alternatives for satisfying the need for additional electrical supply to the Transmission system and optimising the existing infrastructure were investigated by Eskom.

2.2.1. Project Alternatives

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

The following criteria were considered by Eskom in the identification of technically feasible alternatives for the Saldanha Bay Network Strengthening Project:

- 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.

Transmission Line Alternatives

Six (6) technically feasible alternative Transmission power line development corridors were identified for investigation within the study area during the EIA process (refer to Figure 2.1). At the conclusion of the Scoping process, it was recommended that all alternatives be considered within the EIA process. However, at the outset of the detailed EIA investigations and through consultation with key stakeholders in the study area, a number of technical fatal flaws were identified to be associated with Alternatives 2, 3 and 5 (mainly as a result of the proximity of these to the Langebaanweg Airforce Base). These alternatives were therefore excluded from further investigation.

Three technically feasible alternative **Transmission power line** development corridors of 1km in width were identified for detailed investigation within the study area during the EIA phase of the EIA process (refer to Figure 2.2). These alternatives are, in some cases, a combination of alternatives considered with the scoping process and all fall within the original study area considered within the Scoping Study. Due to this combination of corridors, the alternatives were renamed in some instances.

The identified power line development corridors as proposed and assessed within this report, and the areas affected are described in more detail below.

Alternative 3 power line corridor is indicated as the purple line on Figure 2.2. This corridor is approximately 22km in length and is proposed to exit from the existing Aurora Substation which is situated approximately 12km north west of the town of Hopefield, parallel to the existing Aurora/Bouwater 132kV power line.

Where the existing power line crosses the R27 regional road, the proposed power line alignment deviates slightly from the existing line, running parallel to the R27 road for a stretch of 1km in order to avoid existing buildings, then follows the existing line to the proposed transmission substation Site A.

Alternative 4 power line corridor is indicated as the blue line on Figure 2.2. This corridor is approximately 25km in length and is proposed to exit from the existing Aurora Substation parallel to the existing Aurora/Bouwater 132kV power line. Where the existing power line crosses the R27 regional road, the proposed power line alignment deviates, running parallel to the R27 road for a stretch of approximately 6km after which is changes direction to the north, then the north west and then the west for short distances before crossing the R27 to the proposed transmission substation Site D.

Alternative 6 power line corridor is indicated as the yellow line on Figure 2.2. This corridor is approximately 25km in length and is proposed to exit from the existing Aurora Substation parallel to the existing Aurora/Blouwater 132kV power line. Where the existing power line crosses the R27 regional road, the proposed power line corridor deviates, running parallel to the R27 road for a stretch of approximately 7km to the proposed transmission substation Site F.

The authorised power line will be built as a 400kV, but will be operated as a 132kV in order to connect into the proposed Distribution substation discussed below until the completion of the Transmission substation.

Distribution Substation Alternatives

Three Distributions substation (Dx) sites are being investigated within this EIA process (refer to Figure 2.2). The identified sites are all located within 1km east of the existing Blouwater Substation with a footprint of 160m x 300m. The authorised substation will replace the existing Blouwater Substation which is planned to be decommissioned. Associated 132kV double-circuit power lines between the Dx and Tx substation sites will be considered for each alternative.

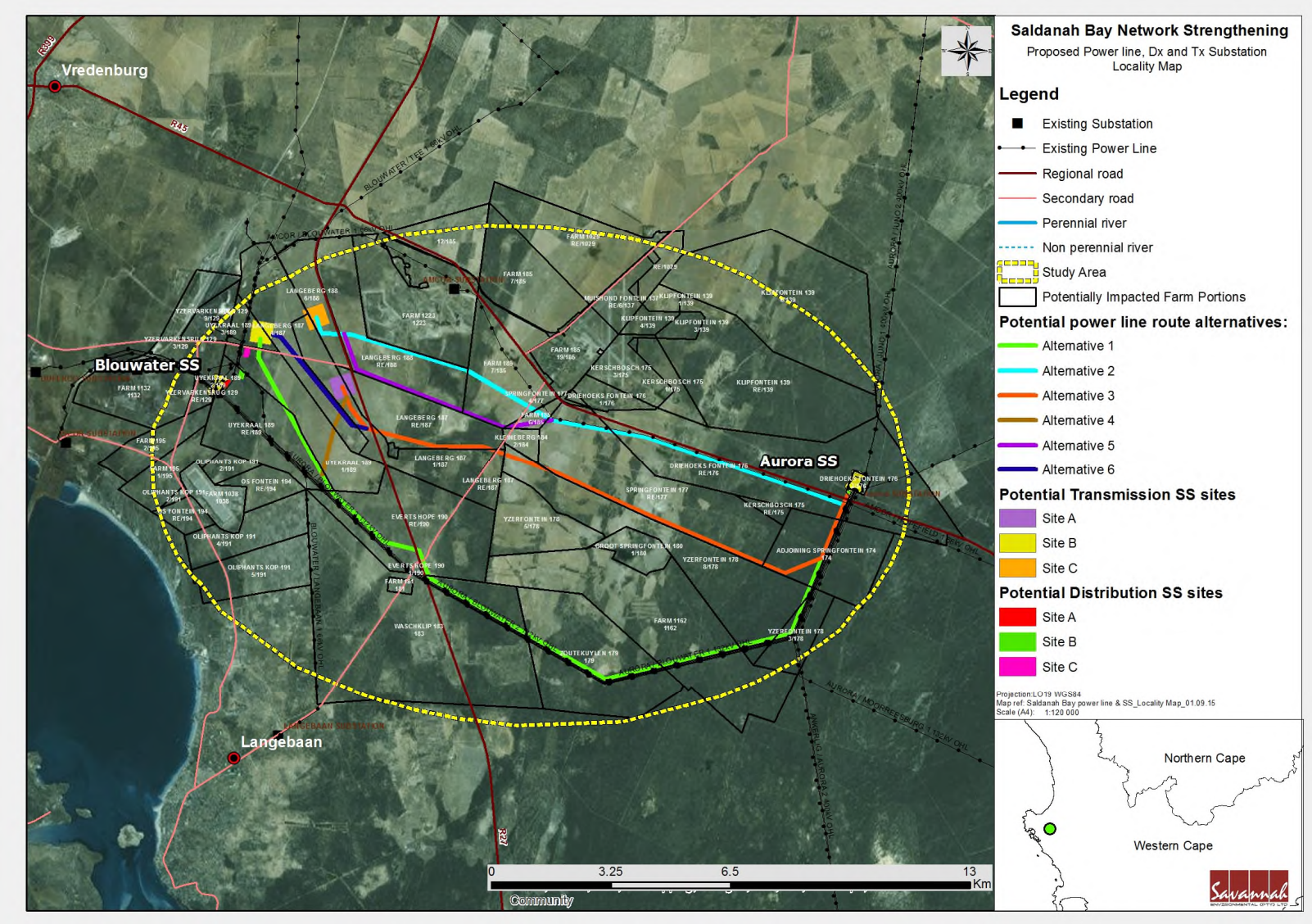

Figure 2.1: Map indicating the alternative Transmission line & Substation sites considered at scoping

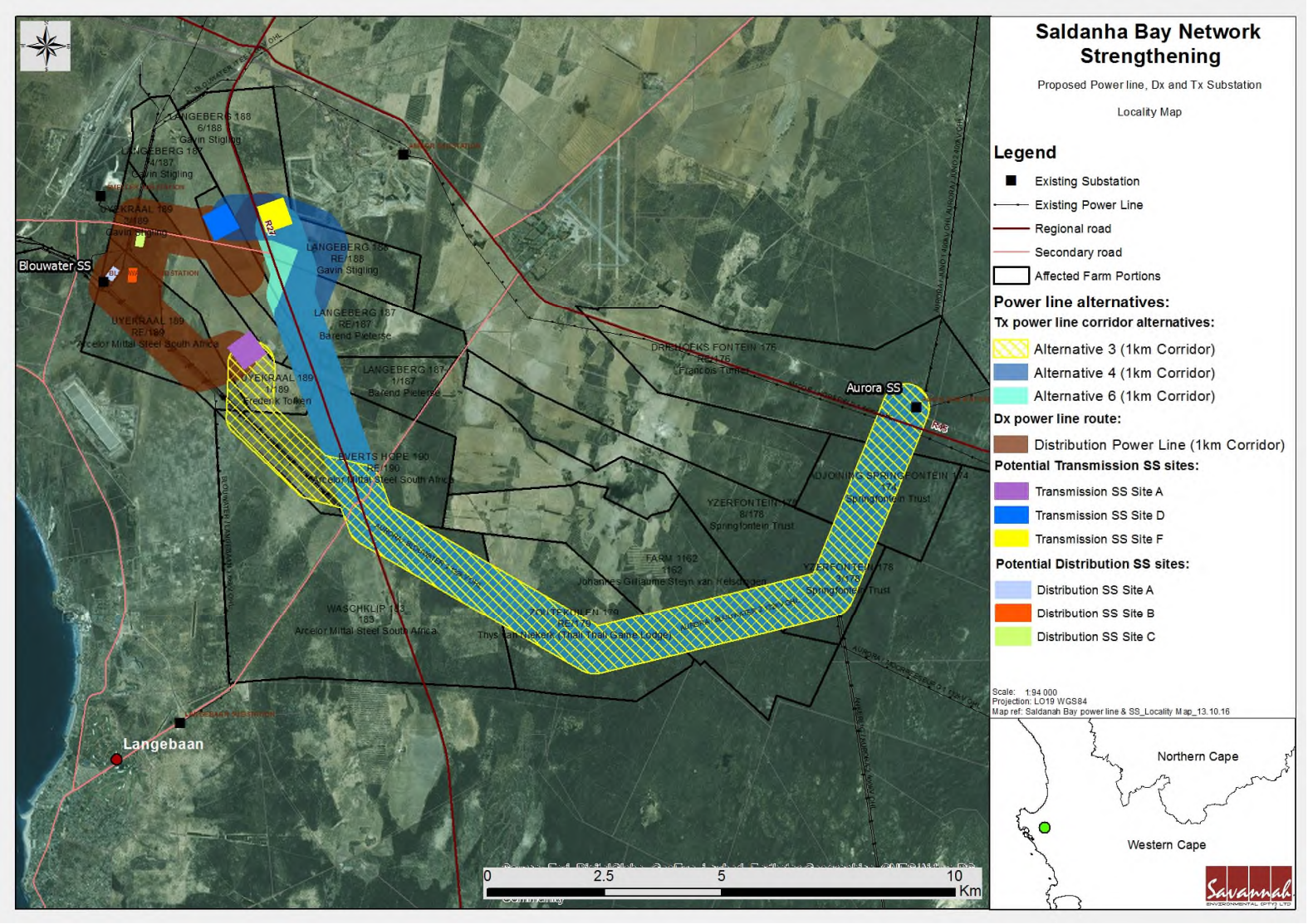

Figure 2.2: Map indicating the alternative Transmission line & Substation sites identified for consideration in the EIA process

Transmission Substation Alternatives

Three technically feasible sites for the **Transmission Substation (Tx)** are being investigated within this EIA process (refer to Figure 2.2). All three sites are located in the vicinity of the Blouwater Substation (approx. 3km east) and adjacent to the R27 regional road that crosses the study area. The transmission substation footprint will be 600m x 600m.

Upgrade of Aurora Substation

Aurora Substation will be upgraded/extended as part of the proposed project. This will include the following:

» Replacing two of the four existing 250 MVA 400/132kV transformers with 2 x 500 MVA transformers at Aurora Substation.
» Establishing 2 x 132 kV feeder bays around Aurora Substation.

This proposed expansion will be undertaken within the existing substation footprint and, therefore, no alternatives are proposed for assessment.

Decommissioning of the Blouwater Substation

The existing Blouwater Substation will be decommissioned once the new distribution substation has been constructed and commissioned. This will include the following:

» Decommissioning and disassembly of the project components
» Removal of components from site
» Rehabilitation of the substation area

As the decommissioning activities relate to the existing substation no alternatives are proposed for assessment.

2.2.2. 'Do-nothing' alternative

The Do Nothing Alternative is the option of not implementing the Saldanha Network Strengthening Project. AS required in term of the EIA Regulations, alternative is assessed within this report.

2.3. Construction phase

2.3.1. Technical Details of Transmission Power Lines

Power lines are constructed in the following simplified sequence:

Step 1: Determination of technically feasible alternatives
Step 2: EIA input into route selection
Step 3: Negotiation of final route with affected landowners
Step 4: Survey of the route (by air)
Step 5: Determination of the conductor type
Step 6: Selection of best-suited conductor, towers, insulators, foundations
Step 7: Final design of line and placement of towers (including final walk-though survey by environmental specialists and compilation of site-specific Environmental Management Programme (EMP)).
Step 8: Issuing of tenders, and award of contract to construction companies
Step 9: Vegetation clearance and construction of access roads (where required)
Step 10: Tower pegging
Step 11: Construction of foundations
Step 12: Assembly and erection of towers
Step 13: Stringing of conductors
Step 14: Rehabilitation of disturbed areas and protection of erosion sensitive areas
Step 15: Testing and commissioning

Construction of the proposed the 400kV lines will take approximately 24 months to complete. Construction crews for the power lines and substations will constitute mainly skilled and semi-skilled workers. No construction workers will reside on site. It is most likely that construction workers will be accommodated within formal housing within towns surrounding the study area.

All components of a Transmission line are interdependent, but are distinct in the roles which they fulfil. The primary components include towers, foundations, insulators and hardware, and conductors.

» *Towers*
Transmission line conductors are strung on in-line (suspension) towers and bend (strain) towers. Various tower designs are available for use by Eskom on the proposed project (refer to Figure 2.3 to 2.5). The type of towers which can be used will be dependent on the final alignment of the power lines and individual agreements with affected landowners and stakeholders. Suspension towers are typically less cumbersome structures, which are less steel-intensive than strain/bend towers. This makes them less visually

intrusive, and cheaper to construct than strain towers. Therefore Transmission line routes are planned with as few bends as possible. The compact cross-rope suspension tower is typically used along the straight sections of the servitude, while the self-supporting angle towers are used where bends occur in the power line alignment.

» *Servitude Requirements*

The servitude width for a 400kV Transmission line is 55 m. The servitude is required to ensure the safe construction, maintenance and operation of the line, and thereby entitles Eskom Transmission Division certain rights (e.g. unrestricted access). Where 400kV Transmission lines are constructed in parallel, a minimum separation distance of 55 m is required in order to ensure the reliable operation of both lines. The minimum vertical clearance to buildings, poles and structures not forming part of the power line must be 3.8 m, while the minimum vertical clearance between the conductors and the ground is 8.1 m (Refer to Figure 2.6).

The minimum distance of a 400kV Transmission power line running parallel to proclaimed public roads must be 100 m from the centre of the Transmission power line servitude to the centre of the road servitude. Any main road located close to a Transmission line tower must have Armco barriers as protection. The minimum distance between any part of a tree or shrub and any bare phase conductor of a 400kV Transmission line must be 3.8 m, allowing for the possible sideways movement and swing of power towers and conductors.

A maximum 8 m wide strip is to be cleared of all trees and shrubs down the centre line of the Transmission line servitude for stringing purposes only. Any tree or shrub in other areas which will interfere with the operation and/or reliability of the Transmission line must be trimmed or completely cleared. The clearing of vegetation will take place, with the aid of a surveyor, along approved profiles and in accordance with the approved EMPr, and in accordance with the minimum standards to be used for vegetation clearing for the construction of the proposed new Transmission line as listed in Table 2.1.

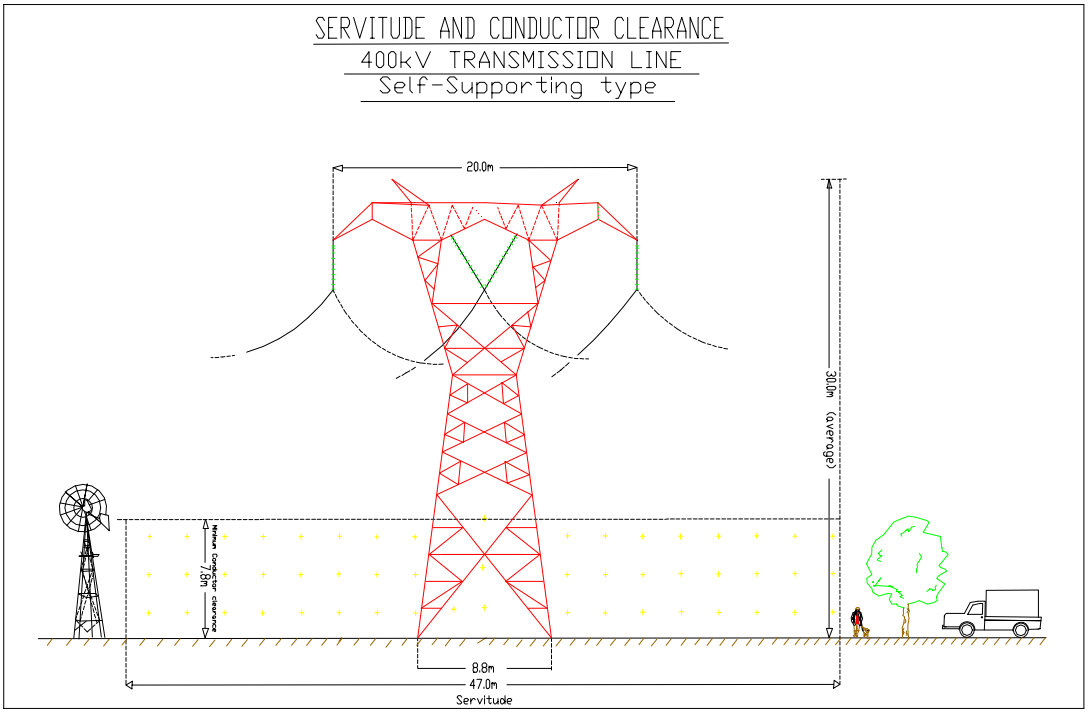

Figure 2.3: Diagrammatic representation of the self-supporting strain/bend tower

Figure 2.4: Compact Cross-rope suspension tower

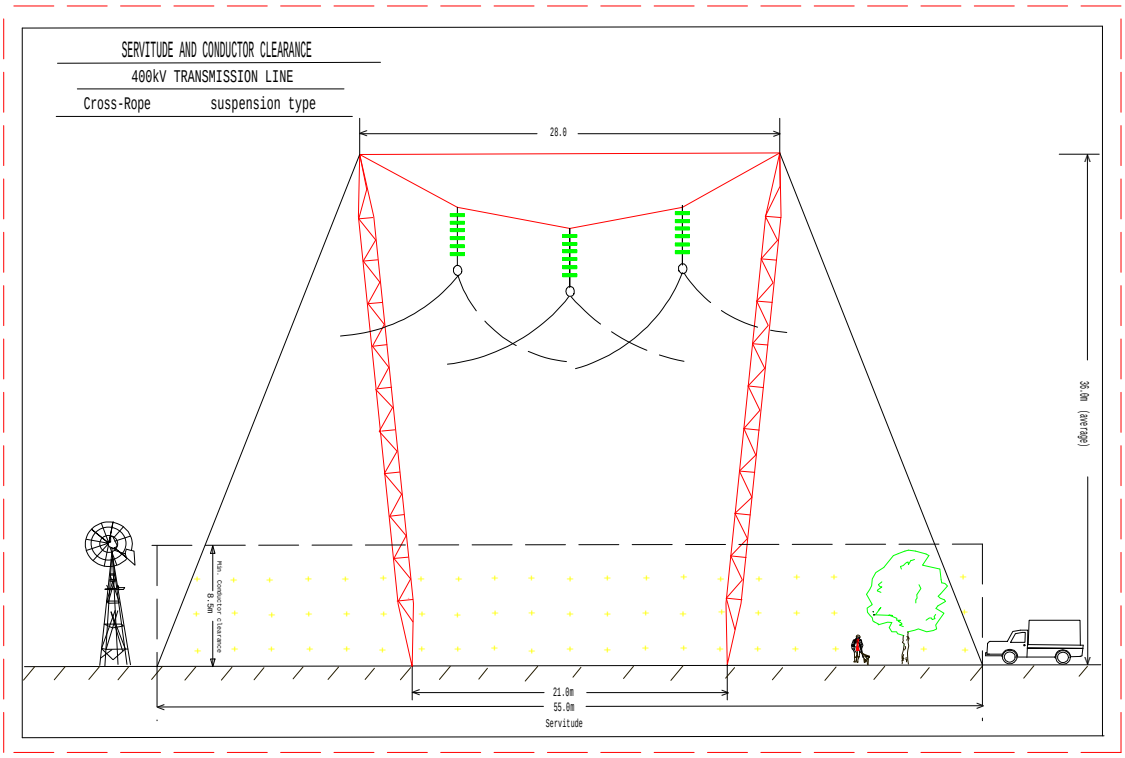

Figure 2.5: Cross Rope Suspension Tower

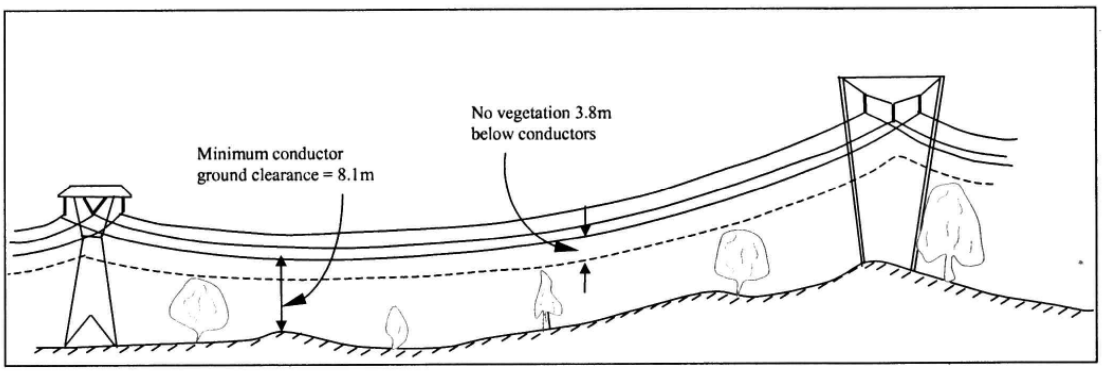

Figure 2.6: Servitude requirements in terms of vegetation clearing under conductors and minimum ground clearance

Table 2.1: Minimum standards to be used for vegetation clearing for the construction of a new Transmission power line

Item	Standard	Follow up
Centre line of the proposed Transmission line	Clear to a maximum (depending on tower type and voltage) of a 4-8m wide strip of all vegetation along the centre line. Vegetation to be cut flush with the ground. Treat stumps with herbicide.	Re-growth shall be cut within 100 mm of the ground and treated with herbicide, as necessary.
Inaccessible valleys (trace line)	Clear a 1 m strip for access by foot only, for the pulling of a pilot wire by hand.	Vegetation not to be disturbed after initial clearing – vegetation to

Item	Standard	Follow up
		be allowed to re-grow.
Access/service roads	Clear a maximum (depending on tower type) 6 m wide strip for vehicle access within the maximum 8 m width, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Proposed tower position and proposed support/stay wire position	Clear all vegetation within proposed tower position in an area of 20 x 20m (self-supporting towers) and 40 x 40m (compact cross-rope suspension towers) around the position, including de-stumping/cutting stumps to ground level, treating with a herbicide and re-compaction of soil. Allow controlled agricultural practices, where feasible.	Re-growth to be cut at ground level and treated with herbicide as necessary.
Indigenous vegetation within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, selective trimming or cutting down of those identified plants posing a threat to the integrity of the proposed Transmission line.	Selective trimming
Alien species within servitude area (outside of maximum 8 m strip)	Area outside of the maximum 8 m strip and within the servitude area, remove all vegetation within servitude area and treat with appropriate herbicide.	Cut and treat with appropriate herbicide.

Once the centre line has been cleared, the contractor's surveyor will peg every tower position and marks the crossing point with existing fences for new gate installation. Where required, once the tower positions have been marked, the vegetation clearing team will return to every tower position and clear vegetation (in accordance with the specification outlined in the Environmental Management Programme (EMP)) for assembling and erection purposes.

» *Foundations*

The choice of foundation is influenced by the type of terrain encountered, as well as the underlying geotechnical conditions. Geotechnical requirements for all tower types are catered for by using various foundation types, which are designed to withstand conditions varying from hard rock to waterlogged marshes. The main types of foundations include piles, pad-and-chimney, and rock anchors. The actual size and type of foundation to be installed will depend on the type of tower to be erected, and the actual sub-soil conditions.

Strain towers require more extensive foundations for support than in-line suspension towers, which contribute to the construction expenses.

The construction of foundations is the slowest part of the line construction, and is typically started some time ahead of tower erection. Prior to filling of the foundations and tower erection, excavated foundations are covered or fenced in, in order to safe-guard unsuspecting animals and people from injury. The foundations also represent the biggest unknown in the cost and construction time, since access to the tower sites is required for earth-moving machinery and concrete.

All foundation excavations are back-filled, stabilised through compaction, and rehabilitated at ground level.

» *Insulators and Hardware*
The insulators and hardware are used to connect the conductors to the towers. The main types are glass, porcelain, and composite insulators.

Glass and porcelain have been used for many years, and are the most common. They are, however, heavy and susceptible to breakage by vandals, as well as contamination by pollution. Composite insulators have a glass-fibre core with silicon sheds for insulation. The composite insulators are light-weight and resistant to both vandalism and pollution. They are, however, more expensive than the more common glass insulators.

» *Conductors*
The conductors are made of aluminium with a steel core for strength. Power transfer is determined by the area of aluminium in the conductors. Conductors are used singularly, in pairs, or in bundles of three, four or six. The choice is determined by factors such as audible noise, corona, and electro-magnetic field mitigation.

Many sizes of conductor are available, the choice being based on the initial and life-cycle costs of different combinations of size and bundles, as well as the required load to be transmitted.

» *Access Roads*
Access roads will exceed 8m during construction. The exact length of these roads will be confirmed based on the final location of project infrastructure, to be informed by the final servitude surveys (following negotiation with affected landowners) and the specialist walk-through surveys.

There are numerous existing farm roads and power line servitude roads within the study area. As far as possible, use will be made of these roads. The

exact roads to be used will be confirmed based on the final location of project infrastructure, to be informed by the final servitude surveys (following negotiation with affected landowners) and the specialist walk-through surveys.

Existing roads will be widened by up to 6m. Existing roads to be widened are local farm roads and servitude roads which do not have a formal road reserve. The exact length of these roads will be confirmed based on the final location of project infrastructure, to be informed by the final servitude surveys (following negotiation with affected landowners) and the specialist walk-through surveys.

2.3.2. Technical Details of 132kV Power Lines

Three 132kV servitudes (31m each) are required to integrate the new 132/66/11kV substation into the proposed 400/132kV main transmission station. These will be double circuit 132kV lines.

Construction of the proposed the 132kV lines will follow the same process as for the 400kV power lines detailed above.

2.3.3. Technical Details of the Substations

The proposed substations would be constructed in the following simplified sequence, and will take approximately 12 months to complete:

Step 1: Survey of the substation site
Step 2: Site clearing and levelling and construction of access road to substation site
Step 3: Construction of terrace and substation foundation, including the installation of stormwater drainage on the surface to dispose of such stormwater on the terrace
Step 4: Assembly, erection and installation of equipment (including transformers and control building)
Step 5: Connection of conductors to substation infrastructure
Step 6: Rehabilitation of any disturbed areas and protection of erosion sensitive areas.

A number of fences will be installed to secure the substations and the substation sites. These fences include a 2.4 m high security fence to enclose all assets, a 1.8 m high fence around the yards, and a 1.2 m high boundary fence on the property-line.

Construction of the substations will take approximately 12 months to complete. Construction crews for construction of the substation will constitute mainly skilled and semi-skilled workers. No construction workers will reside on site. It is most likely that construction workers will be accommodated within formal housing within towns surrounding the study area.

The proposed 400kV transmission substation footprint will be up to 600 m x 600 m. The 132kV distribution substation will be 160 m x 300 m in size.

Upgrades to the existing Aurora Substation are also required as part of the project. This involves replacing two of the four existing 250 MVA transformers with 2 x 500 MVA transformers. The upgrade also involves establishing 2 x 132kV feeder bays at Aurora Substation.

2.4. Servitude Negotiation and the EIA Process

Power lines are constructed and operated within a servitude (55 m wide for 400kV lines) that is established along the entire length of the power line. Within this servitude, Eskom has certain rights and controls that support the safe and effective operation of the power line. The process of achieving the servitude agreement is referred to as the Servitude Negotiation Process, or simply just the negotiation process. The following important points relating to the negotiation process should be noted:

» Servitude negotiation is a private matter between Eskom Transmission and the appropriate landowner.
» The negotiation process involves a number of stages (see below), and culminates in the 'signing' of a servitude. Here Eskom Transmission enters into a legal agreement with the landowner.
» The servitude is registered as a 'right of way', and Eskom do not purchase the servitude from the landowner. Compensation measures are agreed in each case.
» The agreements will detail such aspects as the exact location and extent of the servitude, and access arrangements and maintenance responsibilities, as well as any specific landowner requirements.
» The negotiation process may take place at any time in the planning of a new power line.
» This process must be completed (i.e. the agreement must be signed) with the relevant landowner before construction starts on that property.
» The negotiation process is undertaken directly by Eskom Transmission and is independent of the EIA process. It is important that the aims of the two processes are seen as separate.

The EIA process has become important in the initial planning and route selection of new Transmission lines. For this reason, it is usually preferable that the negotiation process begins after the EIA has been completed. At this stage there is greater confidence in the route to be adopted, and it would be supported by environmental authorisation. However, it may be required that the negotiation process begins earlier, and may begin before, or run in parallel with the EIA process. This may be due to urgent timeframes for the commissioning of the new power line, knowledge of local conditions and constraints, etc. Eskom Transmission has a right to engage with any landowner at any time, though they do so at risk if environmental authorisation has not been awarded.

2.4.1. The Negotiation Process

Eskom is responsible for the negotiation process for all new Transmission power lines. It is critical that the process is correctly programmed and incorporated into the planning of a new line. The negotiation process involves the following steps:

i. Initial meeting with the landowner.
ii. The signing of an 'option' to secure a servitude (this indicates that the owner will accept that the power line will traverse his property, subject to conditions to be finalised in the negotiation of the servitude agreement). An option is valid for one year.
iii. Once the route is confirmed (i.e. options are signed with the upstream and downstream landowners), the servitude agreement will be finalised with the individual landowners. This agreement will set out the conditions for the establishment, rehabilitation and maintenance of the servitude, and will be site-specific (as different landowners may have different requirements). Compensation payments would be made when the servitude is registered at the Deeds Office[2].
iv. Once construction is complete and the land rehabilitated to the landowners satisfaction (and as agreed prior to construction), the landowner signs a 'Final Release' certificate. Until the 'Final Release' certificate has been signed, Eskom Transmission remains liable for the condition of the land.
v. Once the clearance certificate is signed, the responsibility for the power line and servitude is handed over to the regional Eskom Transmission office.

[2] Compensation will be based on present day property valuations for all properties obtained from registered evaluators. Eskom only pays compensation for the strip of land that is affected at 100% of present day property value. In cases where properties are significantly affected, Eskom may consider purchasing the whole property at present day market value. All improvements will be valued. Sentimental value is not considered in any valuations as it is not measurable. Valuations are done according to the Expropriation Act.

2.5. Project Operation Phase

The expected lifespan of the proposed infrastructure is between 35 and 40 years, depending on the maintenance undertaken on the power line structures. During the life-span of the power lines and substations, on-going maintenance is performed. Power line inspections are undertaken on an average of 1 – 2 times per year, depending on the area. During this maintenance period, the power line is accessed via the access routes, as agreed with affected landowners during the negotiation phase. During maintenance activities on the substations, components may require replacement in order to significantly extend the lifespan. Maintenance of the power lines and substations are required to be undertaken in accordance with the specifications of the Environmental Management Programme (EMPr) (refer to Appendix L).

The creation of additional employment opportunities during the operational phase of the power lines and substations will be limited, and will be restricted to skilled maintenance personnel employed by Eskom.

2.5.1. Servitude Maintenance Responsibilities

The management of power line servitude is dependent on the details and conditions of the agreement between the landowner and Eskom, and are therefore site-specific. These may, therefore, vary from one location to another. However, it is a common occurrence that there is a dual responsibility for the maintenance of the servitude:

» Eskom will be responsible for the tower structures, maintenance of access roads, watercourse crossings, and gates and fences relating to servitude access.
» The landowner will retain responsibility for the maintenance of the land and land use within the servitude (e.g. cropping activities, veld management, etc.).

Exceptions to the above may arise where, for example dual use is made of the access roads and gates or specific land use limitations are set by Eskom Transmission within the servitude which directly affects the landowner (e.g. forestry). Maintenance responsibilities are, ultimately, clearly set out in the servitude agreement.

2.6. Decommissioning Phase

The project infrastructure is expected to have a design lifespan in excess of 25 years (extendable with appropriate refurbishment). The infrastructure would only be decommissioned once it has reached the end of its economic life. It is most

likely that decommissioning activities of the infrastructure would comprise the disassembly and removal of the individual components and the rehabilitation of the impacted area to a suitable state for the required future use.

The following decommissioning activities will form part of the project scope and will be applicable for the decommissioning of the Blouwater Substation.

Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment (e.g. lay down areas, construction platform) and the mobilisation of decommissioning equipment.

Disassemble and Replace Existing Components

When the project is ultimately decommissioned, the equipment to be removed will depend on the proposed land use for the site at that time. At this time, all above ground facilities that are not intended for future use at the site will be removed. Underground equipment (e.g. foundation, wiring) will be removed, and the surface restored to a stable slope. Much of the above ground wire and steel, of which the infrastructure is comprised are recyclable materials and would be recycled to the extent feasible. The components of the various infrastructure would be deconstructed and recycled or disposed of in accordance with regulatory requirements. The site will be rehabilitated and can be returned to agricultural or other beneficial land-use.

APPROACH TO UNDERTAKING THE EIA STUDY CHAPTER 3

An Environmental Impact Assessment (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 EIA process is illustrated below:

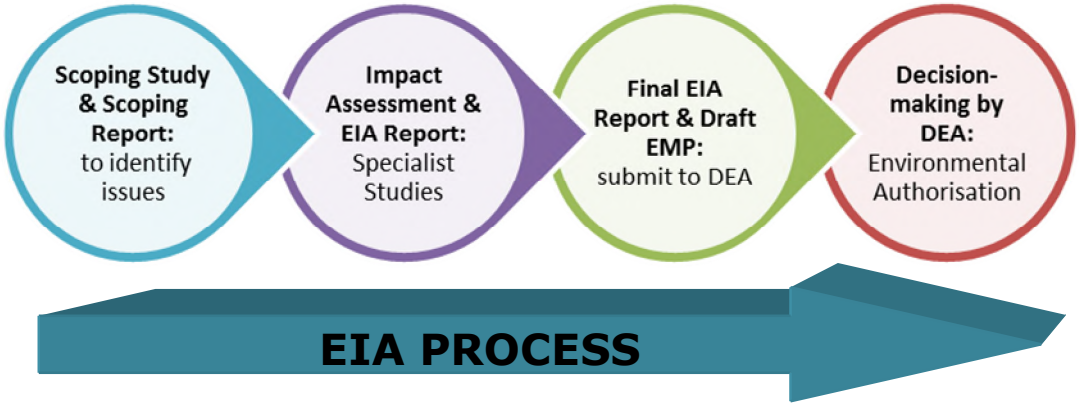

Figure 3.1: The Phases of an EIA Process

The EIA process for the Saldanha Bay Network Strengthening Project is being undertaken in accordance with the Sections 24 (5) of the National Environmental Management Act (No 107 of 1998). In terms of the EIA Regulations (2014) of GN R982 as well as GN R983, GN R984 and GN R985, a Scoping and EIA Study are required to be undertaken for this proposed project. The environmental studies for this proposed project were undertaken in two phases, in accordance with the EIA Regulations.

3.1. Relevant Listed Activities

In terms of the EIA Regulations, 2014 of GN R983, GN R984 and GN R985; the following 'listed activities' are triggered by the proposed projects as shown in **Table 3.1**.

Table 3.1: Listed activities triggered by the proposed projects

Number & date of relevant notice	Activity No (s) (in terms of relevant Regulation or notice)	Describe each listed activity as per project description
GN 983, 08 December 2014	11	The development of facilities or infrastructure for the transmission and distribution of electricity- (i). outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts ***A Distribution Substation of 132kV is proposed and 132kV lines connecting it to existing 132kV lines and the proposed 400kV substation.***
GN 983, 08 December 2014	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 towers and access roads may impede upon watercourses or tower structures and access roads situated within 32 metres of a watercourse.***
GN 983, 08 December 2014	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 cubic metres from- i.) a watercourse ***The power lines, substations and access roads would require the removal or infilling of material more than 5 cubic metres from a watercourse where these are affected by the infrastructure.***
GN 983, 08 December 2014	24(ii)	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 ***New access roads will need to be constructed to access the power lines. Some will be 8m or wider.***

Number & date of relevant notice	Activity No (s) (in terms of relevant Regulation or notice)	Describe each listed activity as per project description
GN 983, 08 December 2014	28(ii)	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes. ***The area to be transformed for the proposed substation and power line will be greater than 1 ha and less than 20ha in extent.***
GN 983, 08 December 2014	31	The decommissioning of existing facilities, structures or infrastructure for– (i) any development and related operation activity or activities listed in this Notice, Listing Notice 2 of 2014 or Listing Notice 4 of 2014 ***The decommissioning of existing Dx substation (Blouwater s/s) and its associated infrastructure***
GN 983, 08 December 2014	56	The widening of road by more than 6 meters, or the lengthening of a road by more than 1 kilometre (ii) where no reserve exists, where the existing road is wider than 8 metres ***The widening and/lengthening of existing roads will be required.***
GN 984, 08 December 2014	9	The development of facilities or infrastructure for the transmission or distribution of electricity with a capacity of 275kV or more, outside an urban area or industrial complex. ***Two 400kV power lines and a 400kV substation is proposed to be constructed outside an urban area***
GN 984, 08 December 2014	15	The clearance of an area of 20 hectares or more of indigenous vegetation ***The clearing of more than 20 hectares of indigenous vegetation may be undertaken during construction of the project***

Number & date of relevant notice	Activity No (s) (in terms of relevant Regulation or notice)	Describe each listed activity as per project description
		infrastructure
GN 985, 08 December 2014	4	The construction of a road wider than 4 metres with a reserve less than 13,5 metres (f) In Western Cape: (i) Areas outside urban areas; (aa) Areas containing indigenous vegetation; ***The project is proposed in an area containing indigenous vegetation***
GN 985, 08 December 2014	10	The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (g) In Western Cape: (i) All areas outside urban areas ***Fuel to be used during construction will exceed 30 cubic metres, and will need to be stored on-site in areas falling outside urban areas***
GN 985, 08 December 2014	12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. (a) In Western Cape: (ii) Critical biodiversity areas as identified in bioregional plans ***The project will require the clearance of 300 square metres or more of indigenous vegetation which falls within an area defined as a CBA***.
GN 985, 08 December 2014	14	The development of: (xii) infrastructure or structures with a physical footprint of 10 square metres or more. within a watercourse; (f) In Western Cape: (i) outside urban areas, in:

Number & date of relevant notice	Activity No (s) (in terms of relevant Regulation or notice)	Describe each listed activity as per project description
		(bb) National Protected Area Expansion Strategy Focus areas; (ff) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans ***There are drainage lines within the study area which will be impacted by the proposed infrastructure within an area defined as a CBA.***
GN 985, 08 December 2014	18	The widening of a road by more than 4 meters or the lengthening of a road by more than 1 kilometres (f) In Western Cape: (i) All areas outside urban areas: (aa)Areas containing indigenous vegetation; ***Access roads may be widened or lengthened within areas containing indigenous vegetation***

3.2. The Scoping Process

The Scoping Phase of the EIA process refers to the process of identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA Phase. This is achieved through an evaluation of the proposed project, involving the project proponent, specialists with relevant experience, and a public consultation process with key stakeholders (including government authorities) and interested and affected parties (I&APs).

