132/11kV Olifantshoek Substation

Northern Cape Province

Final Basic Assessment Report

January 2018

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PROJECT DETAILS

Title	:	Environmental Assessment Process Final Basic Assessment Report for the 132/11kV Olifantshoek Substation, Northern Cape Province
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TABLE OF CONTENTS

APPENDICES

Appendix A: A3 Maps
- *Appendix A1: A3 Locality Map*
- *Appendix A2: A3 Sensitivity Map*

Appendix B: Site Photographs

Appendix C: Facility Illustration(s)

Appendix D: Specialist(s)
- *Appendix D1: Ecology Report*
- *Appendix D2: Avifauna Report*
- *Appendix D3: Wetland Delineation and