In accordance with the EIA Regulations, the main purpose of the Scoping Phase is to focus the environmental assessment in order to ensure that only potentially significant issues and reasonable and feasible alternatives are examined in the EIA Phase. The Draft Scoping Report provided stakeholders with an opportunity to verify that the issues they had raised through the process were been captured and adequately considered, and provided a further opportunity for additional key issues for consideration to be raised. The Final Scoping Report incorporated all issues and responses raised during the public review of the Draft Scoping Report prior to submission to DEA. The Final Scoping Report was accepted by DEA on 13 July 2016 (refer to Appendix C). The additional information requested by DEA in

the acceptance letter and the location of the requested information in this report is detailed in the table below.

3.3. The EIA Phase

The EIA Phase for the proposed project aims to achieve the following:

» Provide a comprehensive assessment of the social and biophysical environments affected by the proposed project.
» Assess potentially significant impacts (direct, indirect, and cumulative, where required) associated with the proposed project.
» Comparatively assess identified feasible alternatives.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public participation process to ensure that I&APs are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA Report addresses potential direct, indirect, and cumulative impacts (both positive and negative) associated with all phases of the project including pre-construction, construction, operation and and decommissioning. In this regard the EIA Report aims to provide the relevant authorities with sufficient information to make an informed decision regarding the proposed project.

3.4. Overview of the Environmental EIA Process undertaken for the Proposed Project

The EIA Phase has been undertaken in accordance with the EIA Regulations published in Government Gazette No 38282 in December 2014, in terms of NEMA. Key tasks undertaken within the scoping phase included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Undertaking a public involvement process throughout the EIA process in accordance with Chapter 6 of Government Notice R982 of 2014.
» Undertaking of independent specialist studies in accordance with Appendix 6 of Government Notice R982 of 2014.
» Preparation of an EIA Report in accordance with the requirements of Appendix 2 of Government Notice No R982 of 2014.
» Preparation of a Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process.

The tasks are discussed in detail below.

3.4.1. Authority Consultation and Application for Authorisation in terms of GNR982 of 2014

As Eskom is a State Owned Enterprise, the National Department of Environmental Affairs (DEA) will act as the relevant competent authority for this proposed project. The DEA will be supported in the decision-making role by the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) who will act as a commenting authority. Consultation with these authorities has been undertaken throughout the EIA process. This consultation has included the following:

» Submission of the application for authorisation to DEA;
» Submission of the draft Scoping Report for review by the competent authority and commenting authority.
» Submission of a final scoping report to the competent authority (DEA).
» Submission of this draft EIA report for review by the competent authority and commenting authority.

The following will also be undertaken as part of this EIA process:

» Submission of a final EIA Report to DEA following the 30-day public review period for the draft EIA and the receipt of the comments from the DEA on the draft EIA report.
» If required, an opportunity for DEA and DEA&DP representatives to visit and inspect the proposed project site.
» Notification and consultation with Organs of State that may have jurisdiction over the project, including:
  * Provincial departments
  * Parastatals and Non-Governmental Organisations
  * Local Municipality and District Municipality

A record of all authority correspondence undertaken is included in **Appendix B**.

3.4.2. Public Participation

The aim of the public participation process conducted was primarily to ensure that:

» All relevant stakeholders and I&APs are identified and consulted with.
» Information containing all relevant facts in respect of the application is made available to stakeholders and I&APs.
» Participation by stakeholders and I&APs is facilitated in such a manner that they are all provided with a reasonable opportunity to comment on the application.

» Comments received from stakeholders and I&APs are recorded and considered in the EIA process, where appropriate.

The following sections detail the tasks which were undertaken as part of the public participation process.

i. Stakeholder identification

The first step in the public involvement process was to initiate the identification of relevant stakeholders and interested and affected parties (I&APs). This process was undertaken through existing contacts and databases, as well as through the process of networking.

The key stakeholder groups identified include authorities, local and district municipalities, public stakeholders, Parastatals and Non-Governmental Organisations (refer to Table 4.2 below).

Table 3.2: List of Stakeholders identified

Organs of State
National Government Departments
Department of Agriculture, Forestry and Fisheries (DAFF)
Department of Communications
Department of Energy (DoE)
Department of Mineral Resources (DMR)
Department of Public Works (DPW)
Department of Water and Sanitation (DWS)
Government Bodies and State Owned Companies
Eskom SOC Limited
National Energy Regulator of South Africa (NERSA)
Sentech
South African Civil Aviation Authority (SACAA)
South African Heritage Resources Agency (SAHRA)
South African National Roads Agency Limited (SANRAL)
Telkom SA Ltd
Provincial Government Departments
CapeNature
Heritage Western Cape
Western Cape Department of Agriculture and Rural Development
Western Cape Department of Environmental Affairs and Development Planning
Western Cape Department of Transport and Public Works
Local Government Departments
Saldanha Bay Local Municipality
West Coast District Municipality

Conservation Authorities
BirdLife South Africa
Wildlife and Environment Society of South Africa (WESSA)
West Coast Bird Club
West Coast Fossil Park
West Coast Biosphere Reserve
Endangered Wildlife Trust (EWT)
Landowners
Affected landowners and tenants
Neighbouring landowners and tenants

ii. Stakeholder Database

All relevant stakeholder and I&AP information has been recorded within a database of interested and affected parties (refer to **Appendix C**). While I&APs have been encouraged to register their interest in the project from the start of the process, the identification and registration of I&APs was on-going for the duration of the EIA process. The I&AP database has been updated throughout the EIA process, and will act as a record of the parties involved in the public involvement process.

iii. Adverts and Notifications

In order to notify and inform the public of the proposed project and invite members of the public to register as I&APs for the project and EIA process, adverts were placed in Die Burger (29 September 2015) and Weslander newspapers (1 October 2015), which are read in the study area. The advertisements were placed in both English and Afrikaans in order to inform the wider community. The advert provided information on the following (in terms of Regulation 41):

» the details of the project;
» the availability of the draft Scoping Report and
» the date of the public meeting.

A second round of advertisements were placed in the Scoping Phase to announce the availability of the draft Scoping Report for a 30-day review period. These adverts appeared in Die Burger on 18 April 2016 and the Weslander 21 April 2016.

Site notices (in English and Afrikaans) were placed at visible points within the study area (i.e. Aurora Substation, along the R27 Regional road) in accordance with the requirements of the EIA Regulations. Further notices were placed at the Saldanha Bay Local Municipality and the Langebaan Library.

During the EIA phase, newspaper adverts was placed to inform the public of the public meeting in the Die Burger (21 October 2016) and Weslander (20 October 2016) newspapers. A second round of adverts will be placed to inform the public of the review period of the EIA report.

In addition to the advertisements and site notices, key stakeholders and registered I&APs were notified in writing of the commencement of the EIA process, the availability of the draft reports and the date of public meetings. Copies of all the advertisements, site notices and written notifications are included within **Appendix C**.

iv. Public Involvement and Consultation

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to **Appendix C**). The BID has been distributed to identified stakeholders and I&APs, additional copies will be made available at public venues within the broader study area, and was posted electronically on the Savannah Environmental website.

In order to accommodate the varying needs of stakeholders and I&APs, the following opportunities have been provided for I&AP issues to be recorded and verified through the EIA process (refer to Table 3.3 for details):

» Focus group meetings and public meetings (pre-arranged and stakeholders invited to attend - for example with directly affected and surrounding landowners).
» 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.
» Release of draft reports for public review.
» Recording of the comments received from I&APs within a Comments and Response Report, for submission to the authorities for decision-making.

Table 3.3: Consultation undertaken with I&APs for the Saldanha Bay Network Strengthening Project

Scoping Phase	Activity	Date
	Placement of site notices on-site.	30 September 2015
	Distribution of letters announcing the EIA process and the availability of the Scoping Report for review for a 30-day comment period. These letters were distributed to organs of state departments, ward councillors, landowners within the study area, neighbouring landowners and key stakeholder groups.	14 May 2016
	Advertising of the EIA process, the availability of the Scoping Report for review for a 30-day comment period.	Die Burger: 18 April 2016 Weslander: 21 April 2016
	30-day review period for the Scoping Report for public comment.	15 April 2016 – 18 May 2016
	Public meeting & focus group meetings	10 – 12 May 2016
EIA Phase	Meetings with affected and adjacent landowners.	26 – 27 September 2016
	Distribution of letters announcing the availability of the EIA Report for review for a 30-day comment period. These letters will be distributed to organs of state departments, ward councillors, landowners within the study area, neighbouring landowners and key stakeholder groups.	18 November 2016
	Advertising of the public meeting	20 & 21 October 2016
	Public Meeting	03 November 2016
	Advertising of the availability of the Draft EIA Report for public review	Die Burger (21 November 2016) and Weslander (24 November 2016)
	30-day review period of the EIA Report for public comment	18 November 2016 – 09 January 2017
	30-day review period of the Revised EIA Report for public comment	27 January – 27 February 2017

Records of all consultation undertaken are included in **Appendix C**.

v. Identification and Recording of Issues and Concerns

A Comments and Response Report has been compiled to include all comments received through the public participation process. Additional comments received during the scoping phase of the process; including those received in the public review period of the draft EIA Report are included in Comments and Response Report included in **Appendix C**.

3.4.3. Public Review of Draft EIA Report and Public Meeting

The Draft EIA Report will be made available for public review from **18 November 2016 – 09 January 2017**[3] at the following locations:

» Vredenburg Public Library
» Langebaan Public Library
» Hopefield Library
» Saldanha Bay Public Library
» www.savannahSA.com

Copies of the Draft EIA Report will also be made available to the Saldanha Bay Local Municipality as well as the West Coast District Municipality. Affected parties and stakeholders will also receive CDs containing the report, on request.

During the review period, Savannah Environmental received comments from CapeNature dated 20 December 2016. To meet the requirements stipulated in the above-mentioned letter, a number of changes were required and new information was included in the EIAr prior to submission of this report to the DEA. Changes made in this report are underlined for ease of reference. The revised report was made available for an additional 30 days public review from 27 January – 27 February 2017 at the following venues:

» Vredenburg Public Library (School Street, Vredenburg)
» Hopefield Public Library (Oak Street, Hopefield)
» Langebaan Public Library (Cnr. Oostewal & Bree Street, Langebaan)
» Saldanha Public Library (Berg Street, Saldanha)

3.4.4. Assessment of Impacts

Issues associated with the proposed project identified within the EIA process have been evaluated through detailed specialist studies. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist consultants as outlined in **Table 3.3** below.

Table 3.3: Specialist consultants appointed to evaluate the potential impacts associated with the proposed project

Specialist	Area of Expertise	Refer Appendix
Craig Widdows and Ronel Naude (Afzelia Environmental Consultants (Pty) Ltd)	Ecology	Appendix D
Craig Widdows (Afzelia Environmental	Avifauna	Appendix E

[3] Note that this 30-day review period excludes the days of reckoning from 15 December 2016 – 5 January 2017 as per Regulation 3(2) of the EIA Regulations

Specialist	Area of Expertise	Refer Appendix
Consultants (Pty) Ltd)		
Rowena Harrison (Afzelia Environmental Consultants (Pty) Ltd)	Wetlands	Appendix F
Jayson Orton (ASHA Consulting (Pty) Ltd) & Palaeontology – Graham Avery (Iziko Consulting)	Archaeology, heritage & Palaeontology	Appendix G
Garry Paterson (ARC-Institute for Soil, Climate and Water)	Soils and Agricultural Potential	Appendix H
John Marshall (Afzelia Environmental Consultants and Environmental Planning and Design)	Visual	Appendix I
Jan Visagie (Jan Visagie Consulting)	Town Planning Study	Appendix J
Candice Hunter and Pamela Sidambe (Savannah Environmental) with external review by Neville Bews	Social	Appendix K

Specialist studies considered direct, indirect, cumulative, and residual environmental impacts associated with the development of the proposed project. Issues were assessed in terms of the following criteria and scoring system:

- The **nature**, a description of what causes the effect, what will be affected, and how it will be affected
- The **extent**, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. A score of between 1 and 5 is assigned as appropriate (with a score of 1 being low and a score of 5 being high)
- The **duration**, wherein it is indicated whether:
  - The lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1
  - The lifetime of the impact will be of a 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
  - Permanent - assigned a score of 5
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 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)
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes

» The **probability of occurrence**, which describes the likelihood of the impact actually occurring. Probability is estimated on a scale, and a score assigned:
  * Assigned a score of 1–5, where 1 is very improbable (probably will not happen)
  * Assigned a score of 2 is improbable (some possibility, but low likelihood)
  * Assigned a score of 3 is probable (distinct possibility)
  * Assigned a score of 4 is highly probable (most likely)
  * Assigned a score of 5 is definite (impact will occur regardless of any prevention measures)
» The **significance**, which is determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high
» The **status**, which is described as either positive, negative or neutral
» The degree to which the impact can be reversed
» The degree to which the impact may cause irreplaceable loss of resources
» The degree to which the impact can be mitigated

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

S = (E+D+M) P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

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

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

As Eskom has the responsibility to avoid or minimise impacts and plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts is discussed. Assessment of impacts with mitigation is made in order to demonstrate the effectiveness of the proposed mitigation measures. A draft EMPr is included as **Appendix L**.

3.4.5. Final EIA Report

The final stage in the EIA Phase will entail the capturing of comments from stakeholders and I&APs on the Draft EIA Report in order to finalise this report. It is the final EIA Report upon which the decision-making environmental Authorities will base their decision.

3.4.6. Assumptions and Limitations

The following assumptions and limitations are applicable to the studies undertaken within this EIA Phase:

» All information provided by Eskom and I&APs to the environmental team was correct and valid at the time it was provided.
» It is assumed that the development site identified by Eskom represents a technically suitable site for the establishment of the proposed project infrastructure.
» Conclusions of studies undertaken assume that any potential impacts on the environment associated with the proposed development will be avoided, mitigated, or offset.
» This report and its investigations are project-specific, and only technically feasible alternatives have been assessed.

Refer to the specialist studies in **Appendices D – K** for specialist study specific limitations.

3.5. Regulatory and Legal Context

3.5.1. Regulatory Hierarchy

At **National Level**, the main regulatory agencies are:

» *Department of Energy (DoE):* This Department is responsible for policy relating to all energy forms.
» *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector.
» *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation.
» *The South African Heritage Resources Agency (SAHRA):* SAHRA is a statutory organisation established under the National Heritage Resources Act, No 25 of 1999, as the national administrative body responsible for the protection of South Africa's cultural heritage.

» *National Department of Agriculture, Forestry, and Fisheries (DAFF):* This Department is responsible for activities pertaining to subdivision and rezoning of agricultural land. The forestry section is responsible for the protection of tree species under the National Forests Act (Act No 84 of 1998).
» *South African National Roads Agency (SANRAL):* This Agency is responsible for the regulation and maintenance of all national routes.
» *Department of Water and Sanitation:* This Department is responsible for water resource protection, water use licensing and permits.
» *Department of Mineral Resources (DMR):* Approval from the 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): In terms of the Act approval from the Minister of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.

At the Provincial Level, the main regulatory agencies are:

» *Provincial Government of the Western Cape – Department of Environmental Affairs and Development Planning (DEA&DP):* This department is the commenting authority for this project for environmental assessments as well as development planning applications.
» *Department of Transport and Public Works (Western Cape):* This department is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
» *CapeNature:* This Department's involvement relates specifically to the biodiversity and ecological aspects of the proposed development activities on the receiving environment to ensure that developments do not compromise the biodiversity value of an area. The Department considers the significance of impacts specifically in threatened ecosystems as identified by the National Spatial Biodiversity Assessment or systematic biodiversity plans.
» *Department of Agriculture:* This Department's involvement relates specifically to sustainable resource management and land care.
» *Heritage Western Cape:* Heritage Western Cape (HWC) is a provincial heritage resources authority. This public entity seeks to identify, protect and conserve the rich and diverse heritage resources of the Western Cape. HWC is mandated to promote co-operative governance between national, provincial and local authorities for the identification, conservation and management of heritage resources.
» *Department of Water and Sanitation:* This Department is responsible for evaluating and issuing licenses pertaining to water use.

At the **Local Level,** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Western Cape, both the local and district municipalities play a role. The local

municipality is the Saldanha Bay Local Municipality which forms part of the West Coast District Municipality. There are also non-statutory bodies such as environmental non-governmental organisations (NGOs) and community based organisations (CBO) working groups that play a role in various aspects of planning and environmental monitoring that will have some influence on proposed solar energy development in the area.

3.5.2. 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 (Act No. 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, 2010)
  - Integrated Environmental Management Information Series (published by DEA)
- Provincial Government Western Cape, Department of Environmental Affairs and Development Planning: Guideline for Environmental Management Plans, 2005.
- International guidelines – the Equator Principles and the International Finance Corporation and World Bank Guidelines.

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 3.4, where the level of applicability of the legislation or policy to the activity/project is detailed.

Table 3.4: Review of relevant policies, legislation, guidelines and standards applicable to the proposed Saldanha Bay Network Strengthening Project

Legislation	Applicable Requirements	Authority	Compliance Requirements
	National Legislation		
National Environmental Management Act (Act No 107 of 1998)	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. 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. 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.	National Department of Environmental Affairs – lead authority. DEA&DP– commenting authority	This EIA report is to be submitted to DEA and DEA&DP in support of the application for authorisation submitted in April 2016
National Environmental Management Act (Act No 107 of 1998)	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. 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.	National Department of Environmental Affairs (as regulator of NEMA).	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.

Legislation	Applicable Requirements	Authority	Compliance Requirements
Environment Conservation Act (Act No 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992)	DEA&DP	While no permitting or licensing requirements arise directly by virtue of the proposed project, this section will find application throughout the life cycle of the project.
National Water Act (Act No 36 of 1998)	Water uses under S21 of the Act must be licensed, unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation (and then registration of the water use is required). Consumptive water uses may include the taking of water from a water resource and storage - Sections 21a and b. Non-consumptive water uses may include impeding or diverting of flow in a water course - Section 21c; and altering of bed, banks or characteristics of a watercourse - Section 21i.	Department of Water and Sanitation	A General Authorisation will be applicable in terms of Notice 509 OF 2016. This GA will be registered once the final design of the project is completed and the location of infrastructure defined.
Minerals and Petroleum Resources Development Act (Act No 28 of 2002)	A mining permit or mining right may be required where a mineral in question is to be mined (e.g. materials from a borrow pit) in accordance with the provisions of the Act. S53 Department of Mineral Resources: Approval from the 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): In terms of the Act approval from the Minister	Department of Mineral Resources	No permit is required as no borrow pits are expected to be required. A S53 approval will be required to be obtained for the project.

Legislation	Applicable Requirements	Authority	Compliance Requirements
	of Mineral Resources is required to ensure that proposed activities do not sterilise a mineral resource that might occur on site.		
National Environmental Management: Air Quality Act (Act No 39 of 2004)	Measures in respect of dust control (S32) and National Dust Control Regulations of November 2013. Measures to control noise (S34) - no regulations promulgated as yet.	Local Municipality	No permitting or licensing requirements applicable for air quality aspects. The section of the Act regarding noise control is in force, but no standards have yet been promulgated. Draft regulations have however, been promulgated for adoption by Local Authorities. The Act provides that an air quality officer may require any person to submit an atmospheric impact report if there is reasonable suspicion that the person has failed to comply with the Act.
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7). » Provides for the protection of all archaeological and palaeontological sites, and meteorites (S35). » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36). » Lists activities which require developers any person who intends to undertake to notify the	Heritage Western Cape	A Phase I Heritage Impact Assessment was undertaken in the EIA phase of the process and provides a synthesis of the results achieved by the scoping study and the Phase I survey as well as describing the status quo of the project area with regard to its pre-historical, historical and cultural context (Refer to Appendix G).

Legislation	Applicable Requirements	Authority	Compliance Requirements
	responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development (S38). » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44).		A permit may be required should any cultural/heritage sites of significance be unearthed during the construction phase of the project.
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) » A list of threatened and protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » 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	Department of Environmental Affairs Cape Nature	As Eskom will not carry on any restricted activity, as is defined in Section 1 of the Act, no permit is required to be obtained in this regard. Specialist flora and fauna studies are required to be undertaken as part of the EIA process. A specialist ecological assessment has been undertaken for the proposed project (refer to Appendix D). A permit may be required should any protected plant species within the power line corridor or at the substation sites be disturbed or destroyed as a result of the proposed development.

Legislation	Applicable Requirements	Authority	Compliance Requirements
	national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). » This Act also regulates alien and invader species.		
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur. » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048).	Department of Agriculture, Forestry and Fisheries	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.
National Forests Act (Act No. 84 of 1998)	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'.	Department of Agriculture, Forestry and Fisheries	A permit or license is required for the destruction of protected tree species and/or indigenous tree species within a natural forest. No protected tree species were observed within or near the study area and it is highly unlikely that any protected tree species would be impacted by the development.
National Veld and Forest Fire Act (Act 101 of 1998)	In terms of S12 the applicant must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from	Department of Agriculture, Forestry and Fisheries	While no permitting or licensing requirements arise from this legislation, this act will find

Legislation	Applicable Requirements	Authority	Compliance Requirements
	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.		application during the operational phase of the project. Due to the fire prone nature of the area, it must be ensured that the landowner and developer proactively manage risks associated with veld fires and provide cooperation to the local Fire Protection Agency.
Hazardous Substances Act (Act No 15 of 1973)	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. 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. The use, conveyance, or storage of any hazardous	Department of Health	It is necessary to identify and list all the Group I, II, III and IV hazardous substances that may be on the substation 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.

Legislation	Applicable Requirements	Authority	Compliance Requirements
	substance (such as distillate fuel) is prohibited without an appropriate license being in force.		
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the Gazette publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list. » Making other changes to the particulars on the list. 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. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in any other way rendered unlit 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	Hazardous Waste – National DEA General Waste – DEA&DP	As no waste disposal site is to be associated with the proposed project, no permit is required in this regard. Waste handling, storage and disposal during construction and operation is required to be undertaken in accordance with the requirements of this Act, as detailed in the EMPr (refer to Appendix L)

Legislation	Applicable Requirements	Authority	Compliance Requirements
	breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.		
National Road Traffic Act (Act No 93 of 1996)	» 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.	Western Cape Department of Roads (provincial roads) South African National Roads Agency Limited (national roads)	**An** abnormal load/vehicle permit **may be required to transport the various power line and substation 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.
Provincial Policies / Legislation			
Western Cape Noise Control Regulations: PN 627 of 1998	» The control of noise in the Western Cape Province is legislated in the form of Noise Control Regulations promulgated in terms of section 25 of	DEA&DP and West Coast District Municipality	In terms of Regulation 4 of the Noise Control Regulations: "No person shall make, produce or cause

Legislation	Applicable Requirements	Authority	Compliance Requirements
	the Environment Conservation Act No. 73 of 1989. In terms of Regulation 4 of the Noise Control Regulations: "No person shall make, produce or cause a disturbing noise (greater than 5 dBA), or allow it to be made, produced or caused by any person, animal, machine, device or apparatus or any combination thereof".		a disturbing noise (greater than 5 dBA), or allow it to be made, produced or caused by any person, animal, machine, device or apparatus or any combination thereof". The NCR is not triggered by the proposed project.
The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000	The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000) defines the protection status of plants as follows: * ''endangered flora'' means flora of any species which is in danger of extinction and is specified in Schedule 3 or Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include flora of any species specified in such Appendix and Schedule 4; (thus all Schedule 3 species) * ''protected flora'' means any species of flora specified in Schedule 4 or Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Washington, 1973; provided that it shall not include any species of flora specified in such Appendix and Schedule 3 * ''indigenous unprotected flora'' means any species of indigenous flora not specified in Schedule 3 or 4;	Cape Nature	Permitting or licensing requirements arise from this legislation for the proposed activities to be undertaken for the proposed project as there are a succulent plants species on the proposed development site. A permit is required to remove the plants.

Legislation	Applicable Requirements	Authority	Compliance Requirements
Western Cape Transportation Amendment Act of 1996	The provincial MEC may grant permit to undertake works within 200m of the published route upon receipt of the report assessing the potential impacts thereof.	Western Cape Department of Public Transport and Public Works	Any application for authorisation contemplated in the ECA and NEMA in respect of a 200m area on either side of a published route determination for a provincial road must be accompanied by a report that addresses the issues listed in that section of the Act.

DESCRIPTION OF THE RECEIVING ENVIRONMENT CHAPTER 4

This section of the EIA Report provides a description of the environment that may be affected by the proposed Saldanha Bay Network Strengthening Project. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social, heritage and economic environment that could be affected by, or could affect, the proposed development have been described. This information aims to provide the overall context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within **Appendices D-K**.

4.1. Regional Setting: Location of the Study Area

The proposed transmission power line corridors and substations associated with the Saldanha Bay Network Strengthening Project are located within the Saldanha Bay Local Municipality and the West Coast District Municipality of the Western Cape Province (see Figure 4.1). The study area is situated the Saldanha Bay area, approximately 130km north west of Cape Town, in the Western Cape Province. The closest towns are Saldanha Bay, Langebaan and Vredenburg. The study area essentially consists of agricultural land with isolated patches of natural vegetation. The surrounding area is characterised by flat agricultural farm areas, primarily wheat and crop production activities with some grazing and game farming activities. Few farmsteads occur within the study area and within the surrounding area and adjacent farms. A number of properties within the study area are potentially affected by the proposed alternative transmission power line corridors and substation sites. These are mostly owned by private landowners. On a regional scale, the R27 and R45 roads provide access to the study area. The area is a highly sensitive environment characterized by a network of power line and railway lines. Prominent features in or near the study area include:

» Nearby areas are comprised of developments such as the Saldanha Bay Smelter, Langebaan Air Force Base and Independent Power Producers' Wind Farms.
» Saldanha Steel (ArcelorMittal South Africa, Saldanha Works) is located approximately 1km north west of the study area
» Vredenburg town is located approximately 10km north west of the study area.
» Thali-Thali Game Lodge is located within the southern section of the study area. Thali Thali is a 1.460ha Cape West Coast game and fynbos reserve situated just off the R27 near Langebaan. The game lodge has a 3-star grading with 8 accommodation units.

» West Coast Fossil Park is located within the northern section of the study area. According to the Saldanha Bay SDF (2011) the West Coast Fossil Park is a national asset and the significance of this tourism attraction should be emphasised. The fossil park in the area is an important heritage resource which could potentially form part of a network of protected areas within the Saldanha Bay municipal area. The unique qualities of the fossil park should be enhanced as an important regional tourist attraction.
» West Coast National Park (Langebaan) is located approximately 2km south of the study area
» Elandsfontein Private Nature Reserve is located approximately 5km south east of the study area
» Hopefield Private Nature Reserve is located approximately 4km south east of the study area
» Elandsfontein Phosphate Mine is located approximately 2km east of the study area
» Coastal areas to the west of the study area are also developed as tourist destinations. Mykonos, Langebaan and areas to the south particularly around the lagoon are tourism areas of possible national importance.
» Existing power lines and substations are apparent within the study area.
» Oil storage, paper production and steel production have all been attracted to the area around the port of Saldanha Bay. The necessary infrastructure to supply power and support these heavy industries is also evident throughout the landscape.
» According to the Western Cape Provincial Spatial Development Framework, the R27 and R45 are secondary scenic routes. Both these secondary scenic routes traverse the study area.

4.2. Biophysical Characteristics of the Study Area

4.2.1. Climatic Conditions

The site is in a winter rainfall area. Mean maximum and minimum temperatures are 36.5°C and 2.2°C, for January/February and July/August respectively. Sea fog and dew contribute to the moisture balance in summer and autumn months. Summer months are characterised by strong south easterly winds, during winter months northerly winds are more frequent. The average annual rainfall for this area is around 280 mm, giving rise to a low production potential (rainfall 200 – 300 mm/year, if <20% in summer) according to the annual rainfall criteria (Jacobs, 1999).

Figure 4.1: Municipal boundaries of the Saldanha Bay Local Municipality and the West Coast District Municipality

4.2.2. Topography and Geology

The study area is comprised of the west coast coastal plain. It is generally flat with limited undulations and ridgelines. The landform rises relatively rapidly from the coastline to 60 - 70m amsl which is maintained to the foot of more mountainous area approximately 70km inland. The elevation does rise to approximately 150m amsl in the north around the town of Vrenderburg and to the south of Langebaan. The Berg River is the main drainage feature located towards the north of the study area. This river has cut a broad valley through the landform reducing levels in the vicinity of the river channel to below 10m amsl. The extent of open, relatively flat land surrounding the proposed development is likely to mean that the proposed development may be visible over an extensive area. The depressed Berg River Valley and the more rugged land around Vredenburg and south of Langebaan are likely to be the only significant landform contribution to possible screening of the proposed development.

The area comprises aeolian sands of the Springfontyn Formation, underlain by limestone and calcrete of the Langebaan Formation with occasional outcrops of granite of the Vredenburg and Langebaaan-Saldanha Plutons, Cape Granite Suite (Geological Survey, 1990).

4.2.3. Land-Uses

The study area is characterised by urban development including the towns of Hopefield, Langebaan, Saldanha, Vredenburg, and Velddrift. These are relatively small rural towns with reasonably good infrastructure. Views of the broader landscape are probably only possible from the edges of urban development areas.

Agricultural development in the study area includes maize and wheat crop production with limited grazing and game farming. This results in an open arable landscape within which the main elements that are likely to influence visibility of the proposed power line are the minor ridgelines located within the vicinity. Isolated farmsteads are located around the maize/wheat fields that include farmhouses, workers accommodation, storage and farm working areas. The farm houses and accommodation areas are often surrounded by trees that were possibly planted as wind breaks as well as for ornamental reasons.

Industrial Development including oil storage, paper production and steel production have all been attracted to the area around the port of Saldanha Bay. The necessary infrastructure to supply power and support these heavy industries is also evident throughout the landscape. Coastal areas to the west of the study area are also developed as tourist destinations. Mykonos, Langebaan and areas to the south particularly around the lagoon are tourism areas of possible national importance.

Two major conservation areas are located to the south east of the study area, these include:

» The West Coast National Park which is a formally protected area, and
» The Elandsfontein Private Nature Reserve which is a private nature reserve.

These areas are largely covered with natural Fynbos which produces a very open landscape.

There are a number of planned developments within the study area, including (refer to Figure 4.2):

» the Votem Energy CCGT Power Station (which has received environmental authorisation);
» the proposed Arcelor Mittal 1500MW LNG Power Plant (for which an EIA process is underway); and
» the proposed Mulilo OCGT project which comprises 2 projects (for which an EIA process is underway).

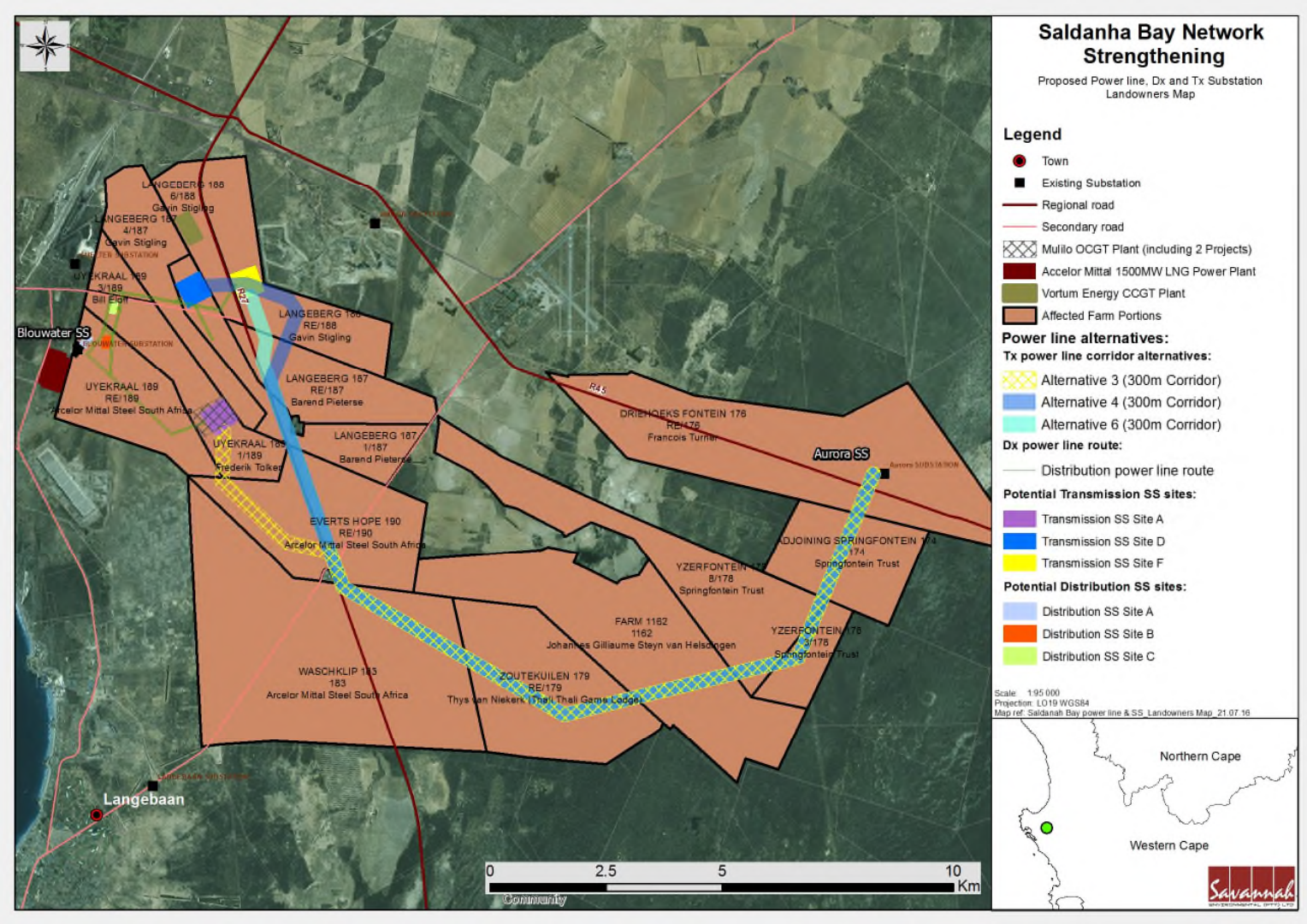

Figure 4.2 Map showing planned developments in the area

4.2.4. Soils, Land Types and Agricultural Potential

Soils

There are five separate land types occurring within the study area with no significant difference in the occurrence of the dominant soils in each land type except for the soil depth variation. The area consists mainly of shallow to deep, greyish brown, fine to medium, non-calcareous to calcareous, sandy soils underlain by calcrete/limestone and occasional rock. When vegetation is disturbed, these soils are susceptible to wind erosion due to the low clay content of the soils. (as can be seen from the information contained in Table 4.1 below).

Land Types

A summary of the dominant land type characteristics is given in Table 4.1.

Table 4.1: A summary of the main soil characteristics is given in

Map Unit	Dominant soils	Sub-dominant soils	Depth (mm)	Characteristics
Fc 108	Kalkbank Ms22, Loskop Ms12 Langebaan Fw21, Motopi Fw20, Fernwood Fw11, Maputa Fw10	60 19	20 – 300 600 – 1200+	Mainly very shallow to shallow, greyish-brown, fine- to medium- grained, neutral to alkaline, sandy soils underlain by calcrete/ limestone
Ha 13	Fernwood Fw11, Maputa Fw10 Tokai Ct11, Strombolis Ct10 Kalkbank Ms22, Loskop Ms12	50 21 15	600 – 1200+ 1200+ 200 – 400	Moderately deep to deep, greyish brown to brown, fine- to medium- grained, acid, sandy soils underlain by calcrete/limestone in some places
Hb14	Loskop Ms12, Kalkbank Ms22 Maputa Fw10, Motopi Fw20 Maputa Fw10, Motopi Fw20, Sunbury Cv30, Bleskop Cv40	48 24 25	100 – 400 400 – 600 600 – 1200	Mainly shallow, greyish-brown, fine-grained, neutral to alkaline, sandy soils underlain by calcrete/limestone
Hb22	Loskop Ms12, Kalkbank Ms22 Maputa Fw10, Motopi Fw20, Fw21 Maputa Fw10, Motopi Fw20, Fw21 Sunbary Cv30, Sandspruit Cv31	45 20 20 13	100 – 400 400 – 600 600 – 1200 400 – 600	Mainly shallow, greyish to greyish-brown, fine- to medium-grained, neutral to alkaline, sandy soils underlain by calcrete/limestone
Hb23	Fernwood Fw11, Maputa Fw10 Kalkbank Ms22, Loskop Ms12, Mispah Ms10, Malgas Gs20 Langebaan Fw21, Motopi Fw20	56 21 18	600 – 1200+ 150 – 400 1200+	Moderately deep to deep, greyish-brown, fine-to medium-grained, neutral to alkaline, sandy soils underlain by calcrete/limestone and occasional rock.

Agricultural Potential

Annual crops such as small grain (wheat and oats), medics and lupine with lucerne as a perennial pasture was taken into consideration (Jacobs, 1999). The average annual rainfall for this area is around 280 mm, giving rise to a low production potential (rainfall 200 – 300 mm/year, if <20% in summer) according

to the annual rainfall criteria (Jacobs, 1999). The main limiting factor that influences the agricultural potential rating, is the soil with above-mentioned limitations.

Taking all the above-mentioned factors into account, a general agricultural potential rating for the study area varies from low to medium–low.

4.2.5. Surface Hydrology Characteristics

Two unchannelled valley bottom wetlands and six depression wetlands were identified within the study area (refer to Figure 4.3).

Unchannelled valley bottom wetlands: Despite the FEPA category of these wetlands (PES Category C; moderately modified) the scores obtained through the Level 1 Wet-Health assessment has found the unchannelled valley bottom wetlands to be generally a PES Category D, associated with largely modified system. Modifications to the unchannelled valley bottom wetlands are predominantly as a result of a phosphorus mine which has been identified adjacent to the wetland areas. Mining activities generally lead to a decline in wetland health due to soil erosion, desiccation of soils and removal of hydrophytic vegetation through the operations of the mine.

Depression wetlands: All depression wetlands were also generally assessed in terms of their health and found to be a PES Category C, associated with a moderately modified system. Modifications to the systems stem primarily from agricultural activities including grazing and cultivation. Agricultural activities generally lead to the removal of hydrophytic vegetation. Cultivation causes soil mixing which can cause desiccation of the soil changing the hydrology of the pan systems.

4.2.6. Access roads and Transportation routes within the study area

the R27 and R45 roads provide access to the study area. Access to the various alternatives under consideration are detailed below:

Transmission (Tx) Substations: Three alternative locations have been identified for the construction of the new Transmission Substation:

» Site A - located to the west adjacent to the R27 and to the south of the weighbridge site at the R27/TR08501 intersection, or TR08501. Direct access off the R27 is not ideal and access should preferably be taken off TR08501. However, the Western Cape Government's Department of Transport and Public Works is planning a grade separated interchange at the R27/TR08501 intersection in the future. The grade separation between the R27 and TR08501 will have an impact on the access opportunities to Site A.

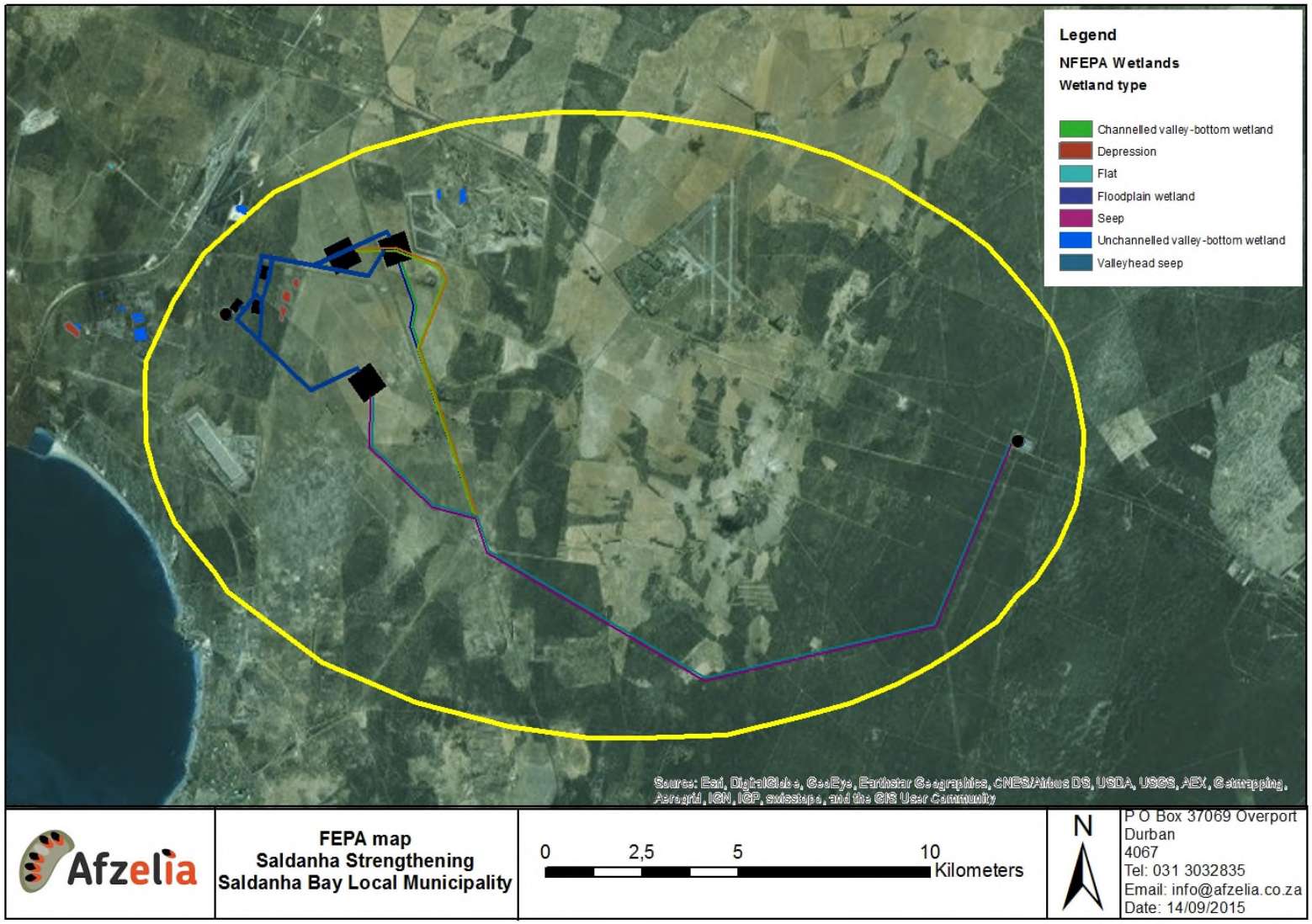

Figure 4.3 Freshwater Ecosystem Priority Area wetlands present in the study area.

» Sites D and F - located to the west adjacent to the R27 and approximately 1 kilometre to the north of the R27/TR08501 intersection. Access to both sites is currently possible off the R27. Direct access off the R27 is not ideal and access should preferably be taken via a new service road of TR08501. The future road network planning for the area shows a north-south road approximately 2 km from the R27 intersection. This road will have an underpass at the TR08501 with no direct link to the TR08501. Access to the larger road network will be via the realigned road along the eastern boundary of the Namakwa Sands Smelter site.

Distribution Substation: The Distribution Substation sites are all in the vicinity of the Blouwater Substation and access can be obtained via the existing Blouwater Substation access road. In the future with the realignment of OP07644 access to the Blouwater Substation can remain via the existing access road.

Power lines: Construction and service access to the power line servitudes will be via gated accesses at the different road crossings.

Proposed upgrade within the Aurora Substation **-** Construction and service access to the upgrades at the Aurora Substation will be via the existing access road at KM12.06. The topography of the surrounding area are relatively flat and the roads in the vicinity of the proposed accesses are relatively straight. There is sufficient shoulder and stopping sight distances (SSD) available at all the proposed access positions and at the proposed power line road crossings.

4.3. Ecological Profile

4.3.1. Flora characteristics

i) Vegetation overview

The study area falls within the Cape Floristic Region (CFR), which is considered a biodiversity hotspot. The CFR is one of the six floral kingdoms in the world, housing approximately 9000 species with a 69% endemism rate. According to the national vegetation map (Mucina & Rutherford 2006; Scott-Shaw and Escott, 2011), four vegetation types occur within the study area (refer to Figure 4.4). Saldanha Flats Strandveld and Hopefield Sand Fynbos are the dominant vegetation types located within the study area while the Saldanha Limestone Strandveld occupies the western edge of the study area. A small outcrop of Saldanha Granite Strandveld is located along the southern section of the study area.

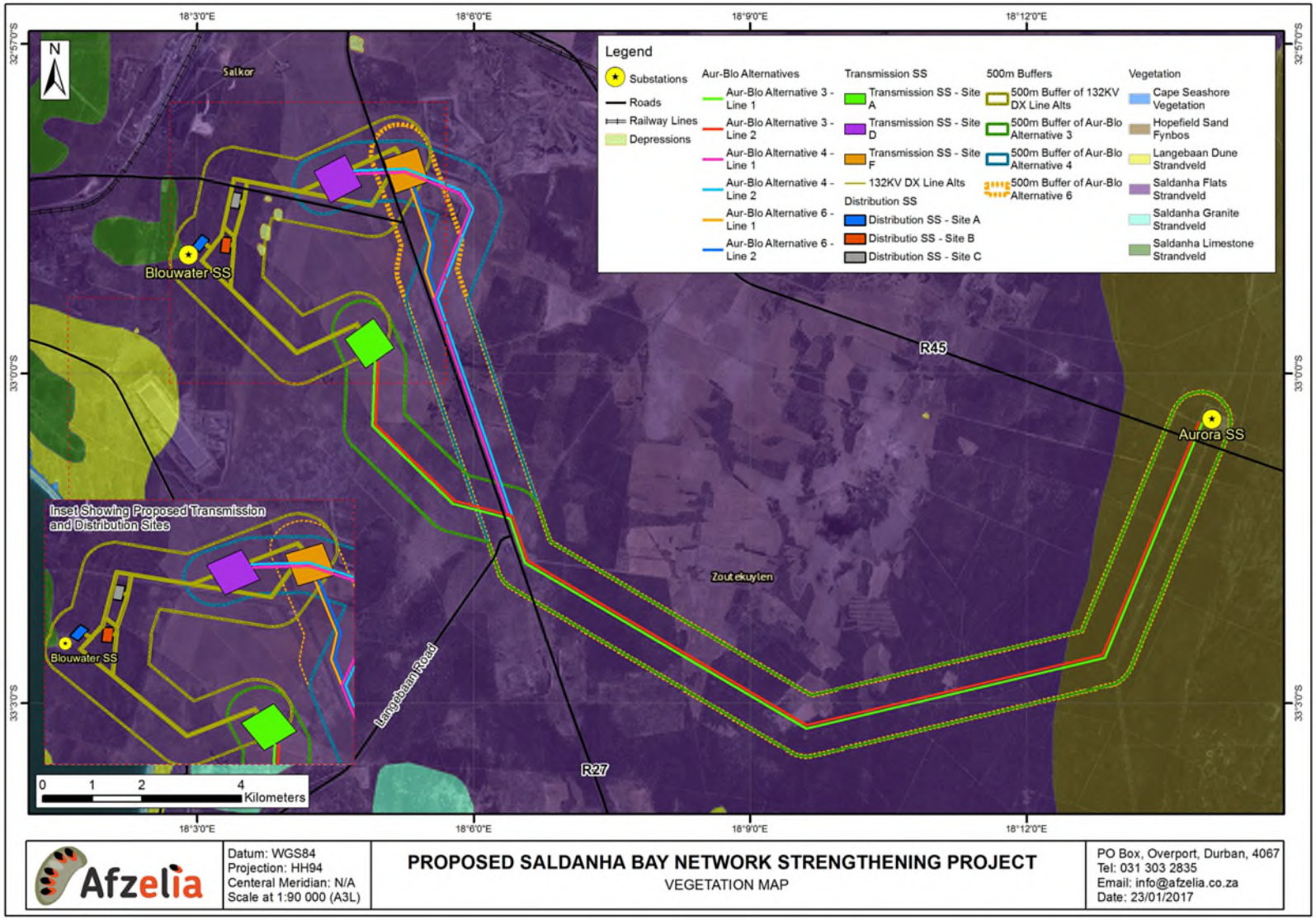

Figure 4.4: The vegetation types on the study site

» *Saldanha Flats Strandveld*
Saldanha Flats Strandveld occurs on coastal flats in the Western Cape (Rebelo et. al. 2006). It comprises sclerophyllous, moderately tall shrublands. The undergrowth is a low succulent shrub layer, and the vegetation type is rich in herbaceous plants and geophytes in spring. This vegetation type is listed as Endangered, with a conservation target of 24% and 11% statutorily conserved. Over 50% has been transformed for cultivation, road building or urban development. Alien vegetation is problematic (Rebelo et.al. 2006). According to CapeNature: " Saldanha Flats Strandveld should be considered as Endangered under criterion A1 (loss of habitat)."

» *Saldanha Limestone Strandveld*
This vegetation type occurs on slightly undulating ridges and steeper coastal slopes of the Western Cape (Rebelo et.al. 2006). It comprises low shrublands with low succulent-stemmed and deciduous, fleshy-leaved shrubs in deeper soils. Geophytic herbs are common in shallow depressions in the limestone. This vegetation type is listed as Endangered, with a conservation target of 24%. None is statutorily conserved. 40% has been transformed for cultivation or urban development, with some areas heavily utilised for grazing. Alien invasive species are a threat. This vegetation type has over 20 red data species, some of which are restricted to Saldanha Limestone Strandveld (Rebelo et.al. 2006).

» *Saldanha Granite Strandveld*
This vegetation type is restricted to the Western Cape on granite domes from Vredenberg to St. Helena bay and many points along the coast (Rebelo et.al. 2006). The vegetation occurs on rounded forms of granite sheets and smooth forms at their feet. It comprises a low to medium shrubland with some succulent elements and rich in geophyte flora. This vegetation type is listed as Endangered, with a conservation target of 24%, with less than 10% statutorily conserved. Already 70% has been transformed for cultivation or urban development. Alien invasive plant species are problematic with coastal development also forming a threat (Rebelo et al. 2006).

» *Hopefield Sand Fynbos*
Hopefield Sand Fynbos occurs within the Western Cape on flat to undulating coastal sand plains (Rebelo et.al. 2006). The vegetation of this type is moderately tall shrubland with a dense herbaceous layer. It tends to be asteraceaous and restioid fynbos, though may contain proteaceous and ericaceous patches. This is the most diverse vegetation type of the area with dominant species including Leucodendron foedium, Leucospermum rodolentum and Serruria fucifolia. This vegetation type is listed as Endangered with a conservation target of 30%. A very small portion is

statutorily conserved. 40% has been transformed for cultivation and grazing. Alien invasive species are a concern (Rebelo et al. 2006).

According to CapeNature: "Hopefield Sand Fynbos has also undergone an analysis by our conservation planner which showed that this vegetation type still qualifies for listing as a Vulnerable habitat although it is very close to qualifying as Endangered under criterion A1 (remaining extent) and could possibly qualify as Endangered under criterion D1 (number of threatened species associated with this habitat)."

ii) Critical Biodiversity Areas

Biodiversity areas represent terrestrial and aquatic sites identified as Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESA), Other Natural Areas and No Natural Remaining Areas through the systematic assessment conducted by the C.A.P.E. Fine Scale Biodiversity Planning (FSP) project (refer to Figure 4.5). The study site contains several CBAs through which the proposed power line traverses.

» *Critical Biodiversity Areas*
Critical Biodiversity Areas are those areas required to meet biodiversity thresholds. CBAs are areas of terrestrial or aquatic features (or riparian buffer vegetation alongside CBA aquatic features), which must be protected in their natural state to maintain biodiversity and ecosystem functioning (Maree and Vromans, 2010). According to Maree and Vromans (2010), these CBAs include:

- areas that need to be protected in order to meet national biodiversity pattern thresholds (target area);
- areas required to ensure the continued existence and functioning of species and ecosystems (including the delivery of ecosystem services); and/or
- important locations for biodiversity features or rare species.

» *Ecological Support Areas*
Ecological Support Areas (ESA) are supporting zones required to prevent the degradation of Critical Biodiversity Areas and Protected Areas. An ESA may include an aquatic or terrestrial feature. ESAs can be further subdivided into Critical Ecological Support Areas (CESA) and Other Ecological Support Areas (OESA). Critical Ecological Support Areas are aquatic features, with their terrestrial buffers, which fall within priority sub-catchments, whose protection is required in order to support the aquatic and terrestrial CBAs.

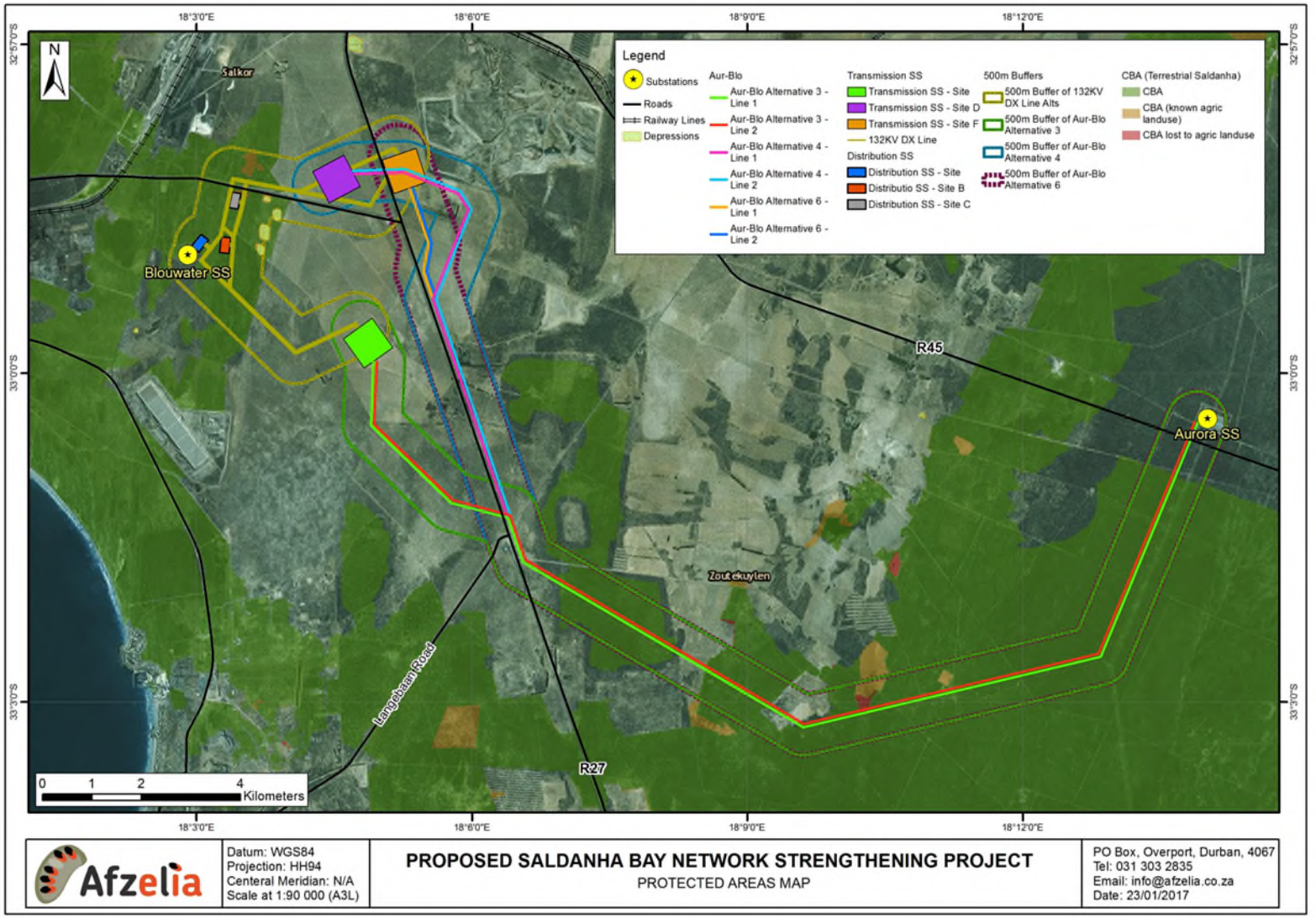

Figure 4.5: Critical Biodiversity Areas in relation to the study area

An example might be a river-reach, which feeds directly into a CBA. Other Ecological Support Areas are all remaining aquatic ecosystems (not classed as CESA or CBA), with their terrestrial buffers, which have a less direct impact on the CBA, e.g. a wetland that is geographically isolated from a CBA, but contributes to ecological processes such as groundwater recharge, thereby indirectly impacting on a CBA downstream. (Maree et al, 2010).

» *Other Natural Areas*
Other Natural Areas are areas of lesser biodiversity importance whose protection is not required in order to meet national biodiversity thresholds. Other Natural Areas may withstand some loss in terms of biodiversity through the conversion of their natural state for development. However, if all Critical Biodiversity Areas are not protected, certain Other Natural Areas will need to be reclassified as Critical Biodiversity Areas in order to meet thresholds. (Maree et al, 2010).

» *No Natural Remaining Areas*
No Natural Remaining Areas are those areas that have been irreversibly transformed through urban development, plantation and agriculture and poor land management. As a result, these areas no longer contribute to the biodiversity of the region. However, in some cases transformed land may be classified as an ESA or CBA if they still support biodiversity (Maree et al, 2010).

iii) Vegetation recorded within the study area

The sections below provide a description of the vegetation recorded within the study area during the ecological assessment. For a complete list of identified species, please refer to Appendix B of the specialist ecological assessment contained in Appendix D of this report.

Distribution Substation Sites

All alternatives for the proposed DX substation comprise of Cape Vernal Pools and Saldanha Limestone Strandveld vegetation types. Indigenous species found included *Eriocephalus africanus*, *Euclea racemose*, *Euphorbia* spp, *Crysanthemoides monilifera*, *Asparagus capensis*, *Aloe perfoliata*, *Thesium spinosum* and *Searsia* spp.

Distribution Substation Site A			
Status	Cape Vernal Pools and Saldanha Limestone Strandveld		
Conservation priority	Low	Sensitivity	Low
Species richness	Low	Need for rehabilitation	High
Dominant plant species	*Searsia spp*.		
Red data species	None		

Distribution Substation Site A	
Alien species	None
Condition	Poor

Distribution Substation Site B and C			
Status	Cape Vernal Pools and Saldanha Limestone Strandveld		
Conservation priority	High	Sensitivity	High
Species richness	High	Need for rehabilitation	Low
Dominant plant species	*Eriocephalus africanus*, *Euphorbia spp*, *Searsia spp*, *Aloe perfoliata*		
Red data species	*Lampranthus vernalis*, *Limonium capense*, *Cephalophyllum rostellum*		
Alien species	None		
Condition	Excellent		

Transmission Substation Site A

The site consists of old agricultural land and is highly degraded and disturbed. An absence of vegetation was noted during the time of the assessment. It is likely that wildflowers will occur on site during the rainy season. However, it is unlikely that any vegetation present on site will be of conservation concern.

Transmission Substation Site A			
Status	Saldanha Flats Strandveld		
Conservation priority	Low	Sensitivity	Low
Species richness	Low	Need for rehabilitation	High
Likely plant species to occur	*Dimorpotheca pluvialis*, *Cotula turbinata*		
Red data species	None		
Alien species	None		
Condition	Poor		

Transmission Substation Site D

Indigenous species recorded included *Limonium peregrinum*, *Eriocephalus africanus*, *Asparagus capensis*, *Crysanthemoides monilifera and Searsia spp.*

Transmission Substation Site D			
Status	Saldanha Flats Strandveld		
Conservation priority	Medium	Sensitivity	Medium-High
Species richness	Medium-High	Need for rehabilitation	Low
Dominant plant species	*Limonium peregrinum*, *Asparagus capensis*, *Searsia spp*.		
Red data species	*Lampranthus vernalis* and *Limonium capense*		
Alien species	*Acacia cyclops*		
Condition	Very good		

Transmission Substation Site F

This site consists of old agricultural land and is disturbed and degraded. No natural vegetation was present on site at the time of this assessment. Some wildflowers are likely to be present during the rainy season; however, it is unlikely that these flowers will be of any conservation concern.

Transmission Substation Site F			
Status	Saldanha Flats Strandveld		
Conservation priority	Low	Sensitivity	Low
Species richness	Low	Need for rehabilitation	High
Likely plant species to occur	*Dimorpotheca pluvialis*, *Cotula turbinata*		
Red data species	None		
Alien species	None		
Condition	Poor		

Aurora to Blouwater SS Route Alternative 3

Indigenous species identified along Route Alternative 1 included *Leucospermum hypophyllocarpodendron*, *Stoebe capitata*, *Othonna cylindrica*, *Lampranthus spp*, *Chrysanthemoides incana*, *Viscum capense*, Cotyledon orbiculata, *Leucospermum hypophyllocarpodendron*, *Ballota Africana* and *Phylica cephalantha*.

Route Alternative 3			
Status	Saldanha Flats Strandveld		
Conservation priority	High	Sensitivity	High
Species richness	High	Need for rehabilitation	Low
Dominant plant species	*Phylica cephalantha*, *Othonna cylindrica*, *Stoebe capitata*		
Red data species	*Leucospermum hypophyllocarpodendron*		
Alien species	None		
Condition	Excellent within intact Strandveld vegetation surrounding the first portion of the corridor. Through fringe vegetation the condition could be considered to be reasonable. Through the agricultural land the condition of the vegetation is low.		

Aurora to Blouwater SS Route Alternative 4

Indigenous species identified along this route included *Asparagus capensis*, Erica *mammosa*, *Phylica cephalantha, Oxalis compressa*, *Thesium spinosum*, *Searsia laevigata var laevigata*, *Putterlickia pyracantha*, *Chrysanthemoides incana*, *Euphorbia spp*, *Tylecodon grandifloras*, *Cynanchum africanum* and *Metalasia muricata*.

Route Alternative 4			
Status	Saldanha Flats Strandveld		
Conservation priority	Medium	Sensitivity	Medium

Route Alternative 4			
Species richness	Medium-High	Need for rehabilitation	Medium
Dominant plant species	*Phylica* cephalantha, *Putterlickia pyracantha* and *Tylecodon grandiflorus*		
Red data species	None		
Alien species	None		
Condition	Excellent within intact Strandveld vegetation surrounding the first portion of the corridor. Through fringe vegetation the condition could be considered to be reasonable. Through the agricultural land the condition of the vegetation is low.		

Aurora to Blouwater SS Route Alternative 6

Erica mammosa, *Diosma oppositifolia* and *Searsia laevigata var laevigata* are among the plant species identified along Route 6.

Route Alternative 6			
Status	Saldanha Flats Strandveld		
Conservation priority	Medium	Sensitivity	Medium
Species richness	Medium-High	Need for rehabilitation	Medium
Dominant plant species	*Searsia laevigata var laevigata*, *Diosma oppositifolia*		
Red data species	None		
Alien species	*Acacia cyclops*		
Condition	Excellent within intact Strandveld vegetation surrounding the first portion of the corridor. Through fringe vegetation the condition could be considered to be reasonable. Through the agricultural land the condition of the vegetation is low.		

iv) Threatened species identified on site

Eleven CSSC were identified within the study area during the site visit. Species of conservation concern are those species that are facing a risk of extinction. This includes species in the categories Critically Endangered (CR), Endangered (EN) and Vulnerable (VU). *Lampranthus vernalis* and *Limonium capense* were recorded at the DX substation sites. Both of these species are classified as Near Threatened according to the SANBI Red List of species. *Cephalophyllum rostellum*, classified as Endangered was also recorded at the DX substation sites. *Leucospermum hypophyllocarpodendron*, classified as Vulnerable, was identified along power line corridor Alternative 3, Lines 1 and 2.

4.3.2. Fauna

Faunal micro-habitats

A number of faunal micro-habitats were identified within the study area (refer to Figure 4.6):

Strandveld shrublands

Strandveld shrublands occupy the central and southern boundaries of the study area. These shrubland areas support certain species such as Grants Golden Mole, Cape Grey Mongoose, Cape Grysbok, burrowing reptiles and several rain frogs. Although the shrublands within the area are negatively impacted due to the disturbance and encroachment from agricultural land and power line infrastructure, they still provide important corridors of natural vegetation, cover and foraging opportunities for many faunal species within the largely anthropogenically disturbed landscape.

Rocky outcrops

A series of rocky outcrops were identified along the southern border of the study area. Within the relatively homogenous nature of the vegetation, rocky outcrops provide a unique habitat for faunal species. These areas are important micro-habitats for reptile species as they provide suitable foraging opportunities and cover from predators. Species likely to be present within this micro-habitat include Cape Girdled Lizard, Spiny Ground Agama, Marbled Leaf-toed Gecko and Ocellated Gecko.

Endorheic depression

These depression or pan systems provide suitable habitats for a variety of faunal species. These include endemic species and those of conservation importance. Various amphibians present within the study area will be localised around these micro-habitats. Various faunal species rely on these wetland areas as a water source as well as providing suitable habitats for roosting, foraging and breeding. The western section of the study area contains seasonal pans. Pans are defined as a near-level shallow depression or basin, usually containing an intermittent supply of water. At certain times of the year, they are characterised by slow flowing water and tall emergent vegetation. These factors provide habitats for various faunal species.

Artificial habitats

A series of troughs are located within the western section of the study site. These contain water all year round and are used by a variety of faunal species as a predictable water source. As a result, these water sources act as a beacon attracting faunal species into the area, particularly during dry periods.

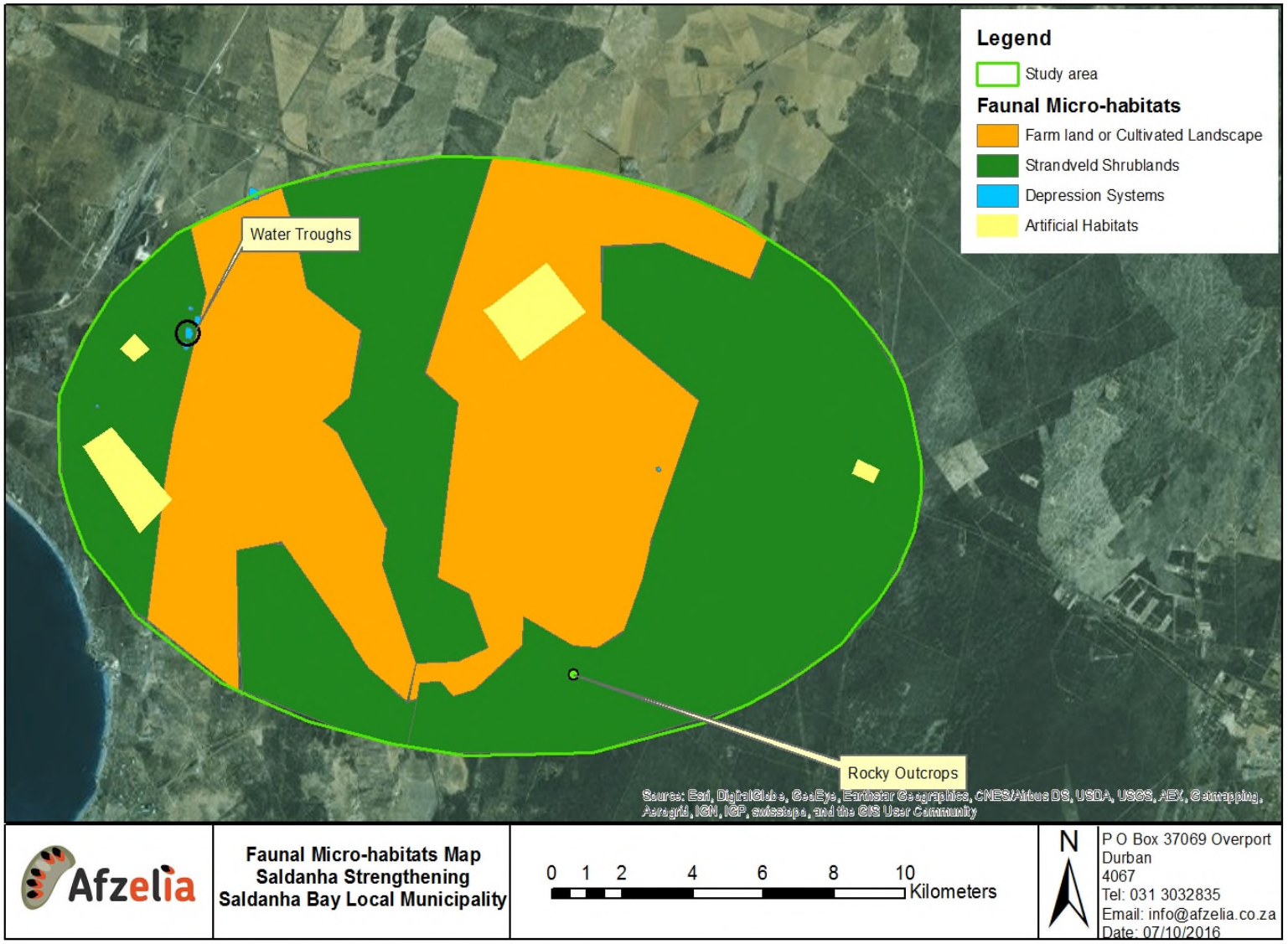

Figure 4.6: Faunal micro-habitats identified within the study area

Faunal composition within the study area and species of conservation concern

This study focused on the current status of threatened faunal species (mammals, reptiles and amphibians) occurring or likely to occur within the study area. Present impacts on faunal communities within the proposed development footprint include:

I. The study area is located within a largely anthropogenically modified environment. Large sections of natural land have been converted into agricultural land. A series of power lines exiting the Aurora and Blouwater substations radiate through the landscape.
II. A phosphate mine is located near Elandsfontein Private Nature Reserve.
III. Saldanha Steel and Freight Rail Pre Cast (Transnet) are located within the western section of the study area.
IV. Numerous informal access roads occur throughout the study area as well as a railway line to the west.

This combination of factors has resulted in habitat transformation and subsequent reduction in suitable habitats for faunal species. These impacts have had a direct negative impact on the remaining fauna living within the study area.

» **Mammals**: Four mammal species, namely Cape Grey Mongoose (, Cape Grysbok), Common Duiker and Cape Hare were recorded within the proposed development site during the site visit.

Four Red Listed species are likely to occur within the study area (Honey Badgers -Near Threatened) are nocturnal carnivores with a solitary life style. They are able to persist in human altered environments due to their opportunistic diet and tolerance to human disturbance. This species could occur within the proposed study area.

Brown Hyena (Near Threatened) require extensive home ranges to maintain a viable population. These large home ranges often coincide with livestock grazing areas and as a result, the hyena is heavily persecuted by farmers. Habitat loss is another primary threat to this species. Due to the high levels of disturbance and habitat transformation, the abundance of Brown Hyena within the study area is likely to be very low.

Both species have a wide distribution within Southern Africa and as a result, the development is not predicted to have a significant influence on the regional populations.

The Cape Horseshoe Bat is endemic to the south-west region of Southern Africa and shows a preference for the Fynbos and Karoo biomes. This species roosts in caves and mine adits and is a clutter forager (due to short wings and low wing loading), mainly foraging in the canopies of trees (Monadjem et al. 2010). This wing structure allows this species to manoeuvre through dense vegetation in pursuit of prey (Coleoptera and Lepidoptera) (Stuart and Stuart 2015).

The White-tailed Mouse has a relatively wide distribution across South Africa and Lesotho. This species frequents shrubland and grassland habitats and requires the presence of black loam and sufficient vegetation cover (Coetzee and Monadjem 2008). Black loam occurs where there is a large amount of organic matter within the top soil. The majority of soils identified in the study area were cohesionless, quarzitic and of aeolian origin. The topsoil was devoid of any organic matter due to the highly aerated conditions found in these sandy soils which tends to oxidise organic matter. As a result, this species is not likely to have resident populations within the study area.

» **Amphibians**: The study area falls within the distribution range of six amphibian species of which three are highly likely to be present within the development footprint. A series of wetland habitats (unchannelled valley bottom) and pan habitats located within the study area may provide suitable breeding and foraging habitats for resident amphibian species. Species likely to be present include Clicking stream frog, Cape River Frog and Raucous Toad.

The only Red Listed species which may occur within the study area is the Cape Caco, listed as Vulnerable. This species inhabits low lying areas with poorly drained, loamy or clay soils and the preferred habitat consists of Renosterveld. Due to the lack of suitable natural (the site falls within Strandveld vegetation) and breeding habitats coupled with the fact that the study area is on the edge of its recorded distribution, it is not predicted that this species will have resident populations within the study area.

No amphibians were recorded during the field assessment. This may be primarily due to the limited habitat diversity and lack of wetlands within the proposed development footprint.

» **Reptiles:** The study areas falls within the distribution range of 44 reptile species and the South African Reptile Conservation Assessment (SARCA) indicated that 37 species have been recorded within he study area. The proposed substation development will result in the natural habitat being replaced and largely unusable for various reptile species and the species diversity within this area will be lower than adjacent natural alternatives. This

is particularly true for burrowing species such as the Near Threatened Bloubergstrand Dwarf Burrowing Skink and Gronovi's Dwarf Burrowing Skink as the hardened surface will restrict movement as these species avoid movement above the ground. However, various species, usually those not sensitive to anthropogenic disturbance, will still use the transformed area such as Variegated skink, Red Lipped Herald Snake and Mole Snakes. According to SARCA, five Red listed species could be present within the study area

The large sections of natural Strandveld located within the central and southern portions of the study area are likely to provide habitat for a variety of reptile species including Puff adders, Cape Dwarf Chameleon and several Skink species. BThe study site had limited rocky areas to support Girdled Lizard species, snakes and geckos. The development of the proposed strengthening project is unlikely to have a long term impact of reptilian populations within the area. Furthermore, these impacts would be on a local scale.

Four (4) reptile species were recorded during the survey, namely a Brown House Snake, Striped Skaapstekers, G Knox's Desert Lizard and several Variegated Skink.

4.3.3. Avifauna

Avian micro-habitats within the study area

A number of avian micro-habitats were identified within the study area:

Agricultural lands: are found within the study area and are a common micro-habitat. Avian species that will be attracted to these areas include Blue Cranes, Harrier species and various Heron species. In particular the White Stork has a high affinity for arable land, with 80% of sightings in South Africa recorded within this habitat (Dean & Ryan 2005).

Pans: The western section of the study area contains seasonal pans, pans are defined as a near-level shallow depression or basin, usually containing an intermittent supply of water. At certain times of the year, they are characterised by slow flowing water and tall emergent vegetation. These factors provide habitats for various waterbirds and the pans in this study area could be used by White Storks, Greater and Lesser Flamingos. Furthermore, these water sources are often used by large flocks of granivorous bird species such as Cape Sparrow, Canary Species and Southern Red Bishop's.

Strandveld Shrublands vegetation Strandveld low shrublands occupy the central and southern boundaries of the study area. These shrublands are important for

Secretarybirds as they provide foraging opportunities in the form of invertebrates and small vertebrates. Furthermore, the shrubland habitat also provides habitat for various species such as the endemic Cape Spurfowl, Black Harrier, Thrushes and Lark species. Although the shrublands within the area are negatively impacted due to the disturbance and encroachment from the croplands and power line infrastructure, they provide important areas of natural vegetation, cover and nesting opportunities for many avian species within the largely agricultural and industrial landscape

Artificial habitats are provided by the existing overhead power lines that traverse through the study area. The power line towers are used by various species including raptors from which to hunt and to nest.

Avifauna species composition within the study area

A total of 243 species were recorded in 3218CC and 3318AA by SABAP2, with twenty species (8.2%) classified as Red Data species (Barnes 2014). Furthermore, 19 species are Southern African endemics (7.8%). Reporting rates are an indication of the relative density of a species on the ground in that it reflects the number of times that a species was recorded relative to the total amount of cards that were completed for the pentad.

Avifaunal species of conservation concern

Table 4.1 provides a guideline of the Red Data species that could potentially be encountered anywhere within the pentad where suitable habitat is available. This was based on avifaunal micro-habitats in combination with documented records within the study area. Report rates are the likelihood of a particular species occurring within the study site and along any of the alignments/substation sites represented as a percentage.

Table 4.1: Red Listed bird species recorded in the 2821CA and 3318AA quarter degree square within which the proposed substations and power line infrastructure are located.

Species	Status[4]	Likelihood of Occurrence
Secretary Bird	VU	Low
Martial Eagle	EN	Low
Ludwig's Bustard	EN	Possible
Lanner Falcon	VU	Likely
Great White Pelican	VU	Likely
Cape Ganet	VU	Low
Cape Cormorant	EN	Possible
Bank Cormorant	EN	Low

[4] *NT= Near Threatened; VU=Vulnerable; EN= Endangered

Species	Status[4]	Likelihood of Occurrence
Crowned Cormorant	NT	Low
Greater Flamingo	NT	Possible
Lesser Flamingo	NT	Possible
African-Marsh Harrier	EN	Likely
Black Harrier	EN	Highly Likely
Blue Crane	NT	Likely
Chestnut-Banded Plover	NT	Low
Eurasian Curlew	NT	Low
Caspian Tern	VU	Low
Antarctic Tern	EN	Low
Southern Black Korhaan	VU	Highly Likely

During the site visit, 51 bird species were recorded within the proposed study site including the Near Threatened Blue Crane. The avian composition was dominated by small passerine species such as Karoo Scrub Robin, Grey Tit, Southern Double-collared Sunbird and Karoo Prinia.

The study site is considered to be of moderate sensitivity to avifauna. There are very few sensitive areas located within the development footprint and limited significant avifaunal micro-habitats.

4.4. Visual Quality of the Area

The overriding character differentiating factors within the subject landscape appear to be landform /drainage and development. These factors appear to divide the landscape into three discrete areas including:

a) **Urban areas**. These are generally inward looking drawing little character influence from external areas. It is unlikely that the proposed development will have much influence on these areas other than perhaps the edges of the urban areas that face onto sections of the proposed development.
b) **The Coastal Plain**. This this area is relatively flat with generally low vegetation. This LCA is therefore unlikely to provide significant visual absorption capacity and the proposed development is likely to be highly visible. The visibility of the development may be slightly offset by the fact that there are numerous industrial elements that are obvious in the landscape including heavy industry and electrical and railway infrastructure. Mapping also indicates the presence of the West Coast National Park and the Elandsfontein Private Nature Reserve immediately to the south of the proposed development area. As they are relatively free of industrial elements, their presence may justify categorising this area as a separate LCA, although from previous site visits, it is known that electrical infrastructure

does impact on the natural character of sections of these predominantly natural areas.

c) **The coastal strip**. This can be differentiated from the rest of the coastal plain due to its proximity to the sea and the fact that a large portion of the land use is tourism and recreation orientated. There are however also industrial elements present particularly orientated towards coastal activities such as oil and gas and fishing. The area immediately adjacent to the coast generally falls to the west towards the sea and is steeper than the remainder of the coastal plain. As a result of this, the general outlook is generally to the west over the sea although elements in the immediate hinterland to the east are also likely to sit prominently in the periphery of views. It is likely however that development inland will not be prominent from coastal areas due to the landform and a general focus towards the sea.

View of the urban area of Vredenburg and the industrial element

View of the coastal plains & coastal plan strip

Figure 4.7: Views of the different land characteristics within the project site

4.5. Social Characteristics of the Study Area and Surrounds

The socio-economic profile provides an overview of the study area. The following is a summary of the key baseline characteristics and challenges of the Saldanah

Bay Local Municipality (SBLM). In summary, the area was found to have the following general characteristics (Census, 2011 & SBLM IDP 2012-2017):

» The population of the West Coast District Municipality (WCDM) in 2011 was approximately 391 766 people, of which 99 193 people reside in the SBLM.
» Of the ~99 193 population, about 50.2% are female, while 49.8% are male.
» In the SBLM there are approximately ~28 835 households with an average household size of ~3.2 persons per household. Of the ~28 835 households in SBLM approximately 81.7% live in formal dwellings.
» Approximately 55.8% of the population comprise the Coloured ethnic group.
» The most spoken language in the SBLM is Afrikaans (70.8% of the population).
» The Economically Active Population (EAP) (individuals that are aged 15-64 that are either employed or actively seeking employment) accounts for 58.9% of the entire population.
» The population aged 0–14 years comprise 25.2% of the population and those aged 65 years and above accounts for 5.3% of the entire municipal population.
» The dependency ratio is the amount of individuals that are below the age of 15 and over the age of 64, that are dependent on the EAP. The dependency ratio in the SBLM comprises 30.5% of the population.
» There are low levels of literacy amongst the members of the community. The level of education influences growth and economic productivity of a region. In the SBLM 3.4% of the population have no schooling, 39.2% have some primary education, 6.2% have completed primary, 34.8% have some secondary, 12.4% have completed matric and only 1.4% of the population have higher education. This means that majority of the population have a low-skill level and would need job employment in low-skill sectors.
» The municipality's unemployment rate stands at 23.4% (2011).
» Households that have either no income or low income fall within the poverty level (R0- R38 200 per annum) accounts for 48.4%. A middle-income is classified as earning between R38 201 - R307 600 per annum. Approximately 43.4% of the households earn a middle income and 6.8% of households earn a high income that is classified as earning R307 601 or more per annum. A high percentage of household income falls within the poverty level. The high poverty level has social consequences such as not being able to pay for basic needs and services.
» Approximately 88.2% of the population have access to electricity. For all the population that has access to electricity; 97% use it for lighting, 75.4% use it for heating and 92.4% for cooking. Approximately 97.4% of the SBLM have access to regional /local water scheme (operated by municipality or other water service providers)

- Approximately 92.5% of households within the municipality have access to a flush toilet and 96.6% of the municipal households have their refuse disposal removed by the municipality.
- SBLM has a total of 14 primary health care facilities including 8 fixed clinics, 1 district hospital, 3 satellite and 2 mobile clinics.
- Saldanha Municipal area is considered to be well serviced in terms of the extent and level of infrastructure available.
- Agriculture forms the backbone of Saldanha economy and accounts for the largest labour to date. Despite the passing trade, the Saldanha economy has not diversified and capitalized on its potential.
- Saldanha Bay harbour is also considered as a key economic center and major growth node within this district, unlocking trade and manufacturing opportunities.
- In comparison with the District labour force, Saldanha Bay's labour force represents 27.1% of the West Coast District labour force.

The greatest social problems in the SBLM are illiteracy and poverty. The income distribution is distorted in the SBLM to the disadvantage of the less economically secured people, who also represents the majority of the municipal area. Poor households are a result of a lack of wage income, either due to unemployment or low-paying jobs. However, SBLM area is considered to be well serviced in terms of the extent and level of infrastructure available.

The proposed development supports the social and economic development through enabling skills development and training in order to empower individuals and promote employment creation within the local area. The development would mainly focus on economic benefits to the area and contribute towards strengthening the existing electricity network in the local area.

4.6. Heritage features of the region

4.6.1. Heritage and archaeology

Archaeological aspects

Although several very important archaeological sites are known from the Vredenburg Peninsula, the broader study area for this project is not generally archaeologically sensitive. Numerous surveys in the western part in particular have shown archaeological resources to be absent from the surface. Only one archaeological site is known to occur within the study area, while several others occur just outside of it (Figure 4.8).

Figure 4.8: Aerial view of the study area (black oval) with the National Heritage Site of Langebaanweg, Provincial Heritage Site of Elandsfontein and other known archaeological sites in the area indicated

The West Coast Fossil Park includes a sand dune with a deflation hollow in it that is known as Anyskop. This dune lies within the northern part of the study area. The deflation hollow has been the subject of archaeological research (Dietl *et al.* 2005; Kandel *et al.* 2006; Conard 2001, 2002) that has revealed stone artefacts from the Early (ESA), Middle (MSA) and Later (LSA) Stone Ages. The site also yielded pot sherds indicating occupation within the last 2000 years and two stone hearths made of local calcrete. The recovered animal bones were either mineralised, indicating a Pleistocene MSA age, or fresh and dating to the Holocene LSA. Occupation from the ESA appears to have been quite ephemeral, while MSA occupations (including both the Still Bay and Howieson's Poort periods) and to a greater extent, LSA occupations from the mid- and late Holocene were more extensive.

The Elandsfontein site is a very important archaeological site because it was there that the partial skull of an archaic hominid was found (Singer 1954). Although this is the only early human remain to have been recovered from the site, it has yielded many thousands of animal bones which have been studied intensively (e.g. (Braun *et al.* 2013a, 2013b; Ewer & Singer 1956; Hendey 1969; Hooijer & Singer 1960, 1961; Keen & Singer 1956; Klein 1988; Klein *et al.* 2007; Klein & Cruz-Uribe 1991; Singer 1962; Singer & Boné 1960, 1966; Singer & Inskeep 1961, Singer & Keen 1965; Singer & Wymer 1968). In addition to bones, stone artefacts dating to the ESA, MSA and LSA have been found. The ESA material, including hand-axes, has attracted more attention because it is this component that would likely have been associated with the hominid (Archer & Braun 2010; Goodwin & Van Riet Lowe 1929). Although the core of the Elandsfontein site lies 5 km away from the present study area and research there has been focussed on an area of approximately 3 km^2 (Braun *et al.* 2013), it is thought that the archaeological sediments may extend to cover as much as 6 km^2 to 15 km^2 (Besaans 1972; Mabutt 1956). These estimates are likely both too conservative as exemplified by the finding of fossil bones and stone artefacts in the northern part of the Elandsfontein Farm as near as 2.5 km from the present study area (Orton 2007) and on the Elandsfontein Wes mining site (G. Avery, personal observation).

In the Club Mykonos area, just outside the indicated study area, many shell middens have been documented in association with the rocky points there. Some were excavated and revealed the typical cultural finds associated with coastal shell middens including stone artefacts, ostrich eggshell beads and shell scrapers (Hart 2001; Hart & Gribble 1998; Hart & Jerardino 1998). A small shell scatter has also been recorded on a dune top well away from the rocky shoreline and just outside the westernmost end of the study area (Orton 2012). Also in this general area, the Spreeuwalle fossil site mentioned before produced sparse MSA artefacts possibly dating to around 50 000 years ago (Avery, Klein *et al.*, in prep.).

Some of the archaeological sites in this region are important for what they reveal about human development and behaviour, but also about past biodiversity.

Graves

Although formal graveyards would not be impacted, there is always the chance of uncovering unmarked pre-colonial burials during construction. However, such finds cannot be predicted. None were identified during the visit.

Historical aspects

Planning of the air force base began in 1942 and it was officially proclaimed in the government gazette in 1946. It was originally intended as a base from which the threat of Japanese and German submarines could be countered but once opened just after the end of World War II it was used as a training facility. Originally known as the "Bomber Gunnery and Air Navigation School", its name was changed to "Air Force Station Langebaanweg" in 1947. In 1968 the name changed again to "Flying Training School Langebaanweg". In 1983 the name was again changed to "Air Force Base Langebaanweg". These and subsequent changes all reflected the changing role of the base in South Africa (AFB Langebaanweg 2015).

Mining started in 1943, initially at Baard's Quarry close to the air force base, where phosphate was extracted for use as fertilizer. In the early 1960s mining commenced in the Varswater 'C' and 'E' Quarries. The phosphate is part of the Varswater Formation, hence the name. Mining ended in 1993 because it was no longer economically viable (West Coast Fossil Park, n.d.). This same formation is now being targeted for phosphate mining at Elandsfontein.

Built environment

The general area has many farm buildings that date back into the 19th and early 20th centuries. The Uyekraal farm complex is an excellent example that lies alongside the R27 in the western part of the study area (Orton 2011). Fransen (2004) only maps one built environment heritage site, Wasklip, inside the study area – it lies in the far south alongside the R27. He notes the main house to be much altered but to have originally dated to around 1860. A ruined stone house nearby, he thought, could have been an earlier homestead.

Cultural landscape

The cultural landscape of the area revolves strongly around dryland agriculture and livestock grazing. The landscape is generally flat with gum tree lines and groves the only natural, although anthropogenically planted, vertical elements.

Industrial infrastructure is prominent to the northwest of the study area and a number of existing power lines and substations are present. The landscape is thus not sensitive to the proposed development because of the degree of modification already experienced through industrial development.

4.6.2. Palaeontology

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

The Langebaanweg and Saldanha Steel sediments provide a model for the area. Given the sedimentology of the region (Rogers 1980; Hendey 1981; Roberts 1997), and based on current knowledge, it is likely that marine and/or terrestrial fossils will occur in Varswater, Springfontyn and Langebaan Formation sediments should they be encountered during excavations.

From the above it is clear that potential exists for palaeontological occurrences in the study area, with the Varswater Formation being particularly sensitive. There is a strong likelihood that palaeontological remains will be encountered at some point, within any part of the study area.

The Saldanha Bay network strengthening project includes the following:

» Construction of a new 400/132kV Transmission Substation in the Saldanha Bay area with a planned capacity of 3 x 500 MVA transformers. The transmission substation footprint will be 600m x 600m.
» Construction of a new 132/66/11kV Distribution Substation near the current Blouwater Substation in the Saldanha Bay area and decommissioning of the existing Blouwater Substation. The new substation footprint will be 160m x 300m.
» The construction of two 400kV power lines (approximately 35 - 40 km) from the Aurora Substation to the new proposed distribution and transmission substations. A servitude of 55m is required for each power line.
» Three 132kV servitudes (31m each) are required to integrate the new 132/66/11kV substation into the proposed 400/132kV main transmission station.
» 132kV and 66kV servitudes are required to integrate the high voltage lines into the new proposed 132/66/11kV substation.
» Replacing two of the four existing 250 MVA 400/132kV transformers at Aurora Substation with 2 x 500 MVA transformers.
» Establishing 2 x 132 kV feeder bays at Aurora Substation.

The establishment of a project is comprised of various phases, including pre-construction, construction, operation, and decommissioning. The **construction activities** involved for the proposed infrastructure will include the following:

» Conduct pre-construction surveys.
» Establishment of access roads.
» Undertaking site preparation (i.e. including clearance of vegetation; and stripping and stockpiling of topsoil).
» Transportation of equipment to site and establishment of laydown areas (i.e. including storage facilities, site equipment camp, etc.).
» Tower pegging
» Construction of foundations
» Assembly and erection of towers and substation components
» Stringing of power line conductors and connection of conductors to substation infrastructure
» Rehabilitation of disturbed areas and protection of erosion sensitive areas
» Testing and commissioning

The construction phase for the transmission lines is expected to take approximately 24 months. That for the substations and 132kV lines is expected to take up to 12 months.

The **operational activities** will include the following:

» Substation operation and maintenance.
» Power line infrastructure operation and servitude maintenance.

The operation phase is expected to extend in excess of 25 years.

The **decommissioning activities** will include the following:

» Dismantling, removal and disposal of project infrastructure.
» Site rehabilitation.

Environmental impacts of the proposed project are expected to be associated with construction, operation and decommissioning activities. The majority of the environmental impacts associated with the facility will occur during the construction phase. Environmental issues associated with **construction and decommissioning** activities of the proposed infrastructure are similar and include, among others:

» Impact on ecology (flora, fauna and avifauna) and loss of protected species.
» Potential soil loss and change in land-use.
» Impact on heritage resources.
» Social impacts (positive and negative).
» Visual impacts.

For the purposes of this assessment, it has been assumed that the existing Blouwater Substation would be decommissioned after the completion of construction and commissioning of the new substation, and that no separate decommissioning team would be required to establish on site. Therefore, where impacts for construction are described in the sections below, these are also applicable for decommissioning.

Environmental issues specific to the **operation** include, among others:

» Visual impacts (intrusion, negative viewer perceptions and visibility of the facility).
» Avifaunal Impacts (fatalities due to the collision with the power line).
» Social impacts (positive and negative).

These and other environmental issues were originally identified through a scoping evaluation of the proposed project. Potentially significant impacts have now been assessed during this EIA Phase. This EIA process has involved key input from specialist consultants, the project developer, and from key stakeholders and interested and affected parties.

This chapter serves to assess the identified potentially significant environmental impacts associated with all components of the proposed Saldanha Bay Network Strengthening Project, and to make recommendations for the management of these impacts for inclusion in the draft Environmental Management Programme (refer to Appendix M).

5.1. Assessment of Potential Impacts on Biodiversity

5.1.1. Assessment of Potential Impacts on Flora

The power line distribution and transmission substations of all alternatives affect two vegetation communities: Hopefield Sand Fynbos and Saldanha Flats Strandveld. Possible impacts that may occur as a result of this project include the loss of indigenous vegetation, fragmentation of vegetation communities, the proliferation of alien invasive species and the loss of species of conservation concern.

Nature of Impact: Loss of Saldanha Flats Strandveld

This vegetation type is the main vegetation type of the study site, with each of the alternatives traversing a large section. Construction of the power line will entail loss of this vegetation type as the reserve is cleared for construction and then continually mowed for maintenance. This vegetation type is Endangered and on the List of Threatened Ecosystems as well as forming CBA areas, indicating that this veg type is essential to maintain conservation targets. Areas of Saldanha Flats Fynbos that will be lost are as follows:

- Alternative 3: 228.28ha and transmission substation A: 36.29ha
- Alternative 4: 286.94ha and transmission substation D: 36ha
- Alternative 6: 257.86ha and transmission substation F: 36ha
- Distribution substations: 4.1ha

Alternative 3, 4 and 6 and Transmission substation A, D and F		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Local area (2)
Duration	Long-term (4)	Short (1)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance	**High (80)**	**Moderate (55)**
Status	Negative	Negative
Reversibility	Medium	Medium-High
Irreplaceable loss of resources?	No	

Can impacts be mitigated?	Yes	
Distribution substations (all same)		
	Without mitigation	**With mitigation**
Extent	Site (1)	Site (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Long-term (4)	Long-term (4)
Significance	**Moderate (55)**	**Moderate (40)**
Status	Negative	Negative
Reversibility	Medium	Medium-High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	Yes	

Mitigation:

» The clearing of vegetation must be within the designated reserve (within 50m of the line) and where possible, existing roads must be utilised during the construction phase.
» During the operational phase, no mowing must be done to allow for the indigenous vegetation to regrow.
» During the construction phase, workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled.
» Harvesting and collection of any flora must be strictly prohibited.
» During construction, erosion control measures must be implemented in areas sensitive to erosion such as exposed soil, edges of slopes (including trenches cut for construction) etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences and retention or replacement of vegetation.
» Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species led by a botanist.
» No whole-scale vegetation clearing should be done on-site. Clearing should be kept to a minimum by preferably only restricting the height of vegetation under powerlines. This will allow geophytes, forbs and more tolerant perennials to persist within the disturbed area which should largely recover after the disturbance if the soil is not disturbed. Only the actual footprint of the pylon, where excavation is required, should be disturbed.
» Construction camps and laydown areas must only be located in previously transformed areas.
» All access roads must be approved by a botanical specialist prior to construction commencing. If new access roads are required these should be groundtruthed and approved by a local botanist who is highly familiar with the vegetation types and Species of Conservation Concern found in the area.

Cumulative impacts:

Medium. A decrease in floral habitat and ecological structure will lead to the proliferation of alien invasive species and habitat fragmentation. This will lead to an overall decrease in indigenous species richness in the area.

Residual Risks:

Low provided that mitigation measures are implemented fully and correctly. Once the substation sites and power line routes have been constructed, indigenous vegetation

should not be disturbed. The vegetation will therefore recover and indigenous vegetation cover should remain stable.

Nature of Impact: Loss of Hopefield Sand Fynbos

This vegetation type occurs to the west of the site, near to the Aurora substation. All route options traverse the same area of this vegetation type and no alternatives have been considered for this section of the power line route. The total area of this vegetation type that will be lost (within a 50m buffer) is 77.8ha.

All power line Alternatives

	Without mitigation	**With mitigation**
Extent	Local area (2)	Local area (2)
Duration	Long-term (4)	Short (1)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance	**High (80)**	**Moderate (55)**
Status	Negative	Negative
Reversibility	Medium	Medium-High
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Mitigation:

» The clearing of vegetation must be within the designated reserve (within 50m of the line) and where possible, existing roads must be utilised during the construction phase.
» During the operational phase, no mowing must be done to allow for the indigenous vegetation to regrow.
» During the construction phase, workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled.
» Harvesting and collection of any flora must be strictly prohibited.
» During construction, erosion control measures must be implemented in areas sensitive to erosion such as exposed soil, edges of slopes (including trenches cut for construction) etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences and retention or replacement of vegetation.
» Disturbed areas must be rehabilitated immediately after construction has been completed in that area by planting appropriate indigenous plant species led by a botanist.
» No whole-scale vegetation clearing should be done on-site. Clearing should be kept to a minimum by preferably only restricting the height of vegetation under powerlines. This will allow geophytes, forbs and more tolerant perennials to persist within the disturbed area which should largely recover after the disturbance if the soil is not disturbed. Only the actual footprint of the pylon, where excavation is required, should be disturbed.
» Construction camps and laydown areas must only be located in previously transformed areas.
» All access roads must be approved by a botanical specialist prior to construction commencing. If new access roads are required these should be groundtruthed and approved by a local botanist who is highly familiar with the vegetation types and

Species of Conservation Concern found in the area.

Cumulative impacts:

Medium. A decrease in floral habitat and ecological structure will lead to the proliferation of alien invasive species and habitat fragmentation. This will lead to an overall decrease in indigenous species richness in the area.

Residual Risks:

Low provided that mitigation measures are implemented fully and correctly. Once the substation sites and power line routes have been constructed, indigenous vegetation should not be disturbed. The vegetation will therefore recover and indigenous vegetation cover should remain stable.

Nature of Impact: Loss of Species of Conservation Concern

The plant PSSC list for the site is exceptional, and though only few CSSC were recorded from the site, it is highly likely that additional site visits in the growing season would record many more. Impacts on SSC are thus likely to be extremely high.

All alterntives

	Without mitigation	**With mitigation**
Extent	International (5)	International (5)
Duration	Permanent (5)	Long term (4)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance	**Very High (100)**	**High (85)**
Status	Negative	
Reversibility	Medium	High
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes, to some extent	

Mitigation:

» The clearing of vegetation, during the construction phase, must be kept to a minimum and must be within the footprint.

» Operational phase mowing must be prohibited to allow for the natural vegetation to regenerate.

» A pre-construction survey should be undertaken and a qualified botanist must identify all conservation-important species and tag these. The work area should be demarcated by an ecologist prior to construction and enforced by the ECO during construction. This area should be demarcated with construction tape or similar and no activity should be allowed outside of this area.

» Permits are required for the removal or destruction of both plants and animal species. The permitting process requires other site visits to locate and GPS any and all SSC occurring on site and the permitting reporting process must be followed. Considering the likely occurrence of Critically Endangered and Endangered species in the footprint, it is unlikely that, should these be recorded, permits will be granted for their removal.

» A search and rescue must be implemented prior to construction for both plant and animal species by a qualified professional.

» No new access roads should be developed. Any deviation from the infrastructure proposed in this assessment will require additional environmental studies.

» During the construction phase, workers must be limited to areas under construction

and access to the undeveloped areas must be strictly controlled.

» Harvesting and collection of any flora must be strictly prohibited.

» Collection and/or killing of any fauna must be strictly prohibited.

» During construction, erosion control measures must be implemented in areas sensitive to erosion such as exposed soil, edges of slopes (including trenches cut for construction) etc. These measures include but are not limited to - the use of sand bags, hessian sheets, silt fences and retention or replacement of vegetation. These measures must be maintained during operation.

» Disturbed areas must be rehabilitated immediately after construction has been completed in that area. In areas where natural vegetation was disturbed appropriate indigenous plant species must be used for this purpose.

» A comprehensive Vegetation Management Plan should be developed and implemented, and this document should include details on:

* Preventing total clearing under power lines
* Which plant SSC can be translocated and which are not suitable for this.
* Appropriate methodology on moving SSC which can be translocated to areas adjacent to the servitude
* Alien invasive plant management control
* Rehabilitation where total clearance of vegetation is unavoidable

Cumulative impacts:

High. A decrease in floral habitat and ecological structure may lead to the proliferation of alien invasive species, a loss of red listed plant species, habitat fragmentation and an overall decrease in species richness in the area.

Residual Risks:

Low provided that mitigation measures are implemented fully and correctly. Once the power lines and substations have been constructed, disturbance to the area will be minimal. Any species of conservation concern must be translocated, eliminating any residual risks.

Nature of Impact: Fragmentation and edge effects

The proposed project is likely to have a negative impact in terms of loss of ecological connectivity through the clearing of vegetation for the substations, access roads, and power line tower footprints. This will result in habitat fragmentation. Loss of habitat and habitat fragmentation will potentially disrupt ecological functioning, negatively affecting the ecological integrity of the area. Fragmentation is of concern in habitats that are important to meet conservation goals. As with the plant SSC, the conservation importance of these vegetation types mean that disturbance of these vegetation types is of global importance.

All power line alternatives		
	Without mitigation	**With mitigation**
Extent	International (5)	International (5)
Duration	Permanent (5)	Long-term (4)
Magnitude	Very High (10)	High (8)
Probability	Definite (5)	Definite (5)
Significance	**Very High (100)**	**High (85)**
Status	Negative	

Reversibility	Medium	High
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
All substation alternatives		
	Without mitigation	**With mitigation**
Extent	International (5)	International (5)
Duration	Permanent (5)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (80)**	**High (70)**
Status	Negative	
Reversibility	Medium	High
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	

Mitigation:

» Disturbed areas must be rehabilitated immediately after disturbance and appropriate indigenous plant species must be re-established.
» The clearing of vegetation must be kept to a minimum and within the substation site and power line servitude.
» The development of new access roads should be limited as far as possible.
» During the construction phase workers must be limited to areas under construction and access to the undeveloped areas must be strictly controlled.
» Rehabilitated areas must be monitored to ensure the establishment of re-vegetated areas to a ground of cover of at least 85%.

Cumulative impacts:

High. Cumulative impacts include an increase in disturbed habitats, habitat fragmentation, proliferation of alien invasive species, the loss of species of conservation concern and the migration of sensitive avifauna and fauna away from the area.

Residual Risks:

Medium-Low provided that mitigation measures are implemented fully and correctly. Once the power line routes and substation sites have been constructed, disturbance to the area will be minimal.

Nature of Impact: Proliferation of alien invasive species

Alien invasive species will quickly encroach into disturbed areas, particularly adjacent to drainage areas. Alien species generally out-compete indigenous species for water, light, space and nutrients as they are adaptable to changing conditions and are able to easily invade a wide range of ecological niches (Bromilow, 2010). Alien invader plant species pose an ecological threat as they alter habitat structure, lower biodiversity (both number and "quality" of species), change nutrient cycling and productivity, and modify food webs (Zedler, 2004). This negatively affects the ability of the disturbed area to maintain floral biodiversity.

All power line alternatives		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Site (1)
Duration	Permanent (5)	Short (2)

Magnitude	Moderate (6)	Minor (2)
Probability	Definite (5)	Probable (3)
Significance	**High (65)**	**Low (15)**
Status	Negative	Positive
Reversibility	Medium	High
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
All substation alternatives		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Site (1)
Duration	Permanent (5)	Short (2)
Magnitude	Moderate (6)	Minor (2)
Probability	Definite (5)	Probable (3)
Significance	**High (65)**	**Low (15)**
Status	Negative	Positive
Reversibility	Medium	High
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Mitigation:
An invasive alien control programme must be implemented to eradicate the existing alien invasive plants/trees and to prevent the introduction and spread of these species as per the legislative requirements specified under the Conservation of Agricultural Resources Act, 1983 amended in 2001 and the National Environmental Management: Biodiversity Act 2004 (Act No, 10 of 2004).

Cumulative impacts:
Moderate. A reduction in indigenous species will occur as alien invasive species spread.

Residual Risks:
Low provided that mitigation measures are implemented fully and correctly. Once the substation sites and power line routes have been constructed, disturbance to the area will be minimal and the on-site vegetation will recover. Due to the lack of disturbance in the area, it is unlikely that alien invasive species will establish and spread.

5.1.2. Assessment of Potential Impacts on Fauna

Low mammal diversity was predicted for the site due to large scale habitat modification and the high levels of human disturbance. The majority of faunal species recorded within the study area are often associated with disturbed habitats and have generalist habitat and dietary requirements. Low reptile diversity was expected due to the degraded nature of the site and lack of suitable habitats. Low amphibian diversity was recorded within the proposed site due to extremely limited habitat diversity.

Nature of Impact: Loss of faunal habitat and ecological structure
The construction phase of the proposed substation and power line development will result in the loss of faunal habitats within the area. This impact relates to the complete removal or partial destruction and subsequent disturbance of existing vegetation by machinery and

workers. These processes have a direct impact on the ecological condition of natural vegetation and habitat availability. These activities will have an impact on foraging and breeding ecology of faunal species. Loss of vegetation generally affects nutrient cycles, removes the organic litter layer and results in habitat fragmentation and destruction of wildlife corridors.

The habitat surrounding the distribution and transmission substations are however already largely transformed and fragmented due to the adjacent agricultural activities. It is not envisaged that any Red Data species will be displaced by the habitat transformation that will take place as a result of the construction of the proposed transmission and distribution substations. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local in extent, i.e. it will not have a significant effect on regional or national populations. The proposed development will have a limited impact on the loss of faunal habitat.

All three power line alternatives will traverse through Strandveld vegetation for approximately 15km. The power line towers will result in the partial destruction of habitat but this will be limited to the tower footprint.

Distribution and Transmission substation		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Site (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (65)**	**Moderate (50)**
Status	Negative	
Power Lines		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Local area (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Probable (3)
Significance	**Moderate (52)**	**Moderate (33)**
Status	Negative	
Reversibility	Low	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	

Mitigation:

» All construction and maintenance activities must ensure that the temporal and spatial footprint of the development is kept to a minimum.
» The boundaries of the development footprint areas are to be clearly demarcated and it must be ensured that all activities remain within the demarcated footprint area.
» Edge effects of all construction and operational activities, such as erosion and alien plant species proliferation, which will affect faunal habitats adjacent to the development area, need to be strictly managed.
» Any natural areas beyond the development footprint, which have been affected by the construction activities, must be rehabilitated using indigenous plant species.

» Education and awareness campaigns on faunal species and their habitat are recommended to help increase awareness, respect and responsibility towards the environment for all staff and contractors.
Cumulative impacts: Moderate. The construction of the substations and power line corridor will contribute to the further loss of fauna habitat. The habitat is however already largely transformed and fragmented due to the adjacent agricultural activities.
Residual Risks: Low provided that mitigation measures are implemented fully and correctly. Once the power lines and substations have been constructed, disturbance to the area will be minimal. Any species of conservation concern must be translocated, eliminating any residual risks.

Nature of Impact: Faunal mortalities and trapping

Activities involving the clearing/harvesting of natural vegetation may result in the loss of faunal species.

Faunal diversity within the study area has been negatively impacted as a result of historic and on-going disturbances associated with mining practices. It is not envisaged that any Red data species will be present on the site and thus directly impacted as a result of the project. During the operational phase, a further loss of faunal diversity and ecological integrity will occur due to the increase in human activity and associated disturbance.

Construction Phase		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Local area (2)
Duration	Short (2)	Short (2)
Magnitude	High (8)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	**High (60)**	**Moderate (50)**
Status	Negative	
Reversibility	Low	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	
Operational Phase		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Site (1)
Duration	Permanent/unknown (5)	Permanent/unknown (5)
Magnitude	Low (3)	Minor (2)
Probability	Probable (3)	Low likelihood (2)
Significance	**Low (30)**	**Low (16)**
Status	Negative	
Reversibility	Low	
Irreplaceable loss of resources?	Yes (without mitigation)	

Can impacts be mitigated?	Yes

Mitigation:

» Care must be taken when driving within the study site in order to minimise risk to fauna from vehicles.
» No trapping or hunting of fauna is to take place. Access control must be implemented to ensure that no illegal trapping or poaching takes place.
» The Angulate Tortoise (*Chersina ungulata*) is a protected species by the Nature Conservation Ordinance No. 19 of 1974 (as amended in 2000) and it must not be collected.
» Should any Red Data faunal species be noted within the development footprint areas, these species must be relocated to similar habitat within the vacant land to the west of the development area with the assistance of a suitably qualified Ecologist. Relocation of protected species must be undertaken in terms of an appropriate permit.
» All staff and contractors must undergo an environmental induction course that must include faunal education and awareness programmes.

Cumulative impacts:

Moderate. Reduced species richness and species composition are likely to occur in the area as a result of the loss of habitat and disturbance.

Residual Risks:

Low provided that mitigation measures are implemented fully and correctly. Once the power lines and substations have been constructed, disturbance to the area will be minimal.

Nature of Impact: Disturbance and Displacement

Disturbance created by noise-pollution associated with workers and construction activities can affect local wildlife utilising adjacent habitats, particularly mammalian species. This is likely to be short-lived during the construction phase but will continue to have a limited impact during the operational life span of the development.

The proposed development area is located within close proximity to urban, industrial and power line developments, and therefore, species within this landscape often experience disturbance. As a result, disturbance of fauna by the proposed project during the construction phase is anticipated to be of moderate significance. Species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operational phases.

Construction Phase

	Without mitigation	**With mitigation**
Extent	Local area (2)	Local area (2)
Duration	Short (2)	Short (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Definite (5)	Highly probable (4)
Significance	**Moderate (50)**	**Moderate (40)**
Status	Negative	
Reversibility	Medium	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	

Operational Phase		
	Without mitigation	**With mitigation**
Extent	Local area (2)	Site (1)
Duration	Permanent/unknown (5)	Permanent/unknown (5)
Magnitude	Low (4)	Low (4)
Probability	Probable (3)	Low likelihood (2)
Significance	**Low (33)**	**Low (20)**
Status	Negative	
Reversibility	High	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Yes	
Mitigation: » Strict control must be maintained over all activities during construction. » Care must be taken when driving within the study site in order to minimise risk to fauna from vehicles. » The Environmental Officer must be notified of any Red Data species identified in this report observed to be roosting and/or breeding in the vicinity. Care must be taken surrounding any identified roosting/breeding sites in order to minimise disturbance.		
Cumulative impacts: Low. The proposed development area is located within close proximity to urban and industrial developments, and therefore, species within this landscape often experience disturbance		
Residual Risks: Low provided that mitigation measures are implemented fully and correctly. Once the power lines and substations have been constructed, disturbance to the area will be minimal.		

5.1.3. Comparison of Alternatives

Sensitivity of the study area from a biodiversity perspective is provided in Figure 5.1. Sensitivities of each alternative considered are provided below and has informed the recommendation of preferred alternatives.

The large eastern portion of the project area has been assessed as being of high sensitivity from an ecological perspective. This is attributed to the intact Strandveld vegetation, which, has a conservation status of Endangered. As a result of current and historic anthropogenic activities, which have transformed the ecological integrity of the central portion of the project area, the vegetation is considered to have a low-moderate sensitive status. Moderate sensitivity was attributed to fringe habitats adjacent to anthropogenically disturbed areas. Fynbos of varying condition was identified within these areas.

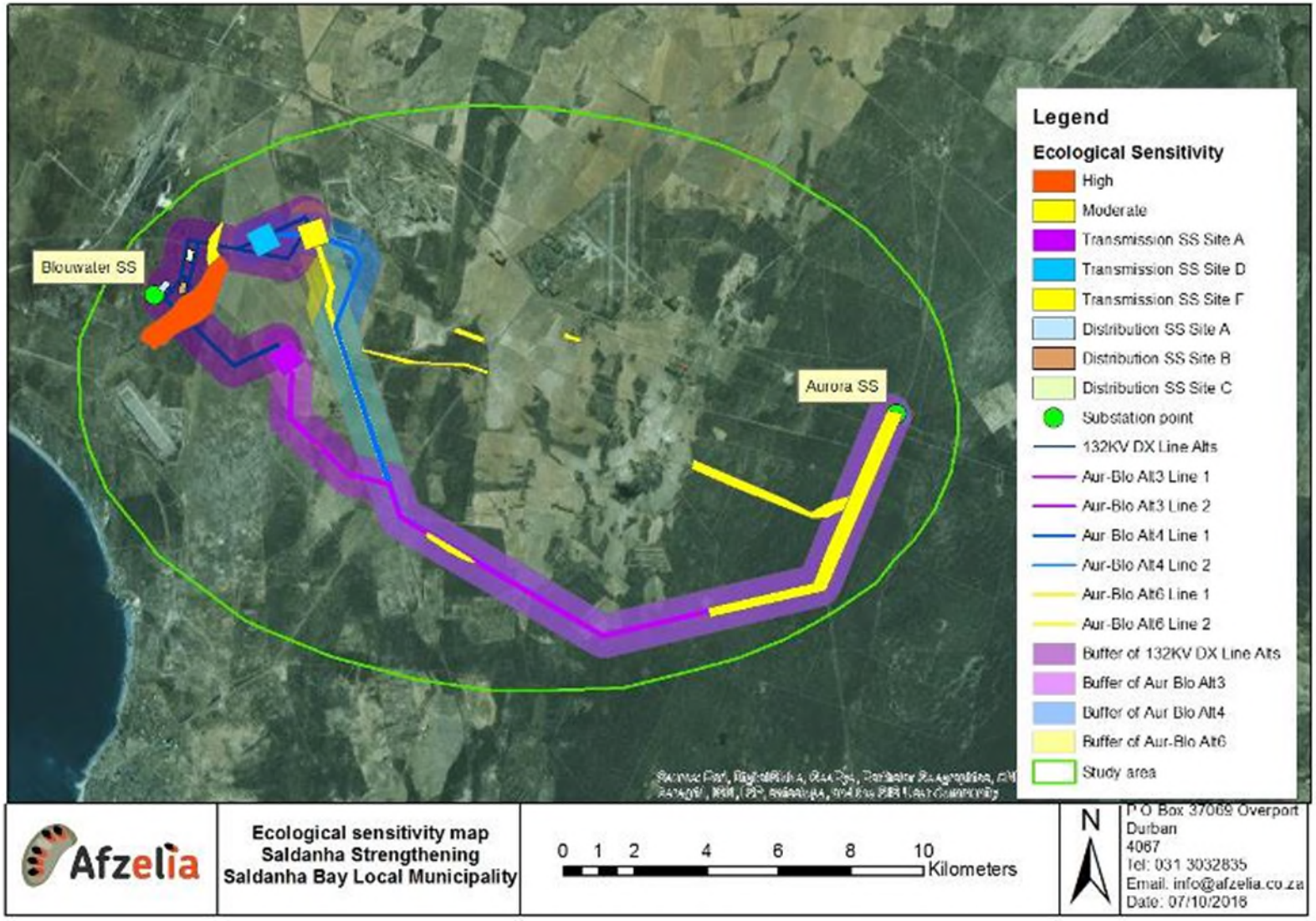

Figure 5.1 Ecological Sensitivity Map

All Red Listed plant species identified within the project area have a medium-high sensitivity and must be translocated to an undisturbed area outside the project footprint, prior to the commencement of any construction and construction related activities. This process must be undertaken in terms of appropriate permits and must be supervised by a qualified botanist. This will promote the conservation of these species. Further to this, a series of gates and fences are located within the area, restricting the movement of various faunal species.

There are also some sensitive faunal areas located within the western portion of the project area associated with the endorheic depressions. Although these are not directly affected by the proposed infrastructure, it is important that these depression habitats are protected from further degradation. The protection of these habitats will ensure that possible faunal species displaced will still have suitable habitat requirements within the area that will provide an important ecological corridor and refuge.

i. Transmission Substation Site Alternatives

All sites are located within close proximity to industrial development and infrastructure including ArcelorMittal South Africa, Saldanha Works to the west (±3km), and the existing Blouwater Substation and associated power lines. Transmission substation site alternative D is located within an area of moderate-high species richness and must be considered as a medium-high conservation priority. Transmission substation site alternatives A and F are located within an agricultural landscape. These sites are located next to the R27 road and 4.5km west of Langebaanweg. As a result, the area often experiences high levels of disturbance. No natural vegetation or trees are present within these site alternative areas. The topography of the site is flat and the soils were sparsely vegetated during the field survey. There are no sensitive faunal micro-habitats within close proximity of these substation site alternatives. No plant species of conservation concern are likely to occur within these site alternatives.

Due to the high levels of habitat transformation and disturbance levels either **transmission substation site alternative A or F** are considered to be suitable for the proposed substation development and are not predicted to have a significant ecological impact within the area.

ii. Distribution Substation Site Alternatives

All three distribution substation site alternatives are located within close proximity (1km radius) of each other. The topography of all site alternatives is flat and the vegetation is dominated by Strandveld fynbos including *Eriocephalus africanus, Euphorbia spp, Searsia spp, Aloe perfoliata*. Three Red Listed species were identified within the site alternatives, i.e. *Lampranthus vernalis*, *Limonium*

capense, *Cephalophyllum rostellum*. A series of endorheic depressions and Strandveld avian micro-habitats are located within the surrounds of all of the Distribution Substation site alternatives. Substation site alternative A is located close to the existing Blouwater substation and as a result this area has experienced some level of disturbance. Site alternative A is located in a highly transformed area.

It is recommended that **distribution substation site alternative A** and the associated 132kV power lines from this substation to the transmission substation is selected as the preferred option as this will minimise the ecological impacts within the area. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

iii. Power Line Corridors

» ***Alternative 3***

A large portion of this power line corridor runs adjacent to existing power lines exiting the Aurora Substation. The selection of this corridor alternative will result in the reduction of new, isolated power lines thus reducing the likelihood of disturbance from an ecological perspective.

Corridor alternative 3 enters into transmission substation A. The use of the existing access roads located along this corridor would also reduce the impact of the power line project. This power line corridor alternative traverses through natural Strandveld Fynbos vegetation (for approximately 15km) and the southern section borders the Thali Thali Game Reserve. It must be noted that existing power line infrastructure is within this reserve and corridor alternative 3 is proposed to traverse the landscape parallel to the existing power line. The power line then deviates to the north-west and traverses through transformed agricultural land. One floral species of conservation concern, *Leucospermum hypophyllocarpodendron* was identified along this corridor alternative. Corridor alternative 3 is the shortest alternative, approximately 19.74km in length.

Despite the advantages of localising the new power line parallel to the existing power lines in the area, the limited levels of disturbance associated with the southern section of the power line corridor could impact on intact ecological structure and processes. As all power line alternatives follow the same route for approximately 15km, it is imperative that mitigation measures be implemented to minimise the impact on the Endangered Strandveld vegetation.

» ***Alternatives 4 and 6***

These alternatives follow the same route as alternative 3 for this first approximately 15.7km and then deviate to the north east. Alternative 4 is 23.56km in length and enters into transmission substation D. This is the longest line alternative. Alternative 6 is 21.6km in length and enters into transmission substation F. The power line corridors traverse Strandveld fynbos and a mosaic of agricultural land and Fynbos fringe habitats. The central portion of these power line corridors runs parallel to the regional road (R27). A series of farm roads traverse the area. Fringe faunal micro-habitats were identified within close proximity of these corridor alternatives. Vegetation adjacent to the agricultural landscape is considered disturbed and no species of conservation concern were identified. Despite this, these fringe habitats are important ecotones and must be conserved.

The presence of an existing road structure within close proximity of the route alternatives will ensure that the need for new access roads will be reduced.

Power line corridors 4 or 6 are nominated as the preferred alternatives from an ecological perspective.

5.1.4. Conclusions and Recommendations

The dominant vegetation type in the study area is Saldanha Flats Shrubland, which occupies the majority of the study area. Dominant vegetation identified on site included *Eriocephalus africanus*, *Euphorbia* spp, *Aloe perfoliata*, *Limonium peregrinum* and *Asparagus capensis*. Four species of conservation concern were identified during the site visit. *Lampranthus vernalis* and *Limonium capense* were identified at the DX substation sites. *Cephalophyllum rostellum* was also identified at the DX substation sites. *Leucospermum hypophyllocarpodendron*, classified as vulnerable, was identified along Corridor Alternative 3, lines 1 and 2.

Low mammal diversity was predicted for the site due to large scale habitat modification and the high levels of human disturbance. The majority of faunal species recorded within the study area are often associated with disturbed habitats and have generalist habitat and dietary requirements. Low reptile diversity was expected due to the degraded nature of the site and lack of suitable habitats. Low amphibian diversity was recorded within the study area due to extremely limited habitat diversity.

No Red Data faunal species are predicted to be present within the development footprint due to high levels of disturbance and habitat transformation already present within the area.

A number of potential impacts relating to loss of indigenous vegetation, proliferation of alien invasive species, habitat fragmentation, loss of Red Listed species, loss of faunal habitat, direct faunal impacts and disturbance to fauna are predicted to occur as a result of the proposed strengthening project.

Mitigation measures are proposed to lower the significance of these impacts. Provided these mitigation measures are fully adhered to and implemented as part of the Environmental Management Programme during both the construction and operational phase of the development, the project is expected to have a limited long term impact on the surrounding environment.

Once the substation site and power line tower positions have been selected and pegged, a site visit must be conducted by a suitably qualified botanist to determine the presence of Red Listed and Endemic species within the site footprint, prior to the commencement of any construction and construction related activities. Any bulbs and red listed plant species must be immediately translocated to an undisturbed area outside of the development footprint.

Power line corridor alternatives 4 or 6 are the preferred corridor alternatives as these routes are situated within a highly disturbed area and will have the least impact on the receiving environment. Due to the current levels of disturbance, distribution substation alternative A and transmission substation alternative A or F are preferred from an ecological perspective.

5.2. Assessment of Potential Impacts on Wetlands

A desktop and field investigation identified the presence of eight wetland systems within the study area. The wetlands were classified into separate hydrogeomorphic (HGM) units, comprising of six endorheic depression wetlands and two unchannelled valley bottom wetlands.

An initial desktop Level 1 health assessment (conducted during the Scoping Phase) of the wetlands categorised the depressions as moderately modified (PES Category C) and the unchannelled valley bottom wetlands as largely modified (PES Category D). These scores were then evaluated during a field investigation in this EIA phase report. The unchannelled valley bottom wetlands were identified within the West Coast Fossil Park. These wetlands will not be impacted upon by the proposed project as they occur within a minimum distance of over 1km from the alternative power line corridors.

The Level 2 health assessment conducted for the depression wetlands (according to the WET-Health methods) categorised the wetlands as moderately modified (PES Category C) as per the Level 1 (Scoping Phase) investigation. Modifications to the wetlands are minor and stem from agricultural activities including grazing

which has decreased the basal cover within the wetland systems. No erosion was noted at any of the wetland sites largely due to the flat topography of the area and the very sandy nature of the soils present. The Ecological Sensitivity and Importance of the wetlands has been recorded as medium. Although no red-data floral species where identified in the depression systems, the generally high vegetation basal cover surrounding the wetland systems provides habitat for faunal and avifaunal species to utilise the larger ecosystems for protection, feeding and breeding.

The impact assessment identified that no direct impacts would occur on the delineated wetland systems. None of the alternative Distribution substation or Transmission substation sites will have a direct impact on the wetlands, with the closest wetland occurring approximately 520m away. None of the alternative power lines corridors will have a direct impact on any of the wetlands delineated as they do not pass over these areas. All corridor alternatives will have no direct impact on any of the substation sites.

Indirect impacts are highly unlikely due to the flat nature of the whole project area and the very sandy soils, which decreases the likelihood of any runoff from the construction sites entering into any of the wetland systems. A 21m buffer width is recommended to protect the identified wetland systems. This buffer must be enforced during the construction and operational phases of the proposed project.

As no impacts are predicted, no impact assessment tables are presented.

5.2.1. Comparison of Transmission Power Line Alternatives

Three power line corridors were assessed in this investigation. None of the alternatives will directly cross any of the endorheic depression systems. **All corridor alternatives are suitable** from a wetland and watercourse perspective.

5.2.2. Comparison of Transmission Substation Sites

No wetland or watercourses areas were identified in any of the substation sites. Site alternative A is located approximately 2.5km south of the depression systems, Site D is located approximately 940m north-east of a depression and Site F is located approximately 2.1km south from a depression. **Any of the substation sites are acceptable** from a wetland or watercourse perspective. **Transmission substation site A** is however the **preferred alternative** as it is located at the furthest distance from any wetland system.

5.2.3. Comparison of Distribution Substation Sites and associated 132kV Power Lines

The three Distribution Substation alternatives (Site A, B and C) are located within a 1km radius of each other. The endorheic depression wetlands are located to the east of Distribution Alternative B (approximately 600m) and Distribution Alternative C (approximately 520m). Distribution site Alternative A is located at the furthest distance to any of the depressions (approximately 1km). The construction of any of the Distribution substation sites will not have a direct impact on the wetland systems due to the flat topography of the site and the limited runoff potential of the sandy soils associated with the area. **Distribution substation alternative A** and the associated 132kV power lines between this substation and the transmission substation are **the preferred option** as it is located at the furthest distance from a depression in a disturbed area adjacent to the existing Blouwater Substation. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

5.2.4. Conclusions and Recommendations

The impact assessment identified that no direct or indirect impacts would occur on the delineated wetland systems within the study area as a result of the proposed project. None of the alternative Distribution substation or Transmission substation sites will have a direct impact on the wetlands, with the closest wetland occurring approximately 520m away. None of the alternative power lines corridors will have a direct impact on any of the wetlands delineated as they do not pass over these systems. Best practice guidelines for general construction activities within the area must however be enforced in an Environmental Management Programme.

5.3. Assessment of Potential Impacts on Avifauna

The implications of the proposed substation development and associated power lines to avifauna are as follows:

» An area of approximately 600m x 600m and 120m x 120m of land will be altered by the construction of the proposed substations and considered artificial, and largely unsuitable to avian species.
» During the construction phase, disturbance levels will be significantly higher in the immediate vicinity than previously. This disturbance will consist of machinery and vehicle disturbance as well as other construction activities (Steidl and Powell 2006; Homes et al. 1993).

» During the operational phase, there will be some vehicle activity resulting in disturbance, particularly within the road access corridor (Steidl and Powell 2006; Homes et al. 1993).
» Due to the length of the overhead power lines (Alternative 3 = 19.74km, Alternative 4 = 23.56km and Alternative 6 = 21.6km), this will pose a collision and electrocution risk to avifauna, particularly heavier birds with low manoeuvrability.
» There is a possibility that various species such as Corvids and passerines (attracted to the perching substrates) could be electrocuted on substation infrastructure; however raptor electrocutions are rated as uncommon (Avian Power Line Interaction Committee, 2006).

An avifauna sensitivity map, based on available micro-habitats in the area, is presented in Figure 5.2. The majority of the development footprint falls within the transformed anthropogenic landscape which is considered to be of low ecological sensitivity, due to habitat destruction and disturbance. Most of the natural habitat within these areas is absent.

There are also some moderate sensitivity areas located within the study area associated with the relatively intact natural Strandveld vegetation consisting of Eriocephalus, Crysanthemoides and Euphorbia spp. on the southern and western portion of the study area. These areas have a low human footprint and this has allowed most of the endemic avifaunal assemblage to be retained. This vegetation is not unique to the area and exists to the north, west and south of the study area. These natural habitats provide suitable foraging and roosting requirements for avian species and represent an important avifaunal habitat. The protection of this habitat will provide an important ecological corridor and refuge for avifaunal species.

The pan-micro habitats were the only sensitive features identified during the assessment. These pan systems may hold water after rainfall events and subsequently attract avian species. Power line corridors and substation site alternatives should be sited away from these pans to minimise impacts to avian species.

There are numerous power lines that already traverse the study area and various portions of the proposed power line corridor alternatives follow the same as the existing infrastructure. The grouping of this infrastructure reduces the likelihood of collisions with the power line. Furthermore, the development footprint does not occur within an Important Bird Area. Development within this area could proceed with moderate risk of significant post-mitigation residual impact on protected avifaunal species, provided that the stated mitigation measures are implemented.

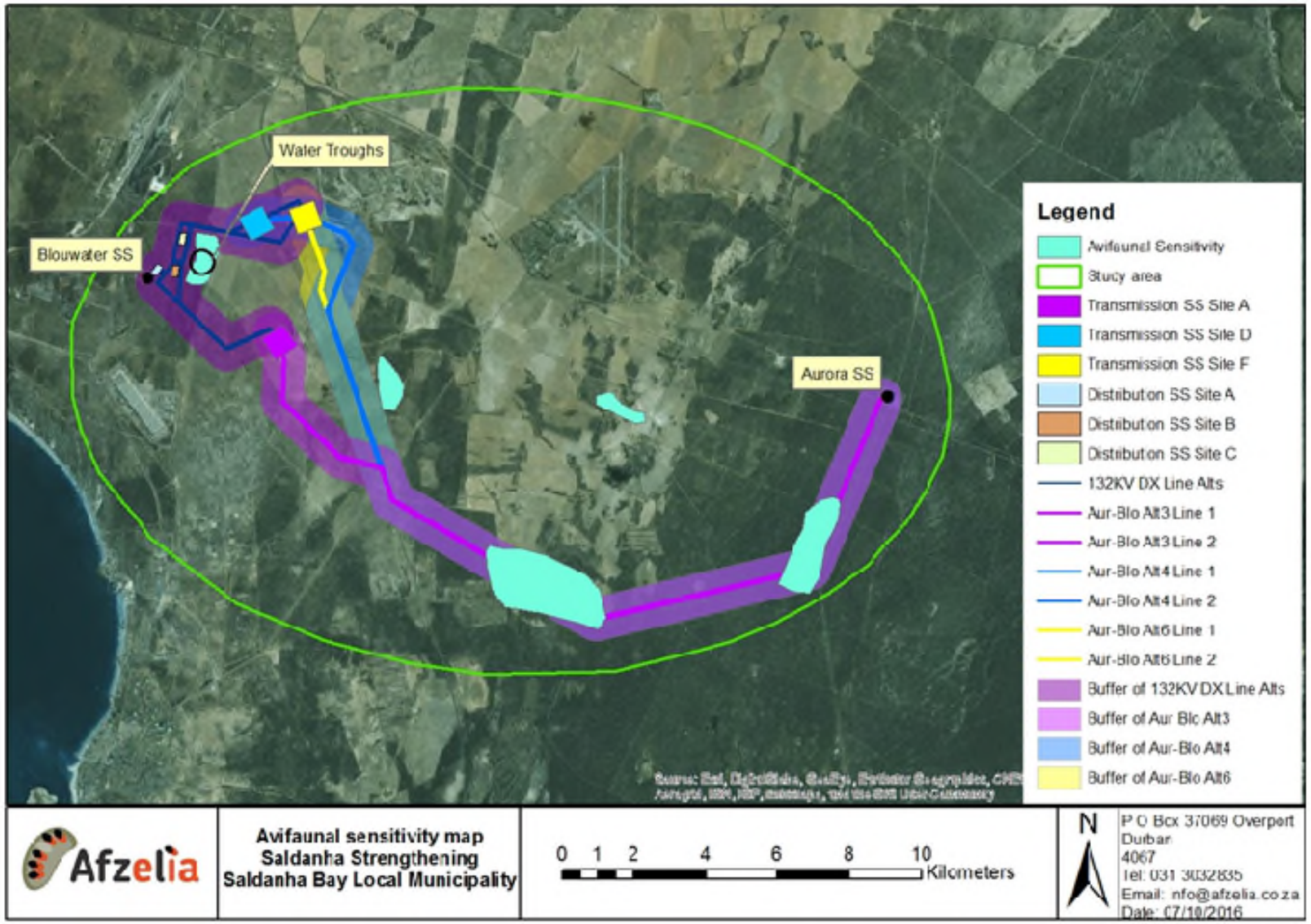

Figure 5.2: Avifauna sensitivity map

The size of the substation development coupled with the degraded nature of the site alternatives and lack of sensitive areas within the study area, avifaunal populations should not be significantly impacted upon provided that mitigation measures are implemented.

Nature: Habitat Destruction due to the construction of the proposed transmission and distribution substations

During the construction phase as well as maintenance of substations, some habitat destruction and alteration will occur. These activities have an impact on foraging, breeding and roosting ecology of avian species within the area through modification of habitat.

Transmission Substation alternatives

All three transmission substation site alternatives are located within close proximity (±1km) of each other. All transmission substation site alternatives are located within an agricultural landscape. These are located next to the R27 road and 4.5km west of Langebaanweg. As a result, the area often experiences high levels of disturbance. No natural vegetation is present within the development footprint. The topography of the sites is flat and the soils were sparsely vegetated at the time of the site visit.

These sites are located in close proximity to industrial development and infrastructure including ArcelorMittal South Africa, Saldanha Works to the west (±3km), and the existing Blouwater Substation and associated power lines.

Blue Cranes are predicted to be displaced by the habitat transformation that will take place as a result of the construction of the proposed transmission substations. Although Blue Cranes were identified within this agricultural habitat, this habitat type not unique within the landscape. Therefore, alternative foraging sites are available for this species within the project area. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local in extent, in that it will not have a significant effect on regional or national populations.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (50)**	**Moderate (40)**
Status	Negative	
Reversibility	Low	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes. However, due to the space requirements, some land and avian micro-habitats will be impacted.	

Distribution Substation Alternatives

All three distribution substation site alternatives are located within close proximity (1km

radius) of each other. The topography at all sites is flat and the vegetation is dominated by Strandveld shrublands including *Eriocephalus africanus*, *Asparagus capensis* and *Euphorbia* spp. A series of endorheic depressions and Strandveld avian micro-habitats are located within the surrounds of all of the distribution substation site alternatives. Distribution substation site alternatives B and C are the closest alternatives to the endorheic depressions. Substation site alternative A is located close to the existing Blouwater substation; as a result, this area has experienced some level of disturbance.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	low (4)
Probability	Definite (5)	Definite (5)
Significance	**High (60)**	**Moderate (50)**
Status	Negative	
Reversibility	Low	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes. However, due to the space requirements, some land and avian micro-habitats will be impacted.	

Mitigation:

» All construction and maintenance activities must be carried out to ensure that the temporal and spatial footprint of the development is kept to a minimum. In particular, care must be taken in the vicinity of avian habitats (Natural Strandveld) and existing roads must be used as far as possible for access during construction and operation.
» The boundaries of the project footprint areas are to be clearly demarcated and all activities must remain within the demarcated footprint area.
» Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO).
» The above measures must be covered in a site specific EMPr and controlled by an ECO.

Cumulative impacts:

Moderate. The Saldanha Strengthening Project is in proximity to numerous existing Eskom power lines and substation infrastructure (Aurora and Blouwater). Furthermore, industrial infrastructure including ArcelorMittal South Africa, Saldanha Works is located to the west of the study area. This project will contribute to the loss of natural habitat within the area.

Residual Risks:

High. The vegetation within the substation footprint will be cleared and surface hardened. It is unlikely that this area will rehabilitate fully after decommissioning.

Nature: Habitat Destruction due to the construction of the 400kV power line

During the construction phase as well as maintenance of the power line some habitat destruction and alteration will occur. These activities have an impact on foraging, breeding and roosting ecology of avian species within the area through modification of habitat.

Due to the fact that all three corridor alternatives traverse through the same habitats, namely Strandveld shrublands for 15km and agricultural landscape for the remainder of the lines (Alternative 3 = ±5km, Alternative 4 = ±8.3km, Alternative 6 = ±6.5km) it is not justifiable to assess the habitat destruction impact of each alternative separately. However, care must be taken to minimise this impact within the Strandveld shrubland habitat.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Low (4)	Minor (2)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (45)**	**Moderate (35)**
Status	Negative	
Reversibility	Low	
Irreplaceable loss of resources?	Yes, avian habitats will be lost	
Can impacts be mitigated?	Yes. However, due to the space requirements, some land and avian micro-habitats will be impacted.	

Mitigation:

» All construction and maintenance activities must be carried out to ensure that the temporal and spatial footprint of the development is kept to a minimum. In particular, care must be taken in the vicinity of avian habitats (Natural Strandveld shrublands through which all three alternatives traverse for approximately 15km) and existing roads must be used as far as possible for access during construction and operation.
» The boundaries of the project footprint areas are to be clearly demarcated and all activities must remain within the demarcated footprint area.
» Any bird nests that are found during the construction period must be reported to the Environmental Control Officer (ECO).
» The above measures must be covered in a site specific EMPr and controlled by an ECO.

Cumulative impacts:

Moderate. The Saldanha Strengthening Project is in proximity to numerous existing Eskom power lines and substation infrastructure (Aurora and Blouwater). Furthermore, industrial infrastructure including ArcelorMittal South Africa, Saldanha Works is located to the west of the study area. This project will contribute to the loss of natural habitat within the area.

Residual Risks:

Moderate-High. The habitat loss surrounding the power line would persist even if the line is decommissioned, which would result in loss/displacement of avian species. Should the area surrounding each tower be revegetated with Strandveld vegetation the residual risk would be low.

Nature: Disturbance and displacement of birds

The disturbance of avifauna during the construction and operation of the substation and power line infrastructure will occur. This is an indirect impact that will affect the movement and distribution of avian species surrounding power line corridors and

substation sites, particularly during the construction of the proposed project. The avoidance of these areas by avian species will impact the breeding and foraging characteristics of affected bird species. Species sensitive to disturbance are ground-nesting species resident within the development footprint. Disturbance can also influence the community structure of avifauna within close proximity to the development as certain species will be displaced and forced to find alternative territories. Avian species with small territories are particularly susceptible.

Disturbance could have a negative impact on the breeding activities of various species, particularly if this occurs during a sensitive period in the breeding cycle.

Species of concern that may be displaced by the proposed substation development include Southern Black Korhaan (*Afrotis afra*), Black Harrier (*Circus maurus*) and Blue Cranes (*Anthropoides paradiseus*). Both *A. afra* and *A. paradiseus* were identified within the study area. Endemic passerine species will be displaced during the construction phase however, this is predicted to be a short term impact and species would return to the area prior to the construction of the power line.

The study area is already subject to varying degrees of disturbance due to agriculture, industrial infrastructure as well as existing power line and substation infrastructure. The proposed development is likely to have a cumulative effect due to the presence of the existing infrastructure. Disturbance and displacement of Red Data species by the proposed substations and power lines is anticipated to be of moderate significance. This is primarily due to the fact that only two Red Data species are likely to be displaced (Blue Crane and Southern Black Korhaan) and these species were identified within the study area. Black Harrier nests have been recorded in the West Coast National Park and this species is unlikely to breed within the vicinity of the substation site alternatives (Bird Life South Africa Important Bird Areas Directory, 2014).

Disturbance during Construction Phase of the Transmission and Distribution Substations		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (45)**	**Moderate (35)**
Status	Negative	
Reversibility	Moderate	
Irreplaceable loss of resources?	Possible disturbance during the breeding season	
Can impacts be mitigated?	Partially	
Disturbance during Construction Phase of the Transmission Power Lines		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Definite (5)
Significance	**Moderate (45)**	**Moderate (35)**

Status	Negative	
Reversibility	Moderate	
Irreplaceable loss of resources?	Possible disturbance during the breeding season	
Can impacts be mitigated?	Partially	
Mitigation: » Strict control must be maintained over all activities during construction, in line with an approved construction EMPr. » The construction equipment camps must be located as close to the construction site as possible and must be located outside of the identified sensitive areas. » Contractors and working staff must stay within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted. » Existing roads must be used as far as possible.		
Disturbance during Operation		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Moderate (30)**	**Low (24)**
Status	Negative	
Reversibility	Low	
Irreplaceable loss of resources?	No	
Can impacts be mitigated?	Partially	
Mitigation: » • Maintenance staff must stay within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.		
Cumulative impacts: Low. The Saldanha Strengthening Project is in proximity to numerous existing Eskom power lines and substation infrastructure (Aurora and Blouwater). Furthermore, industrial infrastructure such as ArcelorMittal South Africa, Saldanha Works is located to the west of the study area. However, this project will contribute to some extent the existing disturbance of avifauna within the area.		
Residual Risks: Moderate. Some disturbance during the construction and operational phase is inevitable. It is likely that some birds will be disturbed and potentially displaced from the area.		

Nature: **Electrocution of birds on substation infrastructure** Since there is live hardware in the substation yard, the potential exists for birds to bridge the gap between two phases and earth resulting in electrocution. However, very few electrocutions have been recorded on transmission and distribution substations. The impact assessment found the impact of electrocution on substation infrastructure to be of low significance once mitigation in the form of bird friendly structures and bird deterrent measures has been put in place. Species likely to be affected are non-

threatened species with the majority of threatened species (Secretarybird, Lesser Flamingo and Blue Cranes) avoiding the substation yard.

	Without mitigation	**With mitigation**
Extent	Low (1)	Low (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Highly Improbable (1)
Significance	**Low (20)**	**Low (8)**
Status	Negative	
Reversibility	Low (birds will be injured or killed)	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	

Mitigation:

» All relevant perching surfaces within the substation must be fitted with bird guards as deterrents.

Cumulative impacts:

The Saldanha Strengthening Project is in proximity to numerous existing Eskom power lines and substation infrastructure. Aurora substation is located on the northern section of the study areas and Blouwater substation is located on the western edge of the study area. The Saldanha Bay Strengthening project will increase the number of substations within the area and subsequent risk. Due to the impacts associated with substation and power line developments, mitigation measures must be implemented to lower the significance of these impacts.

Residual Risks:

Low. If at any stage the substation is decommissioned the electrocution impact will no longer exist.

Nature: Electrocution of birds on overhead power lines (400kV and 132kV)

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004). Electrocution of birds on associated overhead power lines is a primary cause of mortality for a variety of bird species particularly storks, cranes and raptors in South Africa (Van Rooyen & Ledger 1999). Electrocution risk is influenced by the voltage of the power line coupled with the pole structure.

There is no risk of avian electrocution due to 400kV power lines due to the larger distances between live components. These components can't be bridged by even large birds such as Flamingos and Cranes. There is an electrocution risk for the 132kV power line and as there are limited natural perching substrates within the study area, these structures will likely be used for perching by avian species. The electrocution risk is dependent on the pole structure used and as a result, in order to mitigate this, a steel monopole structure must be used.

The impact assessment found the impact of electrocution to be of low significance once mitigation in the form of bird friendly structures and bird deterrent measures has been

put in place.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Improbable (2)
Significance	**Moderate (48)**	**Low (20)**
Status	Negative	
Reversibility	Low (birds will be injured or killed)	
Irreplaceable loss of resources?	Yes	
Can impacts be mitigated?	Yes	

Mitigation:

» A "Bird Friendly" monopole structure, with a bird perch (as per standard Eskom guidelines) should be used for the tower structures.
» All relevant perching surfaces should be fitted with bird guards and perch guards as deterrents (Hunting 2002).
» Installation of artificial bird space perches and nesting platforms, at a safe distance from energised components (Goudie 2006; Prinsen et al. 2012).

Cumulative impacts:

Low. The Saldanha Strengthening Project is in proximity to numerous existing Eskom power lines and substation infrastructure. The construction of the associated power line will increase the length of power line in the area and subsequent risk.

Residual Risks:

Moderate. The power line will be in the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease.

Nature: **Collisions with the power line**

Collisions are the biggest single threat posed by overhead power lines to birds in Southern Africa (van Rooyen 2004). Larger bird species such as bustards, storks, cranes, raptors and various water fowl are highly susceptible to power line collisions. These species often collide with the earthing wire as it is not highly visible. These species are mostly heavy-bodied species with limited manoeuvrability and are not sufficiently mobile to take the necessary evasive action to avoid colliding with power lines (Anderson 2001; Van Rooyen 2004; Jenkins and Smallie 2009). This impact is further exacerbated as they tend to fly between foraging bouts within the elevation ranges of both high and low voltage power lines. Many of the collision sensitive species are considered threatened in Southern Africa.

Areas that are regularly used by "collision prone" species for feeding, roosting or areas located along commonly used flight paths increases the risk of collisions. As a result, power line corridor selection is crucial in mitigating the negative impacts of this infrastructure of large avian species.

The Red Data species that are vulnerable to power line collisions are generally long living, slow reproducing species. Furthermore, various species require specific conditions for breeding, resulting in very few successful breeding attempts, or breeding

might be restricted to very small areas. These species have not evolved to cope with high adult mortality. Therefore, consistent high adult mortality over an extensive period could have a serious effect on a population's ability to sustain itself in the medium to long term.

Species prone to collisions with overhead power lines that may be impacted by the development include Blue Crane and Southern Black Korhaan as well transient Greater Flamingo and Lesser Flamingo. Both Flamingo species and the Blue Crane were reported as the top 10 species prone to collisions.

Due to the fact that all three corridor alternatives follow the same route for the first 15.7km coupled with the fact that the final portion of all corridors alternatives are in close proximity (1-2km), it is not justifiable to assess the collision impact of each alternative separately.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long term (4)	Long term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	**Moderate (48)**	**Moderate (30)**
Status (positive or negative)	Negative	
Reversibility	Low (birds will be injured or killed)	
Irreplaceable loss of resources?	Yes, Blue Cranes and transient Lesser and Greater Flamingos are at risk.	
Can impacts be mitigated?	Yes, the installation of bird diverters to reduce the impacts.	

Mitigation:

» Mark identified sensitive sections of the line with anti-collision marking devices (diurnal and nocturnal diverters) to increase the visibility of the power line and reduce likelihood of collisions. Marking devices should be spaced 10 m apart. These line marking devices include spiral vibration dampers, strips, Firefly Bird Flight Diverters, bird flappers, aerial marker spheres, ribbons, tapes, flags and aviation balls (Prinsen et al. 2012). EBM Flapper and the Tyco Flight Diverter are approved bird flight diverters which are currently used by Eskom (Distribution Technical Bulletin, 2009).

» Anti-collision devices must be fitted in accordance with Eskom guidelines.

» Once the corridor has been selected and prior to the construction phase, an avifaunal walk down must be conducted to determine the exact portions of the power line necessary for marking with anti-collision devices.

Cumulative impacts:

Moderate-High. The construction of the new power lines will increase the length of power line within the area and subsequent risk of collisions. Blue Crane, Lesser Flamingo and Greater Flamingo are large Red Listed species susceptible to collision mortalities.

Residual Risks:

Moderate. The power line will be in the area over a long period of time if not permanent. However, if the power line is removed the impacts associated (avian mortalities) will cease.

5.3.1. Comparison of Transmission Power Line Alternatives

» **Power Line Corridor Alternative 3**
A large portion of this power line corridor runs adjacent to existing power lines exiting the Aurora Substation. The selection of this corridor alternative will lessen the likelihood of new, isolated power lines within the landscape. This will reduce the risks of bird collisions with new stand-alone power lines. The grouping of infrastructure was listed as an important measure in order to mitigate impacts of power line infrastructure of avian populations (Guidelines for mitigating conflict between migratory birds and electricity power grids 2011).

Corridor alternative 3 enters into transmission substation A. This power line corridor alternative traverse through natural Strandveld Fynbos vegetation (for the approximately 15km) and the southern section borders the Thali Thali Game Reserve. It must be noted that existing power line infrastructure was noted within this reserve and corridor alternative 3 is proposed to traverse parallel to the existing power line. The power line then deviates to the north-west and traverses through transformed agricultural land. Strandveld shrublands and agricultural lands are the main avian micro-habitats within close proximity of the proposed power line corridor. Corridor alternative 3 is the shortest line alternative, approximately 19.74km in length.

» **Power Line Corridor Alternative 4**
Power line corridor 4 follows the same route as alternative 3 for approximately 15.7km and then continues northwards for a further 6km. This alternative is 23.56km in length and enters into transmission substation D. This power line corridor runs parallel to the regional road (R27) and a largely agricultural habitat. A series of farm roads traverse the area. This is the longest line alternative.

» **Power Line Corridor Alternative 6**
Power line corridor alternative 6 is 21.6km in length and enters into transmission substation F. This corridor alternative follows the same route as alternative 4 and then deviates for a further 3.5km. This power line corridor runs parallel to the regional road (R27) and a largely agricultural habitat.

Power line corridors 3 and 6 are nominated as the **preferred alternatives** from an avifaunal perspective due to the shorter length of power line required and the consolidation of infrastructure with existing power lines in the area. The main impact associated with the power line infrastructure is attributed to collisions and mitigation measures stated in this report must be implemented fully and correctly.

5.3.2. Comparison of Transmission Substation Sites

All three sites are located within close proximity to industrial development and infrastructure including ArcelorMittal South Africa, Saldanha Works to the west (±3km), and the existing Blouwater Substation and associated power lines. All three transmission substation site alternatives are located within close proximity (±1km) of each other, and within an agricultural landscape. These are located next to the R27 road and 4.5km west of Langebaanweg. As a result, the area often experience- high levels of disturbance. No natural vegetation is present within the transmission site alternative areas. The topography of the sites is flat and the soils were sparsely vegetated at the time of the site visit.

Due to the high levels of habitat transformation (sites cleared and historically cultivated) and disturbance levels coupled with the close proximity of the three site alternatives, **all transmission substation site alternatives are acceptable** from an avifaunal perspective. The primary impact associated with the transmission substation is disturbance and displacement. Once mitigation measures have been implemented these impacts and they are unlikely to have a significant long term impact on avifaunal populations within the area.

5.3.3. Comparison of Distribution Substation Sites and associated 132kV Power Lines

All three distribution substation site alternatives are located within close proximity (1km radius) of each other. The topography at all sites is flat and the vegetation is dominated by Strandveld fynbos including *Eriocephalus africanus*, *Asparagus capensis* and *Euphorbia* spp. A series of endorheic depressions and Strandveld avian micro-habitats are located within the surrounds of all of the Distribution Substation site alternatives. Distribution substation site alternative B and C are the closest alternatives to the endorheic depressions. Substation site alternative A is located close to the existing Blouwater substation. As a result, this area has experienced some level of disturbance.

It is recommended that **distribution site alternative A** and the associated 132kV power lines from this substation to the transmission substation are selected as the **preferred option** as this will minimise impacts to avian communities within the area. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area. If substation site alternatives B or C are selected, stringent mitigation measures will need to be adhered to, to ensure minimal impact to avian species as these sites are the closest to the endorheic depressions.

5.3.4. Conclusions and Recommendations

Due to the current agricultural, industrial and power line developments present within the study area, the proposed substation and power line development is unlikely to have any long-term significant impacts on avifaunal species within the study area. During the site visit, predominantly common bird species were recorded (Cape Sparrow, Karoo Prinia, Pied Starling and various granivorous species). Blue Cranes and Southern Black Korhaan were the only Red Listed species recorded within the study area.

The construction of the proposed transmission substations at any site alternative is adequate from an avifaunal perspective and a poses a limited threat to the birds occurring in the vicinity of this infrastructure. This is largely due to the homogenous nature of the area, high levels of disturbance due to the agricultural practices. The impact of displacement due to habitat transformation should only affect avian species (both Red-data and Non Red-data) at a local level. The construction of the distribution substation at site alternative A is recommended.

The construction of the two new 400kV power lines within corridor alternative 3 and 6 are considered to be the most favourable from an avifaunal perspective. This is due to the fact that these line alternatives follow existing power line routes and traverse a largely agricultural habitat. Due to the susceptibility of Blue Cranes (identified within the study area) Lesser Flamingo and Greater Flamingo to collisions, it is imperative that anti-collision measures are implemented on the selected line.

Given the relative homogeneity of the habitat within the study area as well as existing levels of disturbance (existing power line and substation infrastructure, roads, urban development, agricultural and stock farming), the proposed project is unlikely to have a significant, long-term impact on the local avifauna, provided that mitigation measures outlined in this report are implemented.

5.4. Assessment of Potential Impacts Associated with Agricultural Potential

The soils in the area are generally sandy, with excessive drainage and limited natural fertility. Coupled with the low prevailing annual rainfall, the potential for agriculture in this area is relatively low. Most of the cultivation activities are limited by the general shallow soil depth. Due to the low agricultural potential the impact is not considered to be significant. However, the potential wind erosion threat is probably more significant, if specific mitigation measures are not implemented.

The two major potential impacts on the natural resources of the study area would be: 1) the loss of arable land due to the construction of the various types of

infrastructure and 2) potential increased risk of soil erosion. However, these impacts (if properly mitigated) would in all probability be of limited significance and would be local in extent. At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little residual impact, especially given the low prevailing agricultural potential.

The very low rainfall in the area, coupled with the generally sandy soils, means that the prevailing agricultural potential is very low, and therefore any impacts on this will be minimal.

Nature: Loss of agricultural land Land that is no longer able to be utilised due to construction of infrastructure.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	High (4)	High (4)
Significance	**Low (36)**	**Low (36)**
Status	Negative	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	
Mitigation: The main mitigation would be to ensure that as little pollution or other non-physical disturbance occurs.		
Cumulative impacts: The main potential cumulative impact would be soil removal due to wind erosion caused by developments off site. Due to the nature of the soil removal process, once topsoil is taken up into the atmosphere, wind action can deposit it over a large area and at a considerable distance, depending on the strength and duration of the wind acting upon the soils. Where a large number of developments occur in close proximity to one another, some sort of co-ordinated mitigation plan would be required to ensure that poor soil management procedures on one site do not lead to impacts on another site that actually has implemented mitigation measures correctly. Impacts on agricultural potential will be limited, mainly due to low potential of area, as well as nature of infrastructure.		
Residual impacts: None.		

Nature: Increased risk of soil erosion by wind Removal of topsoil by the action of wind due to removal of vegetation.		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)

Magnitude	Low (4)	Low (4)
Probability	High (4)	High (4)
Status	Negative	
Significance	**Low (36)**	**Low (36)**
Irreplaceable loss of resources	No.	
Can impacts be mitigated	Yes	
Mitigation: The main mitigation would be to ensure that the footprint for vegetation removal is as restricted as possible. In addition, appropriate soil conservation measures to combat wind erosion (windbreaks, geotextiles on the soil surface and immediate re-establishment of vegetation, under the supervision of a qualified vegetation specialist) should be implemented and monitored on at least a six-monthly basis.		
Cumulative impacts: Limited unless vegetation is removed over a wider area than the proposed project site.		
Residual impacts: None.		

5.4.1. Comparison of Transmission Power Line Alternatives, Transmission Substation Sites and Distribution Substation Sites

There is **no preference** for any of the identified power line routes or substation sites from an agricultural perspective. Impacts will be minimal for any option selected mainly due to low potential of area, as well as nature of infrastructure.

5.4.2. Conclusions and Recommendations

Most of the study area consists mainly of sandy soils underlain by calcrete/limestone at varying depths ranging from <300 mm to >1 200 mm. According to the average annual rainfall for this area (280 mm), the dryland crop production potential is low, combined with the marginal crop production potential of the soil, due to the low moisture-holding capacity of the sandy soils and soil depth. The overall agricultural potential is therefore low to medium-low.

It is concluded that the proposed development will not have a large impact due to the overall low agricultural potential of the areas where the construction of the transmission and distribution stations are planned. The main aspect that will have to be managed in this area if vegetation is removed will involve an increased wind erosion susceptibility due to the sandy nature of the soils.

5.5. Assessment of Potential Visual Impacts

5.5.1. Nature of Likely Views of the Development

» **Substations**

Initial activities are only likely to be visible from the immediate vicinity of the site and particularly from adjacent roads. During the latter half of the construction period as larger steel structures are erected, the infrastructure will become obvious over a wider area.

» **Substation Lighting**

It is possible that floodlighting will be used in the HV Yards. Typically this is mounted on high masts. When it is on it will provide a pool of bright within the yard. This will be obvious from a distance as a pool of bright light. It is possible that if the floodlighting is not designed appropriately that there will be light spillage outside the yard area. It is also possible if lighting is not orientated correctly that bulbs will be obvious from surrounding areas causing glare to affect sensitive receivers. It is possible that floodlighting in the HV Yards may be turned off when there is no one present. Visibility at night could therefore depend on how often people are in the HV Yards.

Often the boundary of substations is lit with security lights mounted on poles. This lighting is often required to light a corridor between a perimeter and inner security fence that may run around a substation site. Security lighting may be a continual requirement during hours of darkness or can be turned on if there is an intruder alarm or during patrols.

Substations are also usually equipped with a communications tower which due to its height may require an aviation warning light.

The nature of the lighting will make the site obvious during hours of darkness when it is on. Subject to the light fittings selected and the lighting design is also possible for glare from tall mast lighting and security lighting to spill into surrounding areas.

» **400kV Overhead Transmission Lines**

Towers could be Cross Rope, Self-Supporting or Guyed. Typically these towers range from approximately 32m to 40m in height.

Overhead transmission lines are likely to appear in the landscape progressively. Initial construction is unlikely to have a significant visual impact. Initially work will take place around each tower. Activities will be obvious over limited areas only. As work progresses, towers will become obvious in the landscape. Work is likely to take place on a limited number of

towers at any one time which means that during construction, towers will gradually appear in the landscape on a progressive basis. By the end of the construction process, when cables have been strung between towers, the full visual impact of the project will be experienced.

The operational phase is highly unlikely to result in any significant additional impact. It is possible however, that crews will be visible from time to time undertaking maintenance on individual towers.

Overhead power lines are a familiar sight within the region. Typically, from a distance, the towers are more obvious than the overhead conductors. This is because the towers are reasonably substantial structures whereas the overhead conductors have a relatively small diameter. Whilst the overhead conductors are generally not highly visible from a distance, under certain conditions, they can be made more obvious by reflected sunlight.

» **132kV Overhead Power Lines**
132kV overhead power lines are likely to be strung between either lattice towers constructed with galvanised steel sections or monopoles that are typically placed at changes in direction, at high points on the alignment and at spacing along the power line up to 250m apart. Towers used at changes in direction usually have a larger cross section in order to take directional loads imposed by the line.

5.5.2. Zones of Theoretical Visibility

Zones of Theoretical Visibility (ZTV) are defined as "a map usually digitally produced showing areas of land within which a development is theoretically visible". ZVTs of the proposed development have been assessed using Arc Spatial Analyst GIS. The assessment is based on terrain data that has been derived from satellite imagery. This data was originally prepared by NASSA and is freely available on the CIAT-CCAFS website (http://www.cgiar-csi.org). This data has been ground-truthed using a GPS as well as an online mapping programme.

Whilst the ZTV has been calculated from terrain data only, existing vegetation and development could have a significant modifying effect on the areas indicated. In generating the ZTV coverage, the following heights have been used to represent the maximum height of the elements within each section of the proposed development:

» TX Substations: 22.5m (approximate height of bus bars)
» 400 kV overhead power lines: 36.0m (approximate tower height)

Based on on-site observations indicate that the following specific limits are appropriate and have been used within the impact assessment to determine significance of impacts:

Project Element	Approximate Limit of Visual Influence
400kV overhead power lines	3.0km
132kV overhead power lines	2.5km
TX 400/132kV Sub-Station	2.0km
DX 132/66kV Sub-Station	1.0km

The proposed project elements may be visible beyond these distances up to the limit of visibility indicated in Section 5.1, however, they are unlikely to be obvious to the naked eye and they are highly unlikely to have significant influence over landscape character.

Figures 5.3 – 5.7 inclusive indicate the areas over which the proposed 400kV substations and 400kV power lines are likely to be visible from. Figure 5.8 – 5.10 inclusive indicate the areas over which the proposed 132kV substations are likely to be visible from.

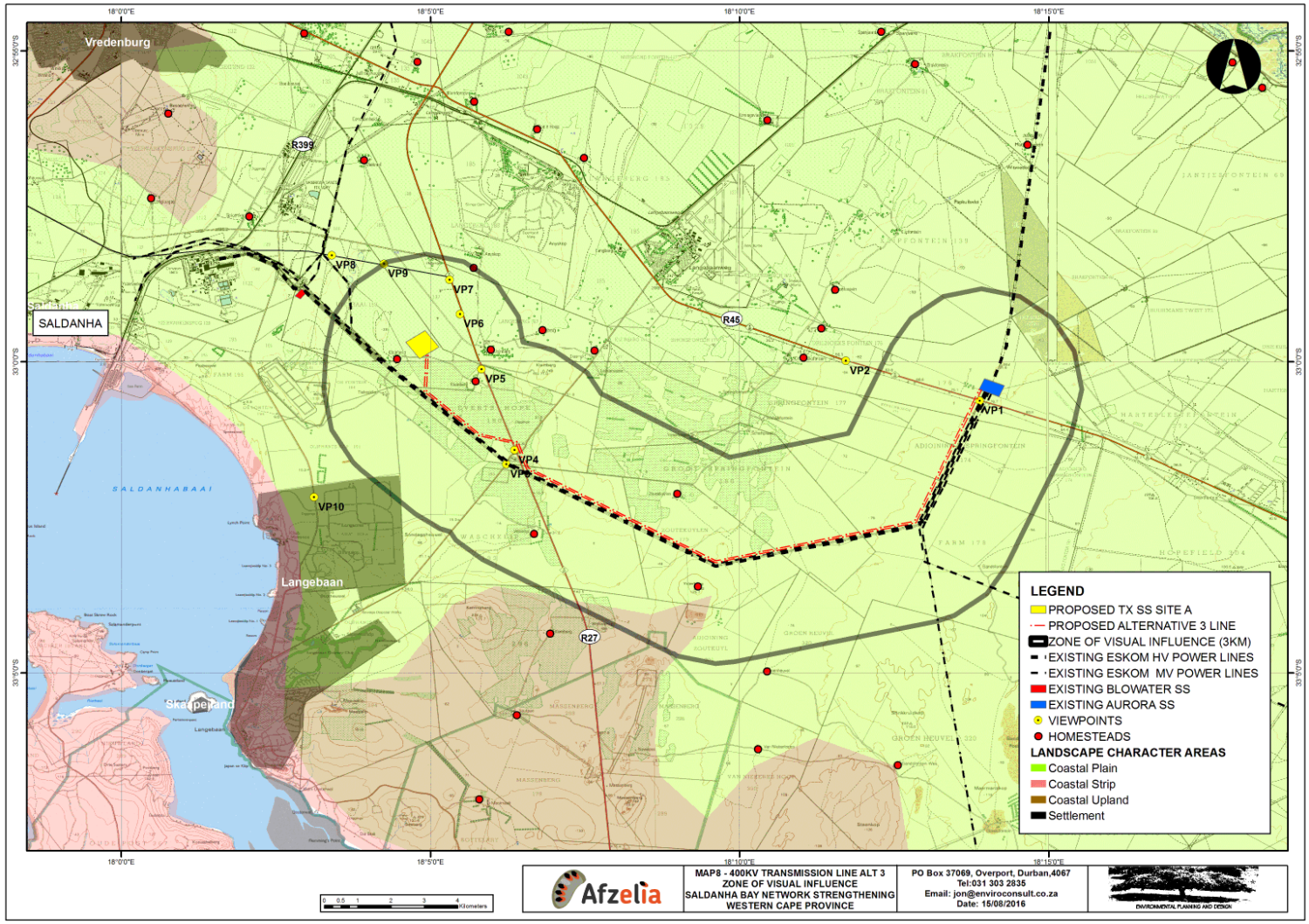

Figure 5.23: Zone of visual influence of power line Alternative 3 with TX Substation Site A

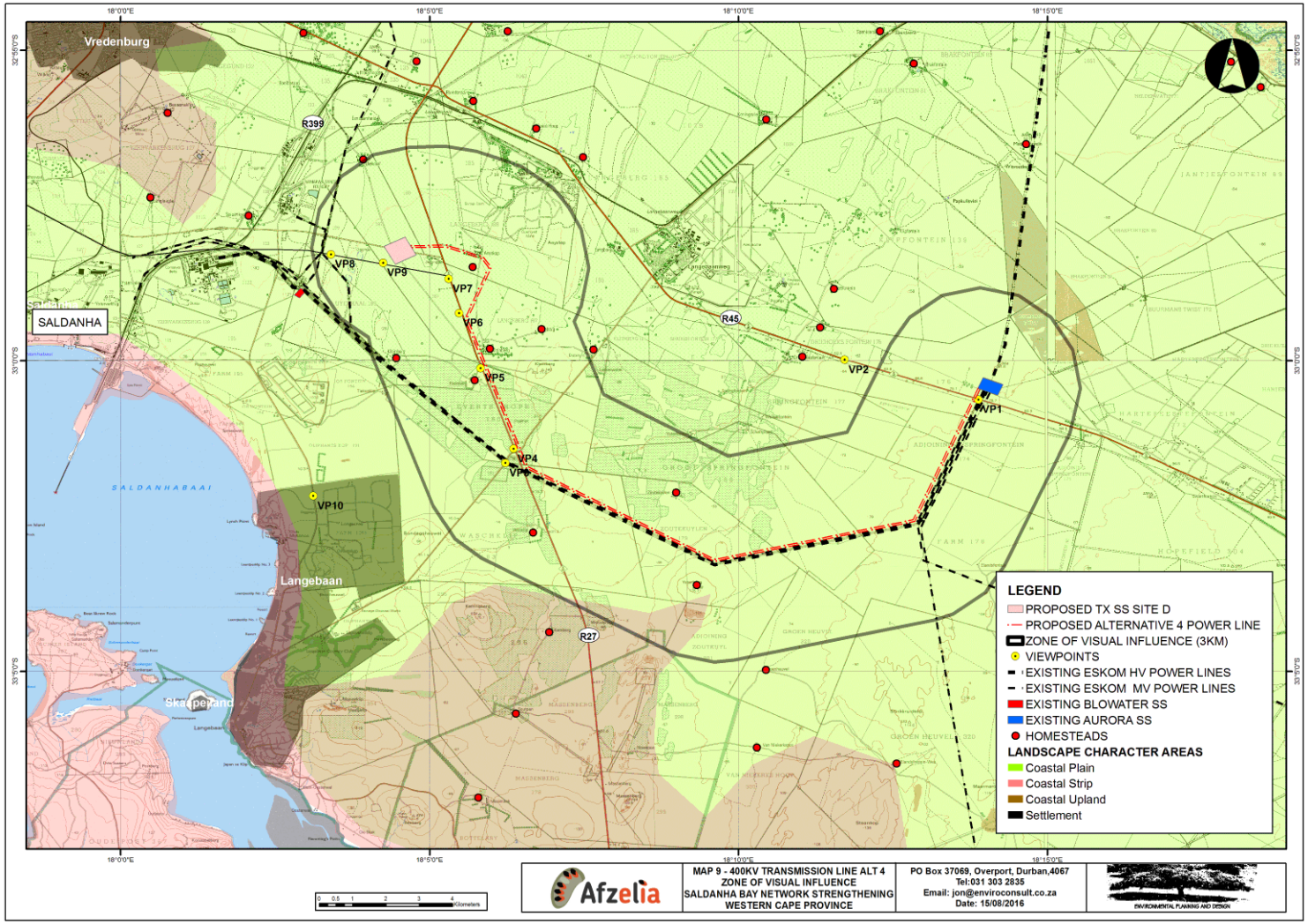

Figure 5.4: Zone of visual influence of Power line Alternative 4 with TX Substation Site D.

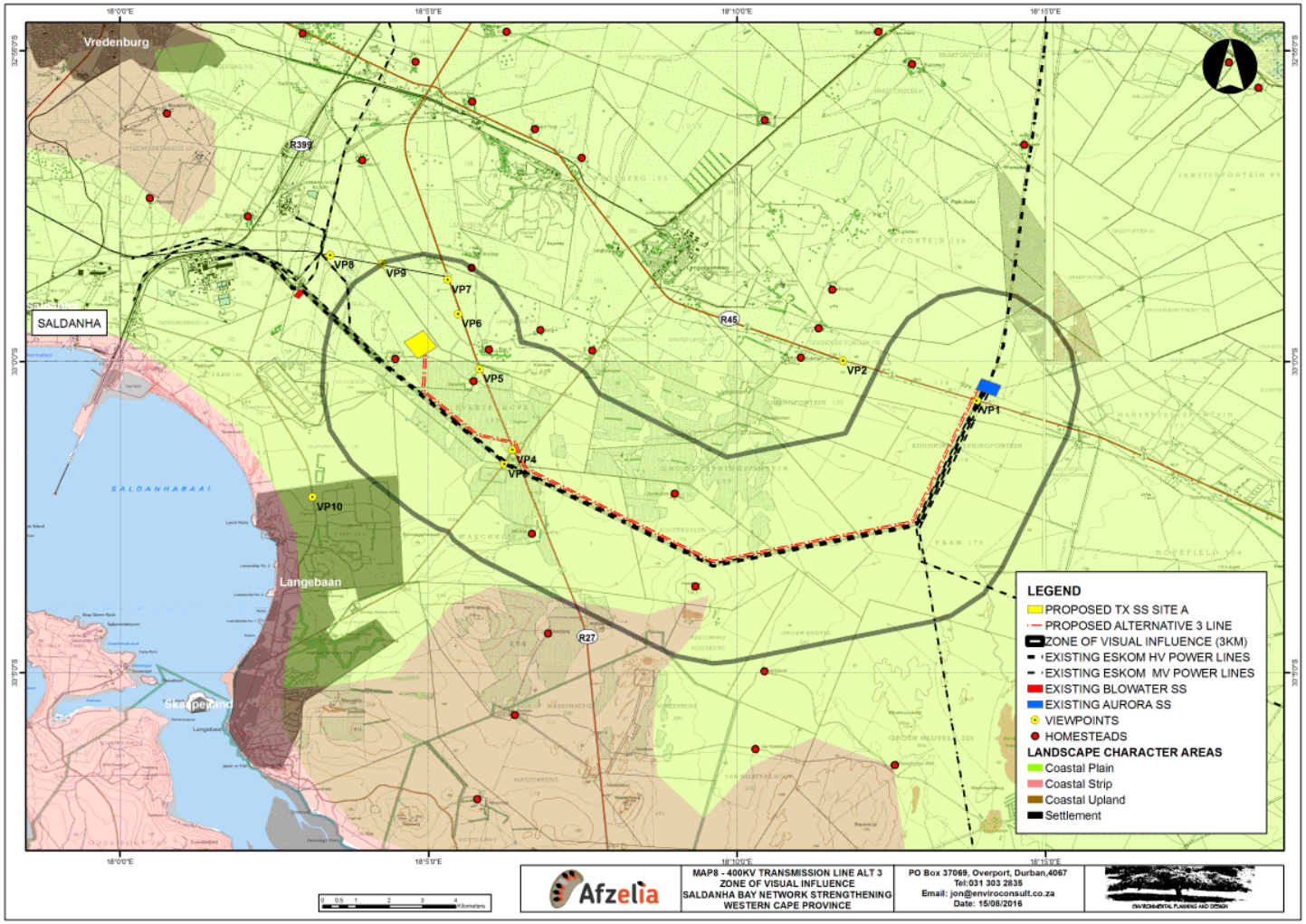

Figure 5.5: Zone of visual influence of Power line Alternative 6 with TX Substation Site F.

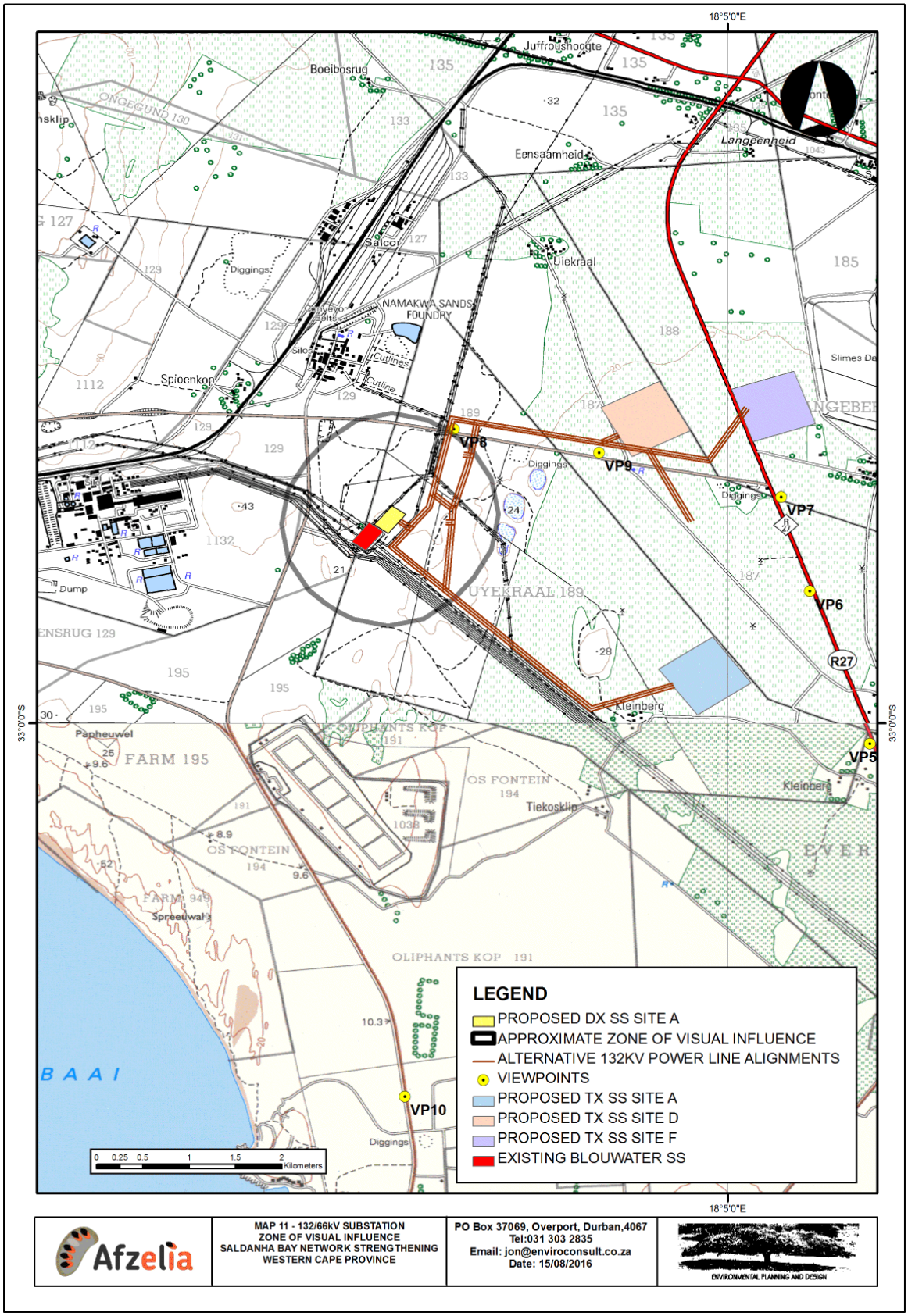

Figure 5.6: Zone of visual influence of DX Substation Site A.

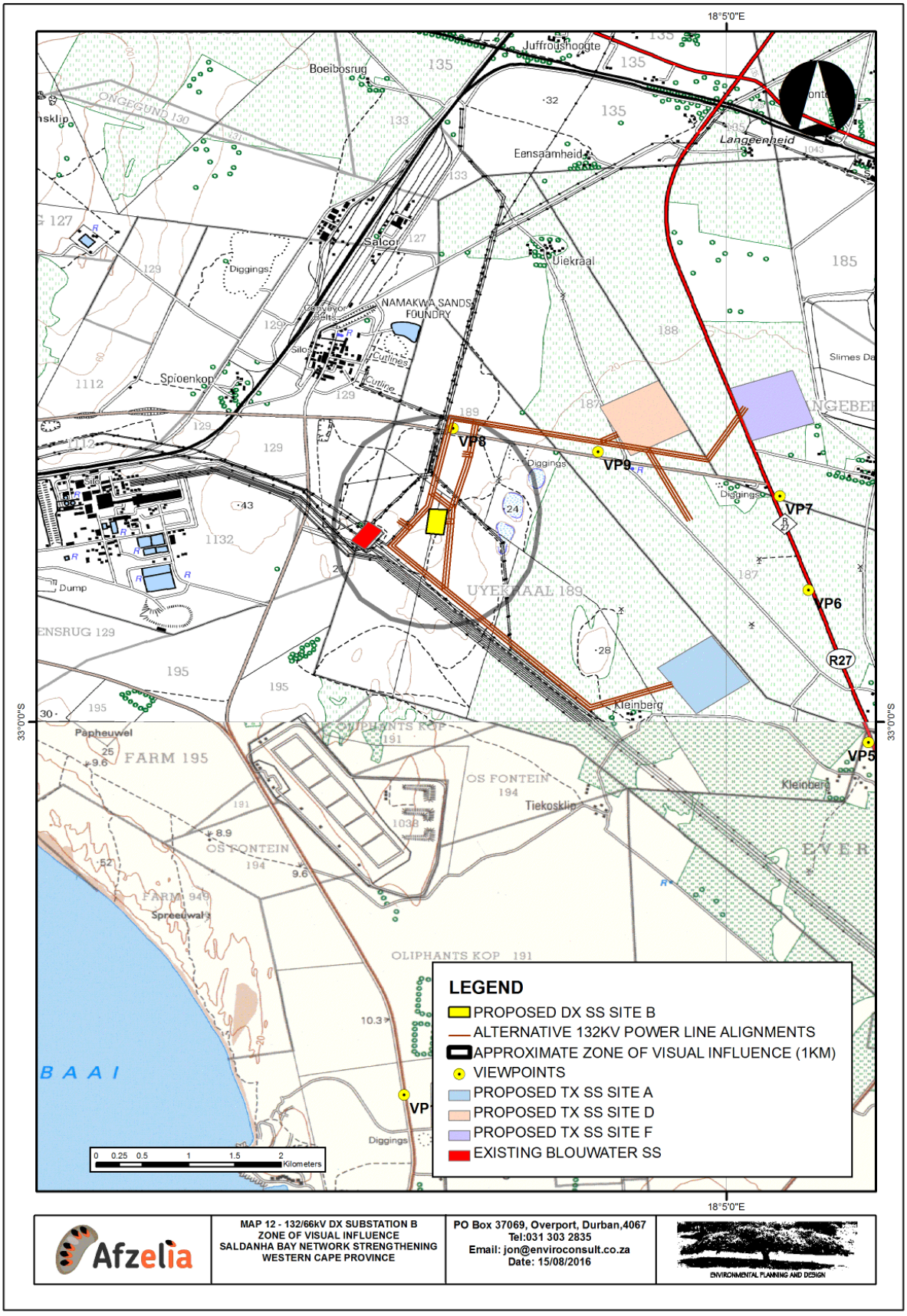

Figure 5.7: Zone of visual influence of DX Substation Site B.

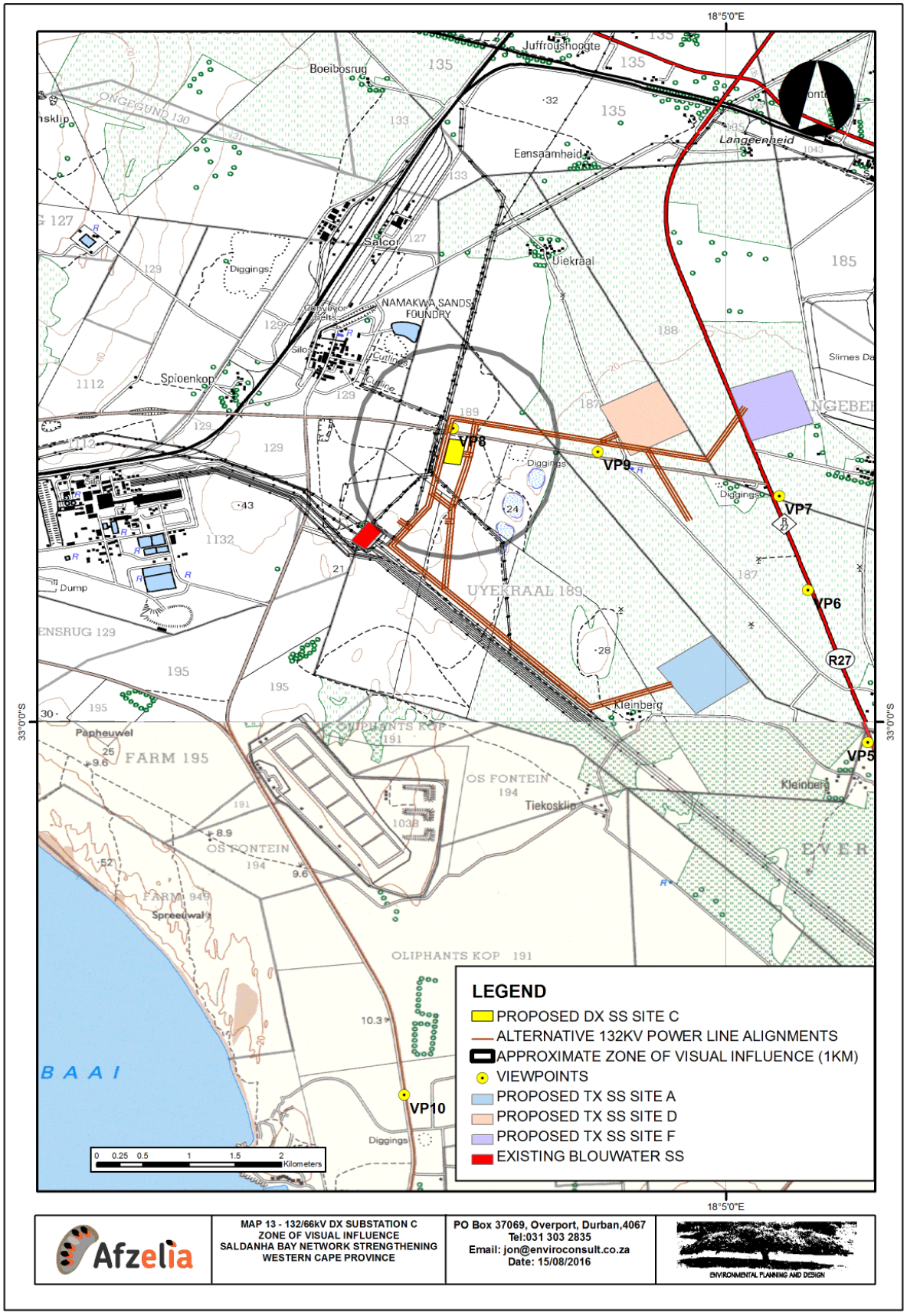

Figure 5.8: Zone of visual influence of DX Substation Site C.

5.5.3. Assessment of Potential Visual Impacts

Nature of impact: General landscape change and degradation of natural / rural characteristics.

The affected landscape is not a highly natural area it is also not a particularly cohesive rural landscape. Current landscape character is affected by major industrial operations as well as strategic electrical infrastructure. It might be best characterised as urban fringe, where the main land uses are rural but there is also a major urban influence provided by infrastructure that is generated by the urban area. All alternatives will add similar amounts of additional infrastructure into the area.

	Without mitigation
Extent	**All Alternative Schemes -** Site and immediate surroundings **(2)**
Duration	**All Alternative Schemes -** Long term **(4)**
Magnitude	**All Alternative Schemes -** Small to minor **(1)**
Probability	**All Alternative Schemes -** Improbable **(2)**
Significance	**All Alternative Schemes -** Low **(14)**
Status	The further loss of rural character is likely to be seen in a **negative** light by tourists and visitors.
Irreplaceable loss	As the development may be removed at some time in the future, it will not cause an irreplaceable loss. However because it is unlikely that the project will be dismantled in the medium to long term, it could be viewed as an irreplaceable loss by sensitive stakeholders.
Can impacts be mitigated?	Mitigation is not possible.

Mitigation / Management:

Mitigation of the ultimate impact is not possible due to the scale and nature of the development.

Cumulative Impacts:

The proposed development alternatives will be seen in different ways relative to existing infrastructure. Expected cumulative impacts are as follows:

» Power line Alternative 3 with TX Substation Site A - Low
» Power line Alternative 4 with TX Substation Site D - Medium
» Power line Alternative 6 with TX Substation Site F - High
» DX Substation Site A - Very Low
» DX Substation Site B and C -Low

Residual Risks:

Should the proposed infrastructure become redundant in the future, infrastructure would be decommissioned. Residual risk relates to the various elements being left in place and rehabilitation / re-use of the affected areas not occurring.

Nature of impact: The visibility of the facility to, and potential visual impact on homesteads that have been identified as potentially being impacted

The impact relates to further industrialisation of the outlook from homesteads.

	Without mitigation
Extent	» **Power line Alternative 3 with TX Substation Site A -** Site and immediate surroundings **(2)**

	» **Power line Alternative 4 with TX Substation Site D -** Site and immediate surroundings **(2)** » **Power line Alternative 6 with TX Substation Site F -** Site and immediate surroundings **(2)**
Duration	Long term **(4).**
Magnitude	» **Power line Alternative 3 with TX Substation Site A -** Low to moderate **(5)** » **Power line Alternative 4 with TX Substation Site D -** Moderate **(6)** » **Power line Alternative 6 with TX Substation Site F -** Moderate **(6)**
Probability	Probable **(3)**
Significance	» **Power line Alternative 3 with Substation Site A -** Medium **(33)** » **Power line Alternative 4 with TX Substation Site D -** Medium **(36)** » **Power line Alternative 6 with TX Substation Site F -** Medium **(36)**
Status	The further loss of rural character is likely to be seen in a **negative** light by residents particularly those in closest proximity to the development.
Irreplaceable loss	As the development may be removed at some time in the future, **it will not cause an irreplaceable loss**. However because it is unlikely that the project will be dismantled in the medium to long term, it could be viewed as an irreplaceable loss by sensitive stakeholders.
Can impacts be mitigated?	No mitigation is possible
Mitigation / Management: Mitigation of the ultimate impact is not possible due to the scale and nature of the development.	
Cumulative Impacts: The proposed development alternatives will be seen in different ways relative to existing infrastructure. Expected cumulative impacts are as follows: » Power line Alternative 3 with Substation Site A - Medium significance » Power line Alternative 4 with TX Substation Site D - Medium significance » Power line Alternative 6 with TX Substation Site F - Medium significance.	
Residual Risks: The residual risk relates to loss of natural landscape being obvious on decommissioning of the proposed project. In order to minimise this impact, it is critical that existing natural landscape areas in and around the development are maintained and protected and that effective rehabilitation is undertaken during and after construction as well as on closure.	

Nature of impact: The visibility of the facility to, and potential visual impact on sections of the R27, R45, R399 and local roads that have been identified as potentially being impacted

The introduction of electrical infrastructure including a major substation and HV overhead power lines in close proximity to the R27 as well as MV overhead power lines in close proximity to a minor road will further industrialise the landscape as seen from the road.

These roads are important for local and regional tourism.

	Without mitigation	With mitigation
Extent	» **Power line Alternative 3 with TX Substation Site A -** Site and immediate surroundings **(2)** » **Power line Alternative 4 with TX Substation Site D -** Site and immediate surroundings **(2)** » **Power line Alternative 6 with TX Substation Site F -** Site and immediate surroundings **(2)** » **DX Substation Site A -** Local **(1)** » **DX Substation Site B -** Local **(1)** » **DX Substation Site C -** Site and immediate surroundings **(2)**	All as without mitigation.
Duration	Long term **(4)**	Long term **(4)**
Magnitude	» **Power line Alternative 3 with TX Substation Site A -** Minor **(2)** » **Power line Alternative 4 with TX Substation Site D -** Low to Moderate **(5)** » **Power line Alternative 6 with TX Substation Site F -** Moderate **(6)** » **DX Substation Site A -** Small **(0)** » **DX Substation Site B -**Small to minor **(1)** » **DX Substation Site C -** Minor **(2)**	» **Power line Alternative 3 with TX Substation Site A -** Minor **(2)** » **Power line Alternative 4 with TX Substation Site D -** Low to Moderate **(5)** » **Power line Alternative 6 with TX Substation Site F -** Moderate **(5)**
Probability	» **Power line Alternative 3 with TX Substation Site A -** Improbable **(2)** » **Power line Alternative 4 with TX Substation Site D -** Probable **(3)** » **Power line Alternative 6 with TX Substation Site F -** Highly probable **(4)**	» **Power line Alternative 3 with TX Substation Site A -** Improbable **(2)** » **Power line Alternative 4 with TX Substation Site D -** Probable **(3)** » **Power line Alternative 6 with TX Substation Site F -** Probable **(3)**

	» **DX Substation Site A -** Very improbable **(1)** » **DX Substation Site B -** Improbable **(2)** » **DX Substation Site C -** Probable **(3)**	
Significance	» **Power line Alternative 3 with TX Substation Site A -** Low **(16)** » **Power line Alternative 4 with TX Substation Site D -** Medium **(33)** » **Power line Alternative 6 with TX Substation Site F -** Medium **(48)** » **DX Substation Site A -** Very Low **(5)** » **DX Substation Site B -** Low **(12)** » **DX Substation Site C -** Low **(24)**	» **Power line Alternative 3 with TX Substation Site A -** Low **(16)** » **Power line Alternative 4 with TX Substation Site D -** Medium **(33)** » **Power line Alternative 6 with TX Substation Site F -** Medium **(33)**
Status	The further loss of rural character is likely to be seen in a **negative** light by residents, visitors and tourists using roads particularly those in closest proximity to the development.	
Irreplaceable loss	As the development may be removed at some time in the future, **it will not cause an irreplaceable loss**. However because it is unlikely that the project will be dismantled in the medium to long term, it could be viewed as an irreplaceable loss by sensitive stakeholders.	
Can impacts be mitigated?	Impacts associated with TX substation alternatives particularly on the R27can be partly mitigated through screen planting. It is not appropriate to mitigate the impact of the DX substation alternatives on the minor road to the north as vegetation in this area is relatively natural.	

Mitigation / Management:

Planning:

» Plan screen planting.

Construction:

» Minimise disturbance;

» Undertake screen planting.

Operations:

» Maintain screen planting.

Cumulative Impacts:

The proposed development alternatives will be seen in different ways relative to existing infrastructure. Expected cumulative impacts are as follows:

» Power line Alternative 3 with TX Substation Site A - Low significance

» Power line Alternative 4 with TX Substation Site D - Medium significance

» Power line Alternative 6 with TX Substation Site F - High significance » DX Substation Site A - Very Low significance » DX Substation Site B - Low significance » DX Substation Site C - Low significance
Residual Risks: Should the proposed infrastructure become redundant in the future, infrastructure would be decommissioned. Residual risk relates to the various elements being left in place and rehabilitation / re-use of the affected areas not occurring.

Nature of impact: The visibility of the facility to, and potential visual impact the towns of Langebaan, Saldanha and Vredenburg

The edges of all of these settlements are outside the approximate limit of visual influence of the development. Whilst elements may be visible to the careful viewer, they will not be obvious to the casual viewer. This issue is therefore not likely to be significant.

	Without mitigation	**With mitigation**
Extent	**All Alternatives -** Site and immediate surroundings **(2)**	-
Duration	**All Alternatives -** Long term **(4)**	**-**
Magnitude	**All Alternatives -** Small to minor **(1)**	**-**
Probability	**All Alternatives -** Improbable **(2)**	**-**
Significance	**All Alternatives -** Low **(14)**	**-**
Status	The further loss of rural character is likely to be seen in a **negative** light by residents, visitors and tourists particularly those in closest proximity to the development.	
Irreplaceable loss	No irreplaceable loss.	
Can impacts be mitigated?	Mitigation is not necessary.	

Mitigation / Management:
None required.

Cumulative Impacts:
No cumulative impact.

Residual Risks:
No residual risk.

Nature of impact: The visibility of the facility to, and potential visual impact on the West Coast National Park, the Elandsfontein Private Nature Reserve and areas of high natural scenic quality

These areas are outside the approximate limit of visual influence of the development. Whilst elements may be visible to the careful viewer, they will not be obvious to the casual viewer. This issue is therefore not likely to be significant.

	Without mitigation	**With mitigation**
Extent	**All Alternatives -** Site and immediate surroundings **(2)**	-

Duration	**All Alternatives -** Long term **(4)**	**-**
Magnitude	**All Alternatives -** Small to minor **(1)**	**-**
Probability	**All Alternatives -** Improbable **(2)**	**-**
Significance	**All Alternatives -** Low **(14)**	
Status	The further loss of rural character is likely to be seen in a **negative** light by residents, visitors and tourists particularly those in closest proximity to the development.	
Irreplaceable loss	No irreplaceable loss.	
Can impacts be mitigated?	Mitigation is not necessary.	
Mitigation / Management: None required.		
Cumulative Impacts: No cumulative impact		
Residual Risks: Should the proposed infrastructure become redundant in the future, infrastructure would be decommissioned. Residual risk relates to the various elements being left in place and rehabilitation / re-use of the affected areas not occurring.		

Nature of impact: The visibility of the facility to, and potential visual impact on the coastal strip and particularly areas that is important for tourism and recreational use

These areas are outside the approximate limit of visual influence of the development. Topography also generally screens the development from this area. The development is therefore highly unlikely to be visible.

	Without mitigation	**With mitigation**
Extent	**All Alternatives -** Site and immediate surroundings **(2)**	-
Duration	**All Alternatives -** Long term **(4)**	**-**
Magnitude	**All Alternatives -** Small **(0)**	**-**
Probability	**All Alternatives -** Very improbable **(1)**	**-**
Significance	**All Alternatives -** Very Low **(6)**	**-**
Status	The further loss of rural character is likely to be seen in a **negative** light by residents, visitors and tourists particularly those in closest proximity to the development.	
Irreplaceable loss	No irreplaceable loss.	
Can impacts be mitigated?	Mitigation is not necessary.	
Mitigation / Management: None required.		
Cumulative Impacts: No cumulative impact.		
Residual Risks: No residual risk.		

Nature of impact: The possible impact of lighting associated with the project

It is likely that lighting will be associated with all substations and will include;

» Security lighting at the fence line;
» Operational lights (occasional lights to ensure on site safety around staff areas) associated with offices and staff rest / ablution facilities; and
» Working lights (flood lighting) associated with HV yards in order that urgent maintenance can be undertaken.

	Without mitigation	**With mitigation**
Extent	**All Substations -** Site and immediate surroundings **(2)**	**All Substations -** Site and immediate surroundings **(2)**
Duration	**All Substations -** Long term **(4)**	**All Substations -** Long term **(4)**
Magnitude	» **TX Substations -** Low **(4)** » **DX Substations -** Low **(2)**	» **TX Substations -** Low **(2)** » **DX Substations -** Small **(0)**
Probability	**All Substations -** Probable **(3)**	**All Substations -** Improbable **(2)**
Significance	» **TX Substations -** Low to medium **(30)** » **DX Substations -** Low **(24)**	» **TX Substations -** Low **(16)** » **DX Substations -** Low **(12)**
Status	» Residents in close proximity to substations are likely to view lighting as a negative issue. » It is also likely that night time visitors to protected areas might view lighting as a negative issue. » Other people who are not in close proximity to substations at night for any length of time are likely to see lighting as a neutral issue.	All stakeholders are likely to see occasional lighting as a neutral issue.
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	The impact can be partly mitigated through careful design and use of lighting.	

Mitigation / Management:

Planning:

» Plan lighting to:
  a. Minimise the use of lighting to absolute necessities.
  b. Investigate the use of an infra-red security lighting and camera system with normal security lighting coming on only when there is a security breach.
  c. Break the HV Yard lighting up into different circuits so only the area to be accesses or worked in is lit.
» Ensure that lighting specification and design is undertaken to minimise light pollution on surrounding areas. This should include:
  a. Ensuring that there is no light spill outside the HV yard / fence line.
  b. Ensuring that all fittings are hooded to prevent glare.

Construction:

» Ensure that planned measures are implemented. » Ensure that temporary lighting used during construction minimises light spill and avoids glare particularly for adjacent roads. <u>Operations:</u> » Maintain lighting and ensure that the planned scheme is not amended or extended in a way that would extend light pollution.
Cumulative Impacts: All TX Substation alternatives - Low to medium significance.
Residual Risks: No residual risk.

5.5.4. Comparison of Transmission Power Line and Transmission Substation Alternatives

Power line Alternative 3 with TX Substation Site A will largely impact sections of the R27 and local roads that are already impacted by electrical infrastructure including major HV power line servitudes. This alternative will be largely viewed in the context of this existing infrastructure. It is likely that this alternative will impact six homesteads. However, these homesteads are already impacted by electrical infrastructure.

Power line Alternative 4 with TX Substation Site D, over approximately half its length this power line alternative will run parallel with and close to existing HV power lines. However over its western most section, this alternative power line will diverge from existing power line servitudes and will run close to and parallel to the R27 creating impacts along a new 7.5km section of this road. This alternative will also require a new 132kV power line to run parallel and close to a section of local road.

Whilst the proposed TX substation will be set back from the R27 which will help to mitigate impacts on this road, it will also be located close to a local road. Power line Alternative 6 with TX Substation Site F, will generally have similar visual impacts as Powerline Alternative 4 with TX Substation Site D. However, because Substation D is close to the R27, visual impact on the R27 is anticipated to be greater.

Both Power line Alternative 4 with TX Substation Site D and Power line Alternative 6 with TX Substation Site F would significantly extend impacts of electrical infrastructure particularly on the R27 which is an important tourist route used by visitors to the West Coast. It is suggested that these should only be considered if there are significant biodiversity or social issues that are likely to outweigh the importance of visual perceptions of the area.

5.5.5. Comparison of Distribution Substation Sites and associated 132kV Power Lines

Visual impacts associated with the proposed DX substation alternatives are anticipated as relatively low.

DX substation Alternative A being located furthest from local roads and immediately adjacent to the existing Blouwater Substation is likely to be barely visible from local roads and surrounding areas. Alternative B is likely to be slightly more visible and Alternative C will be highly obvious from a small section of a local road.

As it will largely be screened by landform, **DX Substation alternative A** and the associated 132kV power lines between this substation and the transmission substation are **preferred** on visual grounds. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

5.5.6. Conclusions and Recommendations

The proposed development will occur within the Coastal Plain LCA as defined above. This is an area where rural land uses currently provide the main landscape character influencing elements. However, rural characteristics are diluted to a large degree in areas by infrastructure development including existing electrical infrastructure.

The main sensitive areas including the edges of urban areas, the coastal strip and protected areas to the south all fall outside the areas of visual influence noted above and are therefore highly unlikely to be impacted to any significant degree.

The main visual issues relate to roads that run through the area that are important for tourism related traffic as well as local homesteads. The proposed development alternatives will be seen in different ways relative to existing infrastructure. Impacts are expected to be low to moderate for all impacts identified.

5.6. Potential Impacts on Heritage Sites and Palaeontology

5.6.1. Assessment of Potential Impacts on Heritage Sites

Identified heritage indicators within the study area include:

» archaeological resources in the form of several historical ruins that lie beneath the proposed Transmission Line Alternative 4 and 6 alignments (largely Grade IIIC but some NCW);

» palaeontological resources in the form of buried fossils which are likely to occur widely beneath the broader area (largely Grade IIIB but potentially as high as Grade I); and
» the cultural landscape which is a combination of a historical agricultural landscape, an area of relatively natural landscape and a modern electrical and industrial landscape (Grade IIIC).

Although other resources like structures (suggested up to Grade IIIB) and the R45 scenic route (suggested Grade IIIB) are present, they will not be unduly impacted.

The only project components likely to result in archaeological impacts are Transmission Line Alternatives 4 and 6 as they run directly above some historical ruins. As a worst case scenario it is assumed that these ruins may need to be levelled in order to clear the transmission corridor. Due to the low cultural significance of these sites, this would not be considered a fatal flaw and the extent of the impacts would be local. Indirect impacts are not expected. With total destruction of the historical ruins along Transmission Line Alternatives 4 and 6 the impacts could be of medium significance. With mitigation this would be reduced to low significance. Impacts to archaeological resources for all other potential project components are considered to be of low significance and therefore no mitigations measures are required for these components.

Nature: **Direct disturbance and/or destruction of archaeological resources within the development footprint of Transmission Line Alternatives 4 and 6**		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (2)	Small (1)
Probability	Probable (3)	Very improbable (1)
Significance	**Low (24)**	**Low (7)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: The ideal mitigation in this instance is to avoid the ruins in question and leave them as they are. The alternative would be to record their layouts (measured drawings) and construction techniques and materials in detail prior to demolition.		
Cumulative impacts: Potential cumulative impacts to archaeological resources for Transmission Line Alternatives 4 and 6 are likely to be of low significance both before and after mitigation.		
Residual impacts: Heritage resources are non-renewable. If directly impacted resources will be permanently lost.		

Nature: **Direct disturbance and/or destruction of archaeological resources within the development footprint of Transmission Line Alternative 3 and all Distribution Line and Transmission and Distribution Substation Alternatives**		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Small (0)	Small (0)
Probability	Very improbable (1)	Very improbable (1)
Significance	**Low (5)**	**Low (5)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Not required	
Mitigation: As no significant impacts are expected and the chances of any impacts at all ae very low, no mitigation measures are suggested.		
Cumulative impacts: Potential cumulative impacts to archaeological resources for Transmission Line Alternative 3, and all distribution line and substation alternatives are likely to be of low significance both before and after mitigation.		
Residual impacts: Heritage resources are non-renewable. If directly impacted resources will be permanently lost.		

5.6.2. Assessment of Potential Impacts on Palaeontological Sites

It is entirely possible that excavations into sediments not normally accessible to palaeontologists will encounter fossils in sub-surface deposits, particularly in the Velddrif, Springfontyn, Langebaan and Varswater Formations. Although the potential to impact on highly significant palaeontological material does exist, such material would be unknown to science until such time as the impact occurs. For this reason, the impact, if mitigated appropriately, is regarded as being a positive one because it may provide opportunities to recover potentially important fossils that enable observations that could otherwise not have been made. Although extensive impacts could occur, the above positive aspect and the screening from the berm means there is no fatal flaw.

In spite of relatively good borehole coverage, which provides a framework, the depth of potentially fossil-bearing sediments is largely unknown and difficult to assess without excavation; it is thus not possible to exclude the possibility that sparsely-distributed sub-surface fossils may be encountered during any excavations into the surface. Small pockets of bone can occur, for instance, where bone accumulators like hyaenas, jackals or porcupines used holes/burrows dug by aardvarks; older and younger sediments, too, may contain ancient wetland deposits and/or more-recent sub-fossils.

Due to the potentially high cultural significance of fossils in the study area (and known national significance of the WCFP), the extent of impacts is given a high rating. Because of the potential size and depth of excavations, the overall significance of impacts before mitigation is rated as being high. After mitigation the impacts would only be of medium significance but would be considered positive because of the potential contribution that mitigation could make to science. Indirect impacts are not expected. As the excavations required for the various power line alternatives would be far smaller than those for the substations, the potential impacts for all power lines alternatives are less likely to occur and are rated as of low significance both before and after mitigation.

Nature: **Direct disturbance and/or destruction of palaeontological resources within the substation development footprint (all alternatives)**		
	Without mitigation	**With mitigation**
Extent	Regional (5)	Regional (5)
Duration	Permanent (5)	Permanent (5)
Magnitude	High (8)	Minor (2)
Probability	Highly probable (4)	Highly probable (4)
Significance	**High (74)**	**Medium (48)**
Status	Negative	Positive
Reversibility	Low	low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Full-time monitoring by an appropriately-qualified person must be carried out at all substation locations until bulk earthworks are completed. Any fossils found must be recorded following accepted palaeontological standards and the material collected for curation in an approved repository where it will be available for future research.		
Cumulative impacts: Almost all developments in the Saldanha Bay region that involve excavations will result in some sort of impacts to palaeontological resources. Cumulative impacts are thus almost certain to occur. For the substations, which would likely require fairly substantial foundation excavations, the significance of cumulative impacts without mitigation is regarded as high and negative. However, application of the suggested mitigation measures would reduce this to medium significance but the impacts would be positive because of the potential contributions to science that may result from successful mitigation.		
Residual impacts: Palaeontological resources are non-renewable. If directly impacted resources will be permanently lost.		

Nature: **Direct disturbance and/or destruction of palaeontological resources within the power line development footprint (all alternatives)**		
	Without mitigation	**With mitigation**

Extent	Regional (3)	Regional (3)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Minor (2)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (24)**	**Low (20)**
Status (positive or negative)	Negative	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: As the limited likelihood of encountering significant fossils, monitoring can be conducted by an environmental officer (EO) and by project staff, all of whom who should be appropriately briefed beforehand. Any fossils found must be protected, preferably *in situ*, and reported to a palaeontologist for inspection, assessment and collection if necessary. The find should be recorded following accepted palaeontological standards and the material deposited for curation in an approved repository where it will be available for future research.		
Cumulative impacts: Almost all developments in the Saldanha Bay region that involve excavations will result in some sort of impacts to palaeontological resources. Cumulative impacts are thus almost certain to occur. The power line alternatives would all require small excavations, which means that the chances of encountering fossils is much less. Nevertheless, similar excavations across the broader area would probably result in potential cumulative impacts of medium significance both before and after mitigation		
Residual impacts: Palaeontological resources are non-renewable. If directly impacted resources will be permanently lost.		

5.6.3. Assessment of Potential Impacts on Cultural Landscape

It should be noted that the assessment in this section refers only to the surface landscape as viewed and experienced by people in the area. It specifically excludes impacts to the fossil landscape which have been assessed under the section above.

As a result of the already highly compromised nature of the landscape within and around the study area, impacts are likely to be of low significance. The proposed developments would only be adding to an existing electrical infrastructure layer on the landscape. There are no fatal flaws. Although the impacts are not considered significant from a heritage point of view, it should be noted that the calculated impact significance is indicated as medium due to the permanent duration and certainty that the impacts would occur. Mitigation of cultural landscape impacts would generally involve screening the development. However, because of the nature and size of the proposed new infrastructure, there are no feasible/practical mitigation measures that could be suggested to reduce the expected impacts.

***Nature:* Disruption/degradation of the cultural landscape within the broader area**		
	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Minor (1)	Minor (1)
Probability	Definite (5)	Definite (5)
Significance	**Medium (35)**	**Medium (35)**
Status (positive or negative)	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	No practical measures possible	
Mitigation: There are no feasible/practical mitigation measures that could reduce the impacts to the landscape.		
Cumulative impacts: As a result of the already highly compromised nature of the landscape within and around the study area, the potential cumulative impacts to the cultural landscape are considered to be of low significance from a heritage point of view.		
Residual impacts: None. Impacts would be removed once the project is decommissioned.		

5.6.4. Comparison of Transmission Power Line and Substation Alternatives

Due to the archaeological resources located along the shared Transmission Line Alternative 4 and 6 corridor, the use of **Transmission Line Alternative 3 is preferred**. This will also reduce the degree to which the power lines are visible from the R27, and result in better clustering of the lines. As such, **Transmission Substation Alternative A** is also preferred so that the majority of electrical infrastructure can be placed on the western side of the R27 where all other industrial and electrical infrastructure currently sits. Should Transmission Line Alternative 4 or 6 be used, then Transmission Substation D is preferred over Alternative F so that the majority of infrastructure will be west of the R27 and the substation would be further away from the WCFP.

5.6.5. Comparison of Distribution Substation Sites and associated 132kV Power Lines

In terms of the Distribution Substations, **Alternative A** and the associated 132kV power lines between this substation and the transmission substation are **preferred** as this option concentrates impacts alongside the existing Blouwater Substation. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities

would be consolidated into a single area. Distribution Substation Alternative C is least preferred because of its proximity to a main road.

5.6.6. Conclusions and Recommendations

Although archaeological resources and the cultural landscape may be negatively affected by the proposed project, the significance of impacts to these resources will be low. There is, however, the potential for highly significant impacts to palaeontological resources to occur. These are deemed manageable and, in fact, positive impacts will be felt with the implementation of successful palaeontological mitigation. Given the limited information available at present, any fossil finds should be treated as significant and would require careful recording and possible systematic excavation in order to ensure that benefits are derived.

This assessment has demonstrated that the proposed project is feasible and that there are no fatal flaws from a heritage perspective. The requirement of HWC to specifically assess archaeological and palaeontological resources as part of the HIA has been met.

Section 38(3)(d) requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development. The present project will ensure a sustainable electricity supply for the further industrial development of the Saldanha Bay IDZ. The negative impacts to heritage resources are not of such a significance as to outweigh the social benefits of the project. In addition, the palaeontological impacts will be positive with mitigation.

As the mitigation and management of any archaeological and palaeontological impacts that might arise are entirely feasible, it is recommended that the proposed project be allowed to proceed from a heritage point of view. However, the preference for Transmission Line Alternative 3, Transmission Substation Alternative A and Distribution Substation Alternative A are stressed. The following recommendations are relevant and should be incorporated into the environmental authorisation for the project as relevant:

» If Transmission Line Alternatives 4 or 6 are authorised, then archaeological mitigation of the historic ruins should take place under a workplan approved by HWC if they cannot be preserved in situ.
» Full-time palaeontological monitoring of both authorized substation foundations (any Alternatives) is required under a workplan approved by HWC. The workplan must include provision for the collection and recording of any fossils unearthed during construction.

» Training in the identification of fossils should be provided to project staff (construction workers, excavator operators and the EO) who should be instructed to watch for fossils and report any discoveries.
» Any fossil material recovered during the course of the project should be properly recorded and then lodged with an appropriate repository.
» If any further archaeological and/ or palaeontological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist or palaeontologist. Such heritage is the property of the state and may require excavation and curation in an approved collection repository.

5.7. Potential Impacts on the Social Environment

The following of key potential social impacts were identified to be associated with the project within the Scoping Phase and through the EIA:

Construction Phase:
The potential issues and impacts for the construction phase of the proposed development have been identified as follows:

» Positive
  * Employment opportunities and skills development
  * Economic multiplier effects
» Negative
  * Pressure on economic and social infrastructure impacts from an in-migration of people (pressure on municipal services)
  * Impacts on daily living and movement patterns (intrusion impacts)
  * Safety and security risks
  * Nuisance impacts (noise and dust impacts)

Operation Phase:
The potential issues and impacts for the operation phase of the proposed development have been identified as follows:

» Positive
  * Employment opportunities and skills development
  * Local procurement for general goods and services
  * Providing electricity network capacity
» Negative
  * Visual impact and sense of place impact
  * Impacts associated with the loss of agricultural land
  * Impact on tourism

Cumulative Impacts:

Possible cumulative impacts as a result of other similar electricity network strengthening projects in the area could have cumulative negative and positive impacts for the local community.

» Negative
  * Cumulative impacts on the sense of place and landscape (visual impacts)
  * Cumulative Impacts on land use
  * Cumulative impact associated with pressure on economic and Social Infrastructure from in-migration of people

This section provides a detailed description and assessment of these potential social impacts associated with the construction, operation and decommissioning phases of the proposed Saldanha Bay Strengthening Project and associated infrastructure.

5.7.1. Potential Impacts during Construction

Impacts associated with the construction phase of a project of this nature are usually of a short duration (approximately 36 months) and temporary in nature, but could have long-term effects on the surrounding social environment if not managed appropriately. Imported labour is usually housed in residential homes rented in the local area. No site camps are expected to be erected.

Nature: The creation of employment opportunities during the construction phase

The construction of the proposed power line and substations will create employment opportunities for both the local communities and at a regional and national level as some of the skills may not be available locally. Based on information provided by Eskom, it is estimated that during the construction phase (for the period of 36 months) about 150 employment opportunities will be generated by the project. In terms of skill requirements, the highly skilled or skilled labour such as engineers, technical staff and project managers usually constitute about 20% of the workforce. Semi-skilled labourers for operation of machinery will make up about 30%, while the unskilled labourers such as general construction and security personnel will constitute about 50% of the entire workforce. Employment opportunities will be higher during construction with minimal opportunities during the operation phase.

The SBLM has a 58.9% of economically active population seeking employment and an unemployment rate of 23.4%. The majority of the population of SBLM have low skill levels and 48.4% of household incomes falling within poverty levels (R0 – R38200 per annum). Approximately 42% of the residents of SBLM have some secondary education. The proposed development will therefore have a positive social benefit to the SBLM communities.

Job opportunities will be available for low skilled (construction, security and maintenance

workers) and semi-skilled workers, which can be sourced from the local area. Where need be construction workers could be sourced from the nearest local towns of Saldanha, Vredenburg, Hopefield and Langebaan. Due to the small population sizes of these towns and their education level, not all skills needed for the project can be sourced from the local community. Some of the labour will have to be sourced from within the West Coast District Municipality (WCDM) or the Western Cape province. While the local labour pool may be qualified for less-skilled jobs, often local hiring will not meet the demands in professional, technical and supervisory areas. A number of specialist contractors would most likely be brought in from other areas.

	Without enhancement	**With enhancement**
Extent	Local- Regional (3)	Local- Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Low (3)	Moderate (5)
Probability	Highly probable (4)	Highly probable (4)
Significance	**Medium (32)**	**Medium (40)**
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources	N/A	
Can impacts be enhanced	Yes	

Enhancement measures:

In order to enhance the local employment and business opportunities associated with the construction phase the following measures should be implemented:

» Efforts should be made to employ local contractors that are Broad Based Black Economic Empowerment (BBBEE) compliant.
» A local employment policy should be adopted to maximise the opportunities made available to the local labour force.
» Employment opportunities for the local areas of Saldanha and Vredenburg should be enhanced. If this is not possible due to limited skills, then the broader focus areas should be considered for sourcing workers such as WCDM and the WCP.
» Set up labour desk in a secure and suitable area to discourage the gathering of people at the gates of the construction site.
» Promote gender equality and the employment of women wherever possible.

Cumulative impacts:

The establishment of a number of projects in the area does have the potential to have a positive cumulative impact in terms of employment and business opportunities. The nature and extent of the positive benefits is dependent on various strategies that will be adopted by developers. For the local communities to realise the benefits, local employment policies should be adopted and local service providers utilised by developers in the area.

Residual impacts:

» Economic growth for small-scale entrepreneurs.
» The community members who were part of the construction team would have gained some skills which could assist them in finding new employment opportunities.

Nature: Economic multiplier effects from the use of local goods and services

Local businesses are likely to have an opportunity to provide goods and services during the construction phase of the proposed development. Due to the proximity of the development area to towns, it is not expected that there would be a need for accommodation on site. Certain professionals not resident in the area will require accommodation. The landowners who have lodge facilities (such as Thali Thali game lodge and the Stigling farm) have indicated that accommodation could be available. The Stigling farms also has storage facilities that could be leased to Eskom or the contractor should this be required for safekeeping of material during construction.

The economic multiplier effects from the use of local goods and services opportunities will include, but is not limited to, construction materials and equipment and workforce essentials such as services, catering, trade clothing, safety equipment, accommodation, transportation and other goods.

The capital expenditure associated with the construction of the project and proposed power lines and substations is estimated to be in the region of R800 million at current prices. About 50% of that amount will be spent locally on goods and services required for the strengthening project. Expenditure during the construction phase will create business opportunities for the regional and local economy. The increase in demand for new materials and services in the nearby area may stimulate local business and local economic development. There is likely to be a direct increase in industry and indirect increase in secondary businesses. The implementation of the enhancement measures below can enhance the opportunities for locally based companies.

The injection of income into the area in the form of wages will represent an opportunity for the local economy and businesses in the area. Through the stimulation of employment and income there will be creation of new demand within the local and regional economies. Increased income leads to a boost in expenditure on goods and services in the area. Indirect impacts would occur as a result of the new economic development, and would include new jobs in businesses that support the expanded workforce or provide project materials. The intention is to maximise local labour employment opportunities. This is likely to have a positive impact on local communities and have downstream impacts on household income, education and other social aspects.

	Without enhancement	**With enhancement**
Extent	Local- regional (3)	Local- Regional (3)
Duration	Short term (2)	Short term (2)
Magnitude	Low (4)	Moderate (6)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Medium (33)**
Status	Positive	Positive
Reversibility	N/A	
Irreplaceable loss of resources	N/A	
Can impacts be enhanced	Yes	

Enhancement: » A local procurement policy should be adopted to maximise the benefit to the local economy. » A database of local companies, specifically the historically disadvantaged (HD) which qualify as potential service providers (e.g. construction companies, security companies, catering companies, waste collection companies, transportation companies etc.) should be created or consulted prior to the tender process and invited to bid for project-related work where applicable. » Local procurement should be encouraged along with engagement with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods and products from local suppliers.
Cumulative impacts: Impacts are expected to be moderate should other similar projects be developed in the area at the same time as the proposed project.
Residual impacts: Improved local service sector and growth in local business.

Nature: Temporary increase in safety and security concerns associated with the influx of people during the construction phase

The perceived decline of security during the construction phase of the proposed project due to the influx of workers and/ or outsiders to the area (as influx of newcomers or jobseekers are usually associated with an increase in crime) may have indirect effects such as increased safety and security issues for neighbouring properties and damage to property, increased risk of veld fires, stock theft, poaching, crime and so forth.

Safety and security impacts are a reality in South Africa which need to be addressed through appropriate security measures. Majority of the impacted and adjacent farm owners utilise their farms for cultivation, livestock and game farming. Landowners consulted indicated a concern about the security of their animals. In addition, increased fire risk as a result of people working in the area could be a concern. It is essential for the appointed contractor to consult with the landowners to implement specific security measures.

In terms of safety, the landowners are currently concerned about the Eskom maintenance personnel leaving the gates that lead into their farms open, which pose security threats specifically to their livestock. Infrastructure such as gates, roads and fencing should be maintained in the present condition or repaired, if disturbed due to project activities. The contractor should be responsible for managing this impact on private property.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Improbable (2)
Significance	**Medium (30)**	**Low (16)**
Status	Negative	Negative
Reversibility	Yes	

Irreplaceable loss of resources	No
Can impacts be mitigated	Yes

Mitigation:

» Working hours should be kept to daylight hours during the construction phase. Any deviation in this regard should be agreed with the local communities and relevant authorities.
» The appointed contractor must appoint a security company and appropriate security procedures and measures are implemented.
» The appointed EPC contractor must appoint a security company and appropriate security procedures and measures are to be implemented.
» Access in and out of the site should be strictly controlled by a security company.
» The contractor should provide workers with identity tags and prohibit the access of unauthorised people to the construction site.
» Infrastructure such as gates, roads and fencing should be maintained in the present condition or repaired, if disturbed due to project activities. The contractor should be responsible for managing this impact on private property.
» Open fires on the site for heating, smoking or cooking must not be allowed except in designated areas.
» The contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.
» A comprehensive employee induction programme would cover land access protocols, fire management and road safety. This must be addressed in the construction EMPr as the best practice.
» The contractor should have personnel trained in first aid on site to deal with smaller incidents that require medical attention.
» A stakeholder management plan should be compiled and implemented by the contractor to address neighbouring landowner concerns regarding safety and security.

Cumulative Impacts:

Cumulative impacts could occur should other similar projects be developed in the area at the same time as the proposed project.

Residual impacts

None anticipated.

Nature: Temporary increase in traffic disruptions and movement patterns during the construction phase

An increase in traffic due to heavy vehicles associated with construction could create short-term disruptions and safety hazards for current road users. Project components and equipment to the proposed site will be transported using vehicular transport. There are two main access roads within the study area, the R45 and the R27. The R27 provides the most direct access to the site. The primary roads that will be used for transportation of project components and equipment will be the R27 and the secondary formal road (gravel access road) off the R27. Increased traffic during construction could cause disruptions to use of roads by local communities and increased safety hazards. Extensive use of local roads and transport systems may cause road deterioration and congestion. Should farm roads be used, impacts associated with erosion could result as these roads are not designed to carry heavy traffic. The landowners have requested that Eskom utilise the

roads along the current servitudes in the area to avoid creating new access roads, as this may mean clearing of vegetation which acts as a buffer against erosion.

In terms of provincial and regional roads involved, the expectation is that Eskom should consult with the relevant roads agency to ensure that they do not contribute to the deterioration of roads without taking some responsibility for repairing the impact that their construction vehicles may have on the road during the construction phase.

	Without mitigation	**With mitigation**
Extent	Local (2)	Local (2)
Duration	Short term (2)	Short term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Highly Probable (4)	Probable (3)
Significance	**Medium (40)**	**Low (24)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation:

» Working hours should be kept to daylight hours during the construction phase. Any deviation in this regard should be agreed with the local communities and relevant authorities.
» Avoid heavy vehicle activity during 'peak' hours (when children are taken to school, people driving to work).
» All vehicles must be road worthy and drivers must be qualified, obey traffic rules, follow speed limits and made aware of the potential road safety issues.
» Heavy vehicles should be inspected regularly by the transport contractor to ensure their road safety worthiness and penalties for reckless driving should be implemented.
» The contractor should ensure the provision of adequate and strategically placed traffic warning signs and control measures along the R27 and access road to warn road users of the construction activities taking place for the duration of the construction phase.
» The contractor should ensure that roads utilised are either maintained in the present condition, upgraded or repaired if disturbed due to project activities.
» The contractor must establish appropriate measures to ensure that the construction activities do not impact on the activities of the surrounding landowners. In particular, it should be ensured that construction activities do not obstruct the Thali Thali game lodge game drive routes or impact on the operation of the lodge.

Cumulative Impacts:

Cumulative impacts could occur should other similar projects be developed in the area at the same time as the proposed project.

Residual impacts:

None anticipated.

Nature: Added pressure on economic and social infrastructure and increase in social conflicts during construction as a result of in-migration of economic seekers

An influx of people in search of economic opportunities could result in pressure on

economic and social infrastructure in SLBM. The increase in the local population will impact provision of basic services (municipal services) and has potential to lead to conflict between locals and outsiders. Informal settlements may mushroom near towns to accommodate the economic seekers.

Saldanha Bay is faced with a high unemployment rate, which will mean competition for available jobs. In-migration of economic seekers could intensify competition for the jobs created by the proposed strengthening project thereby leading to a rise in social conflicts and change in social cohesion of the local area. Furthermore, in-migration of jobseekers is likely to lead to a rise in unemployment in Saldanha due to an oversupply of labour particularly with respect to semi and unskilled workers. It is therefore, important for mitigation plans to be in place to avoid animosity in the area.

	Without mitigation	**With mitigation**
Extent	Local-regional (3)	Local- regional (3)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation:

» Locals should be prioritised for available employment/entrepreneurship opportunities;
» Prior to commencement of construction, representatives from the local community e.g. ward councillor, surrounding landowners should be informed of details of the construction schedule and exact size of the workforce;
» Local community organisations and policing forums must be informed of construction times and the duration of the construction phase. Also establish procedures for the control and removal of loiters at the construction site; and
» A Community Liaison Officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

Cumulative Impacts:

Cumulative impacts could occur should other similar projects be developed in the area at the same time as the proposed project.

Residual impacts:

Possibility of outsiders remaining in the area after construction is completed and subsequent pressures on local infrastructure and services.

Nature: Nuisance impacts in terms of temporary increase in noise and dust, and increased traffic on local access roads to the site

Noise, dust and disruption or damage to roads are potential nuisance impacts envisaged during the construction phase. Experience from other similar projects indicate that site clearing and construction activities does increase the risk of dust and noise being

generated, which can in turn impact on affected and adjacent properties. The primary sources of noise during construction would be from the construction equipment and vehicles. Noise levels are expected to be localised and restricted to the site and are generally short in duration. The impact of noise and dust on farmsteads can be reduced through the implementation of appropriate mitigation measures. Increased traffic associated with the construction activities could impact on local road users. The noise, dust and increased use of the local roads are expected to have a negative impact, on nearby social receptors but for a short period.

	Without mitigation	**With mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)
Probability	Highly probable (4)	Probable (3)
Significance	**Low (28)**	**Low (21)**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation:

» The movement of heavy vehicles associated with the construction phase should be timed to avoid weekends, public holidays and holiday periods as far as possible.
» The contractor must ensure that damage caused by construction related traffic to the access roads is repaired before the completion of the construction phase.
» Appropriate dust suppression measures must be implemented on gravel roads on a regular basis.
» Vehicles used to transport building materials must be fitted with tarpaulins or covers.
» Ensure all vehicles are road worthy and drivers are qualified.
» A community liaison officer should be appointed. A method of communication should be implemented whereby procedures to lodge complaints are set out in order for the local community to express any complaints or grievances with the construction process.

Cumulative Impacts:

Cumulative impacts could occur should other similar projects be developed in the area at the same time as the proposed project.

Residual impacts:

Damage to roads that is not fixed could affect road users.

5.7.2. Potential Impacts during Operation

The proposed infrastructure is designed to be operational for at least 25 years. The project will not generate any new employment during operation. Only about two full time employees are required. Therefore, Eskom will make use of existing labour within Eskom.

The potential positive and negative social impacts which could arise as a result of the operation of the proposed development are discussed below.

Nature: Benefits of local procurement of services

The Saldanha Network Strengthening Project is expected to have minor economic benefits for the local businesses. The local businesses are likely to have an opportunity to supply goods and services for the maintenance of the equipment. albeit limited.

	Without Enhancement	**With Enhancement**
Extent	Local-regional (3)	Local-regional (3)
Duration	Long term (4)	Long term (4)
Magnitude	Low (2)	Low (2)
Probability	Probable (3)	Highly Probable (4)
Significance	**Low (21)**	**Low (24)**
Status	Positive	Positive
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Enhancement measures:

» It is recommended that a local procurement policy is adopted by Eskom to maximise the benefit to the local economy.

» The developer should create a database of local companies, specifically Historically Disadvantaged (HD) which qualify as potential service providers prior to the commencement of the tender process for service providers. These companies should be notified of the tender process and invited to bid for project-related work where applicable.

» It is recommended that goods and services are sourced from the local area as much as possible; engage with local authorities and business organisations to investigate the possibility of procurement of goods and services from local suppliers where feasible.

Cumulative Impacts:

Cumulative impacts could occur as a result of numerous developments in the area requiring similar services.

Residual impacts

Growth in local business

Nature: Benefits of the strengthening project

As part of the envisaged developments in the Saldanha Bay area, Eskom has been prompted to re-assess the capability of the existing electricity network in the area in order to meet the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and also to facilitate the integration of renewable generation in the region. Power to the Saldanha Bay area is supplied from Aurora Substation which is located 28km east of Saldanha Bay. Aurora Substation supplies Blouwater, Saldanha Steel and Smelter Substations. From the load forecast, it is evident that there will be a constraint at Aurora Substation. The projected new load of approximately 200 MVA that will be realised in the area together with the natural load growth will increase Aurora Substation demand from 517 MVA to approximately 890 MVA in year 2030. The firm capacity in the area will be exceeded in 2018 if the additional loads are to be supplied from Aurora Substation. The transformation capacity is also insufficient to evacuate all of the potential renewable generation planned in the area, amounting to 2

885 MW. The provision of electricity is critical for economic growth and development. The industries in the local area rely heavy on the reliable energy sources. There is at present insufficient capacity to cater for the present demand. The Saldanha Bay Network Strengthening project is proposed in order to cater for expansion in development.

	Without Enhancement	**With Enhancement**
Extent	Local-regional (3)	N/A
Duration	Long term (4)	N/A
Magnitude	High (8)	N/A
Probability	Highly probable (4)	N/A
Significance	**Medium (60)**	N/A
Status	Positive	N/A
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Not required	

Cumulative Impacts:
Improved power supply to the area as a result of the proposed project and other existing power transmission and distribution infrastructure in the area.

Residual impacts
None anticipated.

Nature: Impacts on sense of place impacts associated with the operation phase of the project

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. The sense of place impacts relate to the change in the landscape character and visual impact of the proposed project (refer to the Visual Impact Assessment for a detailed assessment in this regard). The alteration of the sense of place will be associated with both the construction and operation phases. In as much as this will be a permanent impact on landowners residing in the area, the landowners interviewed as part of the SIA concurred that the additional two power lines proposed as part of the project will not add significantly to the visual impact of the four existing power lines which cross the study area.

	Without Enhancement	**With Enhancement**
Extent	Local (1)	N/A
Duration	Permanent (5)	N/A
Magnitude	Moderate (6)	N/A
Probability	Probable (3)	N/A
Significance	**Medium (36)**	**N/A**
Status	Negative	Negative
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	Yes	

Mitigation:
Implement mitigation measures and recommendations proposed by the visual specialist as part of the VIA.

Cumulative Impacts: Cumulative impacts are expected to be of low negative significance to the local area largely as a result of the already highly compromised nature of the landscape within and around the study area.
Residual impacts: In order to minimise this impact, it is critical that existing natural landscape areas in and around the development are maintained and protected and that effective rehabilitation is undertaken after decommissioning.

Nature: Impacts associated with tourism

Tourism is an important part of Saldanha Bay as it contributes over 50% to the local economy. Tourists visit the area throughout the year. The natural environment is the main attraction for tourists to the western of the Saldanha municipal area. It is for this reason that the area's biophysical integrity is critical to its future economic well-being. Therefore, industrial development should take place in such a way that the natural environment and tourism attractions are not affected negatively. The strengthening project will take place in an area where there are tourist facilities such as Thali Thali game lodge, West Coast Fossil Park, West Coast National Park and the Elandsfontein and Hopfield Private Nature Reserves. People visit such places for the tranquillity of the area. These areas are likely to be negatively affected to some extent by the development if the area's sense of place is altered.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	N/A
Duration	Long-term (4)	N/A)
Magnitude	Low (4)	N/A
Probability	Probable (4)	N/A
Significance	**Medium (36)**	N/A
Status (positive or negative)	Negative	N/A
Reversibility	Yes	
Irreplaceable loss of resources	No	
Can impacts be mitigated	No	

Mitigation: Implement mitigation measures and recommendations proposed by the visual specialist as part of the VIA.
Cumulative Impacts: Cumulative impacts are expected to be of low negative significance to the local area largely as a result of the already highly compromised nature of the landscape within and around the study area.
Residual impacts: None as impacts will be removed after decommissioning of the infrastructure.

5.7.3. Comparison of Alternatives

All power line corridors are considered to be acceptable from a social perspective. During consultation with stakeholders, possible land use conflict between

transmission substation site A and the proposed Mulilo Gas Project was identified. This alternative is therefore not preferred from a social perspective. **Power line corridor alternatives 4 & 6** and **transmission substation sites D & F** are considered acceptable from a social perspective.

5.7.4. Comparison of Distribution Substation Sites

There is no preference from a social perspective for any of the sites identified for the distribution substation. Selection of substation alternative A will minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

5.7.5. Conclusions and Recommendations

The proposed Saldanha Bay Network Strengthening Project is unlikely to result in permanent damaging social impacts. The potential for positive socio-economic benefits can be realised through direct and indirect job creation. The proposed development will also contribute positively to the various local targets and policy aims. The strengthening project will lead to job creation and associated business opportunities for the struggling residents. The Saldanha Bay Network Strengthening project is necessary for the improvement of current electricity capacity in the area and it will allow for the meeting of the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and also to facilitate the integration of renewable generation in the area. However, the project will also bring with it some negative impacts such as in-migration of people, alteration to the visual sense of place and landscape as well as safety and security risks, which can be minimised.

From a social perspective it is concluded that the project can be developed subject to the implementation of the recommended mitigation measures and management actions contained in this SIA report.

The following recommendations are made on the basis of the social impact assessment and a thorough review of the concerns and suggestions raised by stakeholders and interested and affected parties during the stakeholder engagement process. The proposed mitigation measures should be implemented to limit the negative impacts and enhance the positive impacts. Based on the social impact assessment, the following is recommended:

» A community liaison officer should be appointed during construction to assist with the management of social impacts and to deal with community issues through the grievance mechanisms provided for the Environmental Management Programme (EMPr) which are in line with the International Finance Corporation Standards and Equator Principles.

» In terms of employment related impacts, there is likely to be competition for the unskilled and semi-skilled job opportunities. Therefore, introducing outside workforce can provoke discontent in the local communities and can also put pressure on local basic services. Local labour should be given priority wherever possible to ensure that benefits accrue to the local communities as far as possible. Efforts should be made to involve local businesses during the construction activities as far as possible.
» Local procurement of services and equipment where possible should be encouraged in order to enhance the economic multiplier effect. This aspect would serve to mitigate other subsequent negative impacts such as those associated with the inflow of outsiders to the area, the increased pressure on infrastructure and services in the area as a result of inflow of people to the area, as well as the safety and security concerns.
» The community should be involved in the process as far as possible (encourage co-operative decision making and partnerships with local community through on-going consultations).
» Considering the concerns of the landowners regarding the potential for a man-camp to be associated with the project, and the relative proximity of the proposed development to the local towns, it is recommended that no persons be housed on site.
» In order to minimise safety and security risks, implement mitigation measures such as securing the site, having security personnel at the entrance of the site, ensuring all personnel have access cards to reduce and avoid negative impacts.
» Employ mitigation measures to minimise the noise pollution and damage to existing roads, such as limiting construction vehicles to normal working hours, avoiding weekend and public holidays operations, the developer should repair damaged roads, implementing dust suppression measures.
» Implement a system during construction to ensure the gates to the landowners' properties are always closed to avoid loss of livestock.
» Safety and security risks should be taken into account during the planning/construction phase of the proposed project. Access control, security and management should be implemented to limit the risk of crime increasing in the area as a result of the project.
» Construction activities should be limited to daylight working hours as far as possible to avoid being a nuisance to landowners that offer tourist accommodation.

5.8. Land use and planning

Based on existing information and inputs from key stakeholders and I&APs within the study area, the following potential land use risks have been identified to be associated with the proposed project:

- The radar system used by Air Force is of National Importance. Power Lines and structures may have a negative effect on the effectiveness of the radar and thus place the country in a disadvantage in terms of defence. A close working relationship between those planning the power line route, the environmental practitioners and town planner, must be established when the final routes for the power lines are planned and before the final land use planning applications are submitted.
- Different aircraft (air force and light private air craft) use the two facilities that will be impacted on by the Power lines. It is advisable that no power lines should be in the approach and take off strip of any airfield or airstrip. In this regard, power line alternatives 2, 3 and 5 are not considered feasible from a land use perspective (refer to Section 4.1 blow for more detail).
- Goods are transported in South Africa by either rail or road. Road is currently the most used alternative. Within the Western, Northern and Southern Cape Regions the port in Saldanha Bay is of vital importance in terms of the handling of abnormal equipment which needs to be transported by road. This must be considered in the final planning and design of the power lines in order to ensure adequate clearance heights are implemented where lines cross major routes.
- Due to the nature of land use associated with power lines and substations which is only really compatible with industrial use, like industrial parks and railways the future use will limit the long term potential of the area to that of Industrial use, or commercial as a buffer for future residential developments. However, because of the slower growth in terms of development the negative effect will or may not be experienced before 20 – 30 years from now. As in terms of the Industrial Development hub (Saldanha Industrial Development Zone) declared by the National Government in the area, the development of power for the region is of very high importance. The proposed development must form part of the Future Planning of the Area. In this regard the proposed development must be expressed within the Spatial Development Plan (SDP) and Framework of the Local Municipality or at least it must be mentioned that upgrading of services (including electrical) are required. The land use of the properties mentioned after the proposed development must also be incorporated within the SDP or it should allow for rezoning to the required land use.
- There is a risk of conflict with planned developments in the area, particularly with regards to Transmission Substation Site A. This property is already earmarked for industrial development, including a CCGT Plant. Placement of the substation on this site will hinder this planned development, which could have knock-on effects in terms of other future development in the area. This alternative is therefore not considered feasible from a land use perspective.

5.8.1. Preferred Alternatives

Considering the information above, inputs from landowners and stakeholders in the area, and with the experience of the writer in terms of Town and Regional Planning, it is stated that in relation to the map below that the following recommendations are made:

» Preferred Tx Power Line Route: The Preferred Tx Power Line Route is **Alternative 6**, due to less impact on current and future planning within the area.
» Preferred Transmission SS Site: **Transmission Site F** is the preferred option from a Town and Regional Planning perspective as this site reduces the potential for any land use conflict with planned developments in the area.
» Preferred Distribution SS Site and associated 132kV power lines: The preferred distribution SS Site is **Distribution Site A** because of its close proximity to the Blouwater Substation and less impact from a Future and current Town Planning Perspective. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

5.9. Assessment of the No Go Alternative

The do nothing option would be the option of not implementing the Saldanha Network Strengthening Project.

If Eskom is to meet its mandate and commitment to supply the ever-increasing needs of end-users, it has to plan, establish and expand its infrastructure of generation capacity and transmission power lines on an on-going basis. As part of the envisaged developments in the Saldanha Bay area, Eskom has been prompted to re-assess the capability of the existing electricity network in the area in order to meet the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and also to facilitate the integration of renewable generation within the region. Power to the Saldanha Bay area is currently supplied from Aurora Substation which is located 28km east of Saldanha Bay. Aurora Substation supplies Blouwater, Saldanha Steel and Smelter distribution Substations. From the load forecast for the area, it has become evident that there will be a constraint at Aurora Substation in the next five year period. The projected new load of approximately 200 MVA that will be realised in the area together with the natural load growth will increase Aurora Substation demand from 517 MVA to approximately 890 MVA in year 2030. The firm capacity in the area will be exceeded in 2018 if the additional loads are to be supplied from Aurora Substation. The transformation capacity is also insufficient to evacuate all of the potential renewable generation planned in the area, amounting to 2 885 MW.

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

5.10. Nomination of a Preferred Alternatives

The following tables provide a summary of the preferred alternatives nominated through the specialist studies undertaken.

Table 5.1: Transmission line corridors

	Corridor 3	**Corridor 4**	**Corridor 6**
Biodiversity	Acceptable	**Preferred**	**Preferred**
Agricultural potential	No preference		
Avifauna	**Preferred**	Acceptable	Acceptable
Visual impacts	**Preferred**	Acceptable	Acceptable
Heritage sites	**Preferred**	Acceptable	Acceptable
Wetlands	No preference		
Social impact	Acceptable	**Preferred**	**Preferred**

Table 5.2: Transmission substation sites

	Site A	**Site D**	**Site F**
Biodiversity	**Preferred**	Acceptable	**Preferred**
Agricultural potential	No preference		
Avifauna	No preference		
Visual impacts	**Preferred**	Acceptable	Acceptable
Heritage sites	**Preferred**	Second preferred	Acceptable
Wetlands	**Preferred**	Acceptable	Acceptable
Social impact	Acceptable	**Preferred**	**Preferred**

Table 5.3: Distribution substation sites and associated 132kV Power Lines

	Site A	**Site B**	**Site C**
Biodiversity	**Preferred**	Acceptable	Acceptable
Agricultural potential	No preference		
Avifauna	**Preferred**	Acceptable	Acceptable
Visual impacts	**Preferred**	Acceptable	Acceptable
Heritage sites	**Preferred**	Second Preferred	Acceptable
Wetlands	**Preferred**	Acceptable	Acceptable
Social impact	No preference		

From the above tables, it is clear that there are varying conclusions from the specialist studies undertaken. The majority of specialists nominated Corridor 3 and Transmission Substation Site A as the preferred alternative. However based on discussions with landowners in the area (Appendix C) held during the EIA-

phase, Mulilo confirmed that Site A is not suitable due their planned OCGT plant in the vicinity of Site A. Various other landowners (including Arcelor-Mittal and Gavin Stigling) also commented that Site A would not be suitable from a technical feasibility perspective. **Transmission Substation Site F** with **Transmission Line Corridor 6** are both nominated as the second preferred option. These are therefore nominated as the preferred options for the transmission substation and power line due to the land use conflicts associated with Transmission substation Site A, making this site non-feasible from a technical perspective.

Distribution Substation Site A and associated 132kV power lines was nominated as the preferred option from all the specialist studies and is therefore selected as the preferred alternative for the distribution substation and power lines. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

Construction of the power lines and substations within the preferred alternatives must take the recommended conditions identified by the specialist studies into account. In addition, should the project be authorised by DEA, the final routing of the power lines within the nominated corridor and location of the substations within the identified sites should be undertaken in consultation with the affected landowners and the following specialists:

» Biodiversity specialist
» Avifauna specialist

In addition, once the final substation site has been determined and the transmission power line alignment has been negotiated and the tower positions surveyed and pegged, a walk-though survey must be undertaken by these specialists in order to minimise potential environmental impacts associated with the proposed project.

CONCLUSIONS AND RECOMMENDATIONS CHAPTER 6

The conclusions and recommendations of this EIA are the result of the assessment of identified impacts by specialists, and the parallel process of public participation. The public consultation process has been extensive and every effort has been made to include representatives of all stakeholders in the study area.

6.1. Evaluation of the Proposed Project

The preceding chapters of this report together with the specialist studies contained within Appendices D - L provide a detailed assessment of the environmental impacts on the social and biophysical environment as a result of the proposed project. This chapter concludes the EIA process by providing a summary of the assessment of the proposed Saldanha Network Strengthening project. In so doing, it draws on the information gathered as part of the EIA process and the knowledge gained by the environmental consultants during the course of the EIA and presents an informed opinion of the environmental impacts associated with the proposed project. Environmental specifications for the management of potential impacts are detailed within the draft Environmental Management Plan (EMP) included within Appendix M.

The assessment of potential environmental impacts presented in this report is based on an understanding of the infrastructure proposed as part of this project (i.e. for the TX lines, TX substation, DX power lines and DX substation) provided by Eskom. Alternative power line corridors and substation sites have been considered and comparatively assessed. Environmental impacts of the proposed project are expected to be associated with construction, operation and decommissioning activities. The majority of the environmental impacts associated with the facility will occur during the construction phase. Environmental issues associated with construction and decommissioning activities of the proposed infrastructure are similar and include, among others:

» Impact on ecology (flora, fauna and avifauna) and loss of protected species.
» Potential soil loss and change in land-use.
» Impact on heritage resources.
» Social impacts (positive and negative).
» Visual impacts.

Environmental issues specific to the operation include, among others:

» Visual impacts (intrusion, negative viewer perceptions and visibility of the facility).

» Avifaunal Impacts (fatalities due to the collision with the power line).
» Social impacts (positive and negative).

These and other environmental issues were originally identified through a scoping evaluation of the proposed project. Potentially significant impacts have now been assessed during this EIA Phase. This EIA process has involved key input from specialist consultants, the project developer, and from key stakeholders and interested and affected parties.

No environmental fatal flaws were identified to be associated with any of the alternatives considered, although some land use conflicts were identified influencing the technical feasibility in some areas. The environmental sensitivities (indicated in Figure 6.1) identified during the EIA phase have informed recommendations made regarding preferred alternatives for implementation. The final placement of infrastructure within the preferred power line corridor and substation sites must be informed by technical criteria and environmental sensitivities.

The following sections provide a summary of the assessment of the proposed Saldanha Network Strengthening project.

6.2.1. Local site specific impacts resulting from the physical modification/disturbance of the site primarily during the construction phase

i. Flora, Fauna and Ecology

The dominant vegetation type in the study area is Saldanha Flats Shrubland which occupies the majority of the study area. Dominant vegetation identified on site included *Eriocephalus africanus*, *Euphorbia* spp, *Aloe perfoliata, Limonium peregrinum* and *Asparagus capensis*. Four species of conservation concern were identified during the site visit. *Lampranthus vernalis* and *Limonium capense* were identified at the DX substation sites. *Cephalophyllum rostellum* was also identified at the DX substation sites. *Leucospermum hypophyllocarpodendron*, classified as vulnerable, was identified along Corridor Alternative 3, lines 1 and 2.

Low mammal diversity was predicted for the site due to large scale habitat modification and the high levels of human disturbance. The majority of faunal species recorded within the study area are often associated with disturbed habitats and have generalist habitat and dietary requirements. Low reptile diversity was expected due to the degraded nature of the site and lack of suitable habitats. Low amphibian diversity was recorded within the study area due to extremely limited habitat diversity.

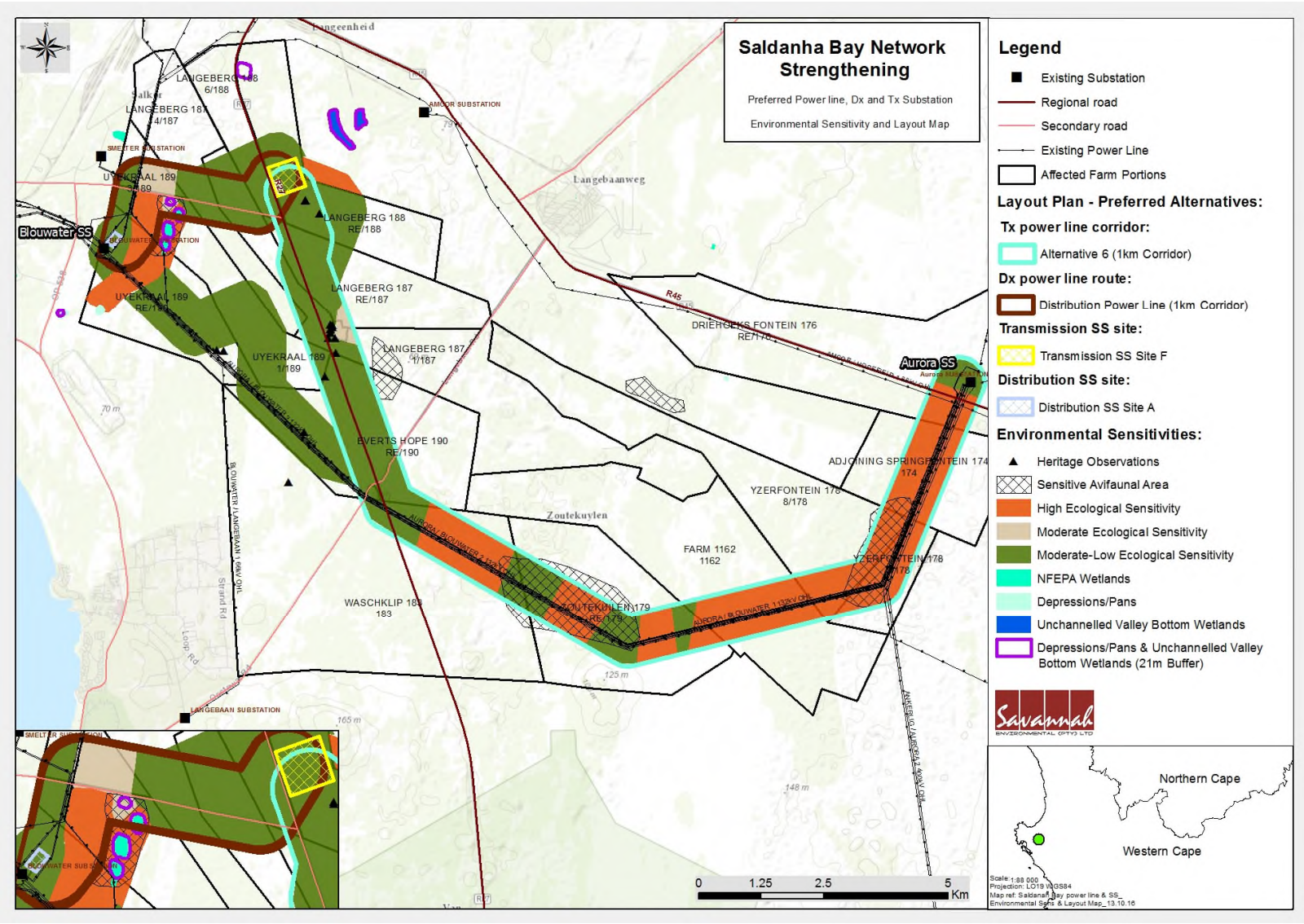

Figure 6.1: Environmental sensitivity map

No Red Data faunal species are predicted to be present within the development footprint due to high levels of disturbance and habitat transformation already present within the area.

A number of potential impacts relating to loss of indigenous vegetation, proliferation of alien invasive species, habitat fragmentation, loss of Red Listed species, loss of faunal habitat, direct faunal impacts and disturbance to fauna are predicted to occur as a result of the proposed strengthening project.

Mitigation measures are proposed to lower the significance of these impacts. Provided these mitigation measures are fully adhered to and implemented as part of the Environmental Management Programme during both the construction and operational phase of the development, the project is expected to have a limited long term impact on the surrounding environment.

Once the substation site and power line tower positions have been selected and pegged, a site visit must be conducted by a suitably qualified botanist to determine the presence of Red Listed and Endemic species within the site footprint, prior to the commencement of any construction and construction related activities. Any bulbs and red listed plant species must be immediately translocated to an undisturbed area outside of the development footprint.

Power line corridor alternatives 4 or 6 are the preferred corridor alternatives as these routes are situated within a highly disturbed area and will have the least impact on the receiving environment. Due to the current levels of disturbance, distribution substation alternative A and transmission substation alternative A or F are preferred from an ecological perspective.

ii. Wetlands

A desktop and field investigation identified the presence of eight wetland systems within the study area. The impact assessment identified that no direct or indirect impacts would occur on the delineated wetland systems within the study area as a result of the proposed project. None of the alternative Distribution substation or Transmission substation sites will have a direct impact on the wetlands, with the closest wetland occurring approximately 520m away. Alternative TX substation Site A and DX substation Site A are preferred as these are located furthest away from wetland areas. None of the alternative power lines corridors will have a direct impact on any of the wetlands delineated as they do not pass over these systems. Best practice guidelines for general construction activities within the area must however be enforced in an Environmental Management Programme.

6.2.2. Impacts on Avifauna

Due to the current agricultural, industrial and power line developments present within the study area, the proposed substation and power line development is unlikely to have any long-term significant impacts on avifaunal species within the study area. During the site visit, predominantly common bird species were recorded (Cape Sparrow, Karoo Prinia, Pied Starling and various granivorous species). Blue Cranes and Southern Black Korhaan were the only Red Listed species recorded within the study area.

The construction of the proposed transmission substations at any site alternative is adequate from an avifaunal perspective and a poses a limited threat to the birds occurring in the vicinity of this infrastructure. This is largely due to the homogenous nature of the area, high levels of disturbance due to the agricultural practices. The impact of displacement due to habitat transformation should only affect avian species (both Red-data and Non Red-data) at a local level. The construction of the distribution substation at site alternative A and associated 132kV power lines is recommended. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

The construction of the two new 400kV power lines within corridor alternative 3 and 6 are considered to be the most favourable from an avifaunal perspective. This is due to the fact that these line alternatives follow existing power line routes and traverse a largely agricultural habitat. Due to the susceptibility of Blue Cranes (identified within the study area) Lesser Flamingo and Greater Flamingo to collisions, it is imperative that anti-collision measures are implemented on the selected line.

Given the relative homogeneity of the habitat within the study area as well as existing levels of disturbance (existing power line and substation infrastructure, roads, urban development, agricultural and stock farming), the proposed project is unlikely to have a significant, long-term impact on the local avifauna, provided that mitigation measures outlined in this report are implemented.

6.2.3. Impacts on Soil and Agricultural Potential

Most of the study area consists mainly of sandy soils underlain by calcrete/limestone at varying depths ranging from <300 mm to >1 200 mm. According to the average annual rainfall for this area (280 mm), the dryland crop production potential is low, combined with the marginal crop production potential of the soil, due to the low moisture-holding capacity of the sandy soils and soil depth. The overall agricultural potential is therefore low to medium-low.

There is no preference for any of the identified power line routes or substation sites from an agricultural perspective. Impacts will be minimal for any option selected mainly due to low potential of area, as well as nature of infrastructure.

It is concluded that the proposed development will not have a large impact due to the overall low agricultural potential of the areas where the construction of the transmission and distribution stations are planned. The main aspect that will have to be managed in this area if vegetation is removed will involve an increased wind erosion susceptibility due to the sandy nature of the soils.

6.2.4. Visual Impacts

The proposed development will occur within the Coastal Plain LCA as defined above. This is an area where rural land uses currently provide the main landscape character influencing elements. However, rural characteristics are diluted to a large degree in areas by infrastructure development including existing electrical infrastructure.

The main sensitive areas including the edges of urban areas, the coastal strip and protected areas to the south all fall outside the areas of visual influence noted above and are therefore highly unlikely to be impacted to any significant degree.

The main visual issues relate to roads that run through the area that are important for tourism related traffic as well as local homesteads. The proposed development alternatives will be seen in different ways relative to existing infrastructure. Impacts are expected to be low to moderate for all impacts identified.

DX Substation Site A and associated 132kV power lines is preferred from a visual perspective. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area. Both Power line Alternative 4 with TX Substation Site D and Power line Alternative 6 with TX Substation Site F would significantly extend impacts of electrical infrastructure particularly on the R27 which is an important tourist route used by visitors to the West Coast. It is suggested that these should only be considered if there are significant biodiversity or social issues that are likely to outweigh the importance of visual perceptions of the area.

6.2.5. Impacts on Heritage and Palaeontological Resources

Although archaeological resources and the cultural landscape may be negatively affected by the proposed project, the significance of impacts to these resources will be low. There is, however, the potential for highly significant impacts to

palaeontological resources to occur. These are deemed manageable and, in fact, positive impacts will be felt with the implementation of successful palaeontological mitigation. Given the limited information available at present, any fossil finds should be treated as significant and would require careful recording and possible systematic excavation in order to ensure that benefits are derived.

This assessment has demonstrated that the proposed project is feasible and that there are no fatal flaws from a heritage perspective. The requirement of HWC to specifically assess archaeological and palaeontological resources as part of the HIA has been met.

Section 38(3)(d) requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development. The present project will ensure a sustainable electricity supply for the further industrial development of the Saldanha Bay IDZ. The negative impacts to heritage resources are not of such a significance as to outweigh the social benefits of the project. In addition, the palaeontological impacts will be positive with mitigation.

Transmission power line corridor 3, TX substation alternative A and DX substation alternative A are nominated as the preferred options from a heritage and palaeontological perspective. As the mitigation and management of any archaeological and palaeontological impacts that might arise are entirely feasible, it is recommended that the proposed project be allowed to proceed from a heritage point of view.

6.2.6. Social Impacts

The proposed Saldanha Bay Network Strengthening Project is unlikely to result in permanent damaging social impacts. The potential positive impacts outweigh the potential negative impacts associated with the improvement in electricity generation. The potential for positive socio-economic benefits can be realised through direct and indirect job creation. The Saldanha Bay Network Strengthening project is necessary for the improvement of current electricity capacity in the area and it will allow for the meeting of the forecasted load requirements from industrial customers, the Industrial Development Zone (IDZ), local distributors and also to facilitate the integration of renewable generation in the area. However, the project will also bring with it some negative impacts such as in-migration of people, alteration to the visual sense of place and landscape as well as safety and security risks, which can be minimised.

All power line corridors are considered to be acceptable from a social perspective. During consultation with stakeholders, possible land use conflict between transmission substation site A and the proposed Mulilo Gas Project was identified.

This alternative is therefore not preferred from a social perspective. Power line corridor alternatives 4 & 6 and transmission substation sites D & F are considered acceptable from a social perspective. There is no preference regarding the DX substation alternatives, although it is noted that selection of substation alternative A will minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

From a social perspective it is concluded that the project can be developed subject to the implementation of the recommended mitigation measures and management actions contained in this SIA report.

6.2.7. Land Use

There are a number of existing and planned land uses within the study area which could potentially conflict with the proposed project. Considering the existing and planned land uses in the study area, inputs from landowners and stakeholders in the area, and with the experience of the writer in terms of Town and Regional Planning, the following is concluded:

» The Preferred Tx Power Line Route is **Alternative 6**, due to less impact on current and future planning within the area.
» **Transmission Site F** is the preferred option from a Town and Regional Planning perspective as this site reduces the potential for any land use conflict with planned developments in the area.
» The preferred distribution SS Site is **Distribution Site A** and associated 132kV power lines because of its close proximity to the Blouwater Substation and less impact from a Future and current Town Planning Perspective. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

6.2.8. Cumulative Impacts

The study area is situated the Saldanha Bay area, approximately 130km north west of Cape Town, in the Western Cape Province. The closest towns are Saldanha Bay, Langebaan and Vredenburg. The study area essentially consists of agricultural land with isolated patches of natural vegetation. The surrounding area is characterised by flat agricultural farm areas, primarily wheat and crop production activities with some grazing and game farming activities. Few farmsteads occur within the study area and within the surrounding area and adjacent farms. A number of properties within the study area are potentially affected by the proposed alternative transmission power line corridors and substation sites. These are mostly owned by private landowners. On a regional scale, the R27 and R45 roads provide access to the study area. The area is a

highly sensitive environment characterized by a network of power line and railway lines. Prominent features in or near the study area include:

» Nearby areas are comprised of developments such as the Saldanha Bay Smelter, Langebaan Air Force Base and Independent Power Producers' Wind Farms.
» Saldanha Steel (ArcelorMittal South Africa, Saldanha Works) is located approximately 1km north west of the study area
» Vredenburg town is located approximately 10km north west of the study area.
» Thali-Thali Game Lodge is located within the southern section of the study area. Thali Thali is a 1.460ha Cape West Coast game and fynbos reserve situated just off the R27 near Langebaan. The game lodge has a 3-star grading with 8 accommodation units.
» West Coast Fossil Park is located within the northern section of the study area. According to the Saldanha Bay SDF (2011) the West Coast Fossil Park is a national asset and the significance of this tourism attraction should be emphasised. The fossil park in the area is an important heritage resource which could potentially form part of a network of protected areas within the Saldanha Bay municipal area. The unique qualities of the fossil park should be enhanced as an important regional tourist attraction.
» West Coast National Park (Langebaan) is located approximately 2km south of the study area
» Elandsfontein Private Nature Reserve is located approximately 5km south east of the study area
» Hopefield Private Nature Reserve is located approximately 4km south east of the study area
» Elandsfontein Phosphate Mine is located approximately 2km east of the study area
» Coastal areas to the west of the study area are also developed as tourist destinations. Mykonos, Langebaan and areas to the south particularly around the lagoon are tourism areas of possible national importance.
» Existing power lines and substations are apparent within the study area.
» Oil storage, paper production and steel production have all been attracted to the area around the port of Saldanha Bay. The necessary infrastructure to supply power and support these heavy industries is also evident throughout the landscape.
» According to the Western Cape Provincial Spatial Development Framework, the R27 and R45 are secondary scenic routes. Both these secondary scenic routes traverse the study area.

There are a number of planned developments within the study area, including (refer to Figure 6.2):

» The Votem Energy CCGT Power Station (which has received environmental authorisation).
» The proposed Arcelor Mittal 1500MW LNG Power Plant (for which an EIA process is underway).
» The proposed Mulilo OCGT project which comprises 2 projects (for which an EIA process is underway).

Considering the nature of the proposed project, as well as the existing and planned developments in the area, there is the potential for cumulative impacts to occur. Based on the findings of the specialist assessments undertaken for the project, the cumulative impacts for the proposed Saldanha Bay Strengthening Project are expected to be low to moderate (refer to Table 6.2).

Table 6.1: Summary of cumulative impact significance (refer also to specialist reports contained within Appendices D – L)

Specialist report	Cumulative Impact Significance (Pre-Mitigation)	Cumulative Impact Significance (Post Mitigation)
Ecology	Moderate – High (-ve)	Moderate-Low
Avifauna	Moderate	Low
Wetlands	Negligible	Negligible
Visual Impact	Moderate	Moderate
Agriculture and soils	Negligible	Negligible
Heritage Impact	Moderate	Low
Socio-Economic	Low	Low

6.2.9. Nomination of Preferred Alternatives

There are varying conclusions from the specialist studies undertaken. The majority of specialists nominated Corridor 3 and Transmission Substation Site A as the preferred alternative. However based on discussions with landowners in the area (Appendix C) held during the EIA-phase, Mulilo confirmed that Site A is not suitable due their planned OCGT plant in the vicinity of Site A. Various other landowners (including Arcelor-Mittal and Gavin Stigling) also commented that Site A would not be suitable from a technical feasibility perspective. Transmission Substation Site F with Transmission Line Corridor 6 are both nominated as the second preferred option. Based on environmental and technical considerations, **Transmission Substation Site F with Transmission Line Corridor 6** are therefore recommended as the preferred option for implementation.

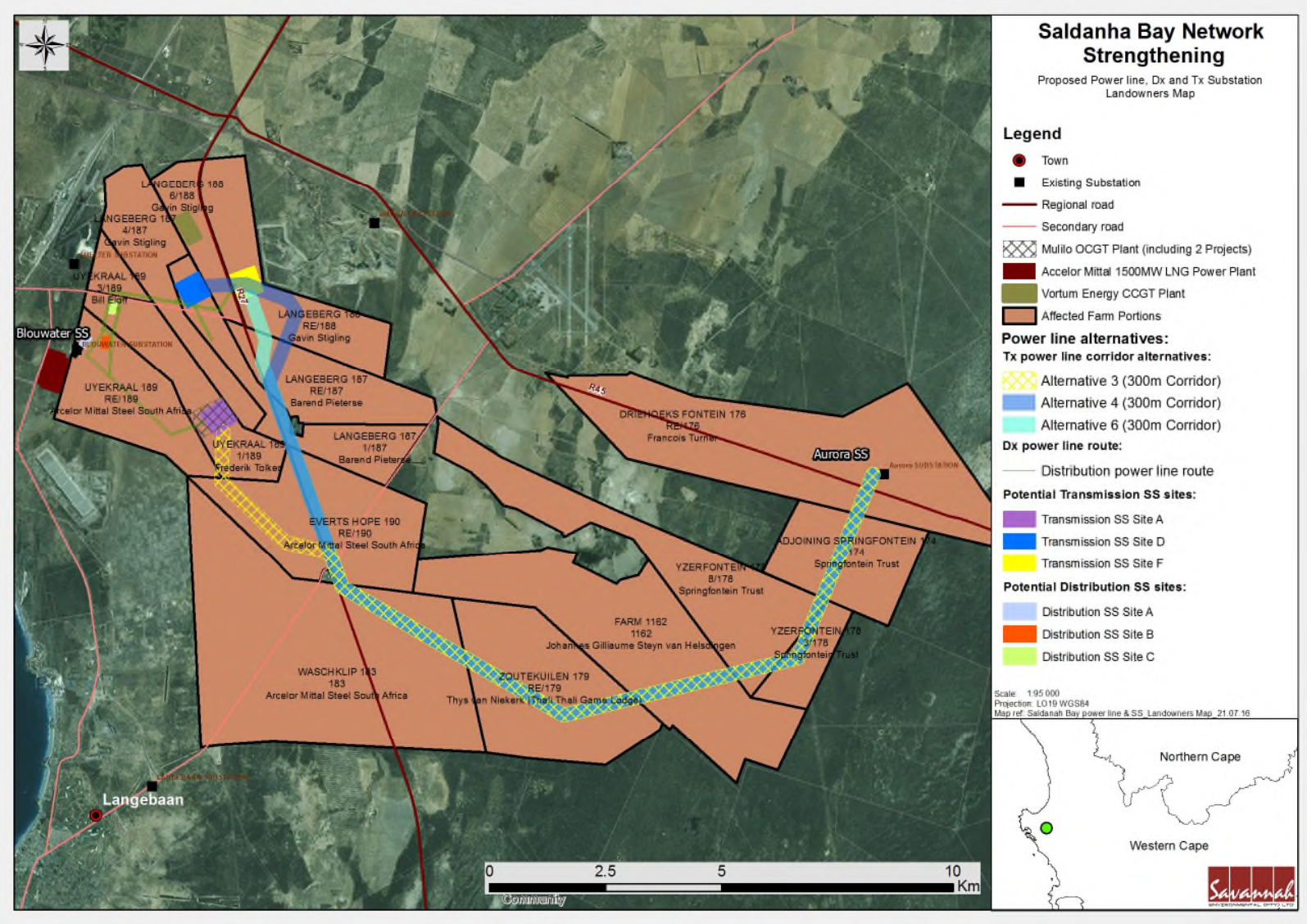

Figure 6.2: Map indicating planned developments in relation to the proposed power line corridors and substation site alternatives

Distribution Substation Site A an associated 132kV power lines was nominated as the preferred option from all the specialist studies and is therefore selected as the preferred site for the distribution substation. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.

Refer to Figure 6.3 for the location of these recommended alternatives. The following farm portions are affected by these preferred alternatives:

Affected Property	SG-Code
Langeberg RE/187	C04600000000018700000
Everts Hope RE/190	C04600000000019000000
Adjoining Springfontein 174	C04600000000017400000
Zoutekuilen 179	C04600000000017900000
Yzerfontein 8/178	C04600000000017800008
Yzerfontein 3/178	C04600000000017800003
Waschklip 183	C04600000000018300000
Langeberg 1/187	C04600000000018700001
Uyekraal RE/189	C04600000000018900000
Farm 1162	C04600000000116200000
Driehoeks Fontein RE/176	C04600000000017600000
Uyekraal 1/189	C04600000000018900001
Uyekraal 3/189	C04600000000018900003
Langeberg RE/188	C04600000000018800000
Langeberg 4/187	C04600000000018700004
Langeberg 6/188	C04600000000018800006

Co-ordinates for the preferred alternatives are as follows:

Infrastructure	Latitude	Longitude
Distribution SS Site A Centre Coordinate	32° 58' 48.667" S	18° 3' 2.129" E
Transmission SS Site F Centre Coordinate	32° 58' 8.697" S	18° 5' 16.740" E
Distribution Power Line Starting Point (Transmission SS Site F)	32° 58' 9.938" S	18° 5' 6.605" E
Distribution Power Line Centre Point	32° 58' 18.691" S	18° 3' 55.247" E
Distribution Power Line End Point (Distribution SS Site A)	32° 58' 49.379" S	18° 3' 5.426" E
Trans line Alt 6 Start Point (Aurora SS)	33° 0' 26.702" S	18° 13' 54.850" E
Trans line Alt 6 Centre Point	33° 2' 51.316" S	18° 8' 50.672" E
Trans line Alt 6 End Point (Transmission SS Site F)	32° 58' 18.719" S	18° 5' 19.029" E

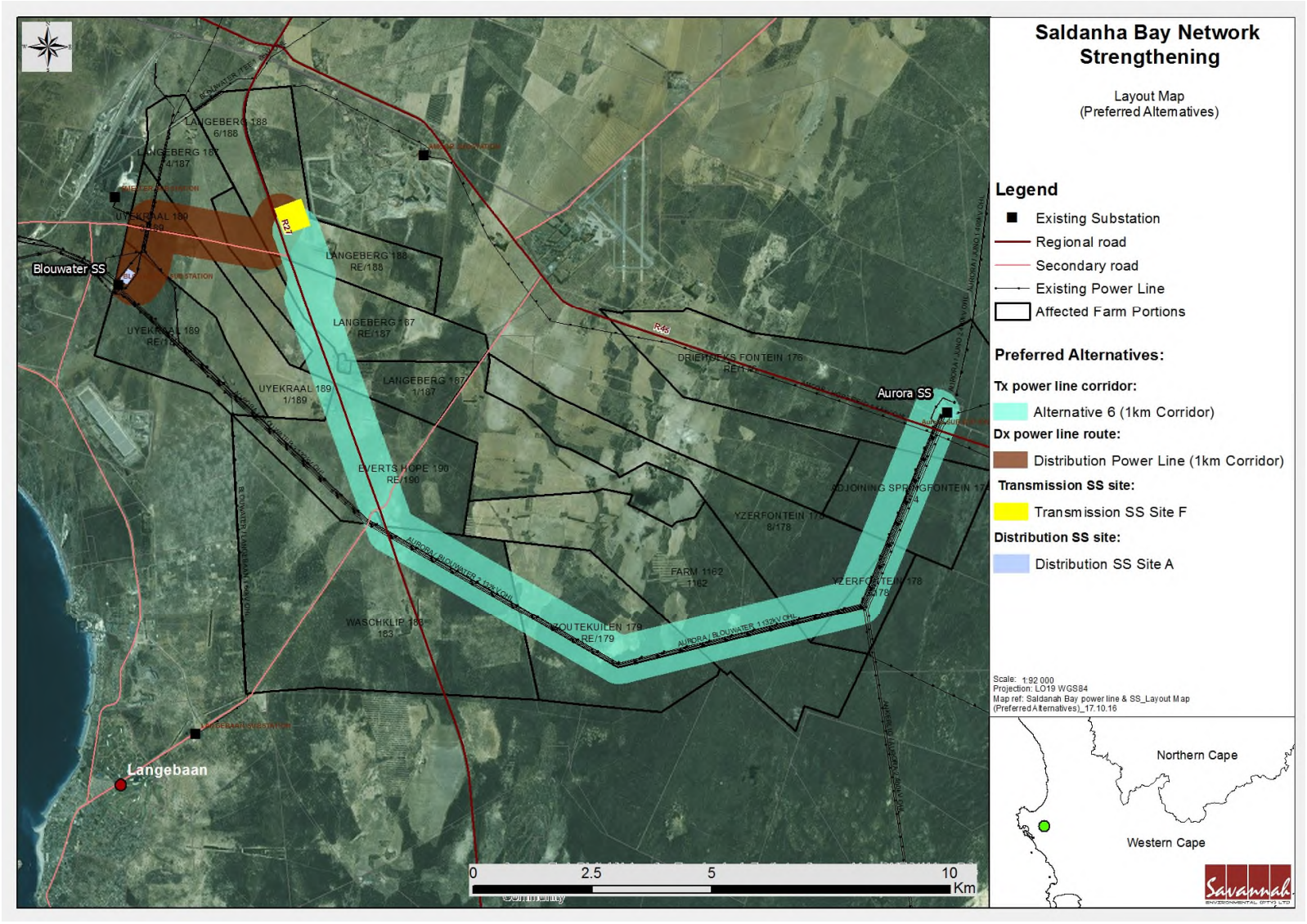

Figure 6.3: Nominated preferred alternatives

6.2. 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 and fauna due to the clearing of land for the construction and utilisation of land for the project (limited to the substation footprint and power line towers). The cost of loss of biodiversity is expected to be high at a local level in areas where natural vegetation remains, but limited as a result of the high levels of disturbance already experienced in the area.
» Impacts on avifauna. The cost of any long-term significant impacts on avifaunal species within the study area is expected to be low due to the current agricultural, industrial and power line developments present within the study area.
» Visual impacts associated with the proposed infrastructure. The cost of loss of visual quality to the area is expected to be low as a result of the location of the proposed development in relation to sensitive visual receptors, as well as the already highly compromised nature of the landscape within and around the study area.
» Change in land-use and loss of land available for agriculture on the development footprint. The cost in this regard is expected to be limited due to the limited footprint of the proposed infrastructure, the low agricultural potential of the area and the fact that current agricultural activities can continue during construction and operation. Any potential conflicts with existing and planned land use can be minimised through the implementation of the nominated preferred alternatives.

These costs are expected to occur at a local and site level and are considered acceptable provided the mitigation measures as outlined in the EMPr are adhered to. No fatal flaws associated with the proposed project have been identified.

The positive implications of establishing the Saldanha Network Strengthening project within the nominated preferred alternatives include:

» The project will result in socio-economic benefits at the local and regional scale through job creation, procurement of materials and provision of services and provision of power to the Saldanha Bay area, thereby enabling future development. These will persist during the construction and operational phases of the project.
» The project provides vital services required to support the National, Provincial and Local goals for the development within the area as outlined in the Saldanha Bay SDF.

» The project is located within an area already largely transformed by similar developments (i.e. industrial type developments, substations and power lines). The location is therefore considered desirable.

The benefits of the project are expected to occur at a national, regional and local level. As the costs to the environment at a site specific level have been largely limited through the identification of the most appropriate alternatives for implementation and recommendation of required mitigation measures, the expected benefits of the project are expected to partially offset the localised environmental costs of the project.

6.3. Overall Conclusion (Impact Statement)

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:

» Substation Site A is not considered to be technically feasible. This is based on the land use conflicts identified though consultations with stakeholders and landowners during the EIA phase.
» **Corridor 6** with **Transmission Substation Site F** is considered to be the second **preferred option** from the conclusions of the majority of the specialist studies undertaken. Based on environmental and technical considerations, this is therefore considered to be the **preferred overall alternative** for the transmission line corridor and TX substation site.
» **Distribution Substation Site A** and associated 132kV power lines is considered to be the **preferred alternative** for the distribution substation. Selection of this substation alternative will also minimise impacts associated with the decommissioning of the Blouwater Substation as activities would be consolidated into a single area.
» No issues of high significance were identified to be associated with the new double circuit 132kV power lines.
» Although some impacts of potential significance are associated with the proposed project, there are no environmental fatal flaws that should prevent the project infrastructure from being constructed within the nominated preferred alternatives, provided that the recommended mitigation measures are implemented.
» The significance levels of the majority of identified negative impacts can be minimised by implementing the recommended mitigation measures.

6.4. Overall 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

substations and power lines, 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 application for the proposed Saldanha Bay Strengthening Project be authorised by the DEA to include the following:

» Construction of a new 400/132kV Transmission Substation at **Site F** in the Saldanha Bay area with a planned capacity of 3 x 500 MVA transformers. The transmission substation footprint will be 600m x 600m.
» Construction of a new 132/66/11kV Distribution Substation at **Site A** near the current Blouwater Substation in the Saldanha Bay area. The distribution substation footprint will be 160m x 300m.
» The construction of three double-circuit 132kV power lines (31m each) to integrate the new 132/66/11kV substation at DX site A into the proposed 400/132kV main transmission station to be located at TX Site F.
» The construction of two 400kV power lines (approximately 20 km in length) from the Aurora Substation to the new proposed distribution and transmission substations. The power lines should follow **Corridor 6**.
» Replacement of two of the four existing 250 MVA 400/132kV transformers at Aurora Substation with 2 x 500 MVA transformers.
» Establishment of 2 x 132 kV feeder bays at Aurora Substation.
» Decommissioning of the existing Blouwater Substation.

The following conditions of this recommendation must be included within the authorisation issued:

» All mitigation measures detailed within this report and the specialist report contained within Appendices D to L must be implemented.
» The Environmental Management Programme (EMPr) as contained within Appendix L of this report should form part of the contract with the Contractors appointed to construct and maintain the proposed project, 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 to be key in achieving the appropriate environmental management standards as detailed for this project.
» An independent Environmental Control Officer (ECO) should be appointed to monitor compliance with the specifications of the EMPr for the duration of the construction period.
» Once the substation site and power line tower positions have been selected and pegged, a site visit must be conducted by a suitably qualified botanist to determine the presence of Red Listed and Endemic species within the site footprint, prior to the commencement of any construction and construction related activities. Any bulbs and red listed plant species must be immediately translocated to an undisturbed area outside of the development footprint.

- An ornithologist must identify the exact power line spans requiring marking in order to minimise the risk of collision of birds with the earth wire. Recommendations must be made regarding the installation of Bird Guards on all self-supporting towers according to the existing Eskom guidelines. This will prevent birds from perching in high risk areas on the towers directly above live conductors.
- The EMPr for construction must be updated to include site-specific information and specifications resulting from the final walk-though surveys. This EMPr must be submitted to DEA for approval prior to the commencement of construction.
- Monitoring must be conducted on an ad hoc basis by the palaeontologist at times when suitable holes are exposed. The environmental officer (EO) and project staff should also be appropriately briefed beforehand to ensure that they are able to recognise and rescue any fossils found during excavations.
- During construction, unnecessary disturbance to habitats should be strictly controlled and the footprint of the impact should be kept to a minimum.
- Areas disturbed during construction should be rehabilitated as quickly as possible and an on-going monitoring programme should be established to detect and quantify any alien species.
- A study must be undertaken by the applicant to determine whether the Blouwater substation site could potentially be significantly contaminated prior to decommissioning activities being undertaken.
- Applications for all other relevant and required permits required to be obtained by Eskom must be submitted to the relevant regulating authorities.

REFERENCES CHAPTER 7

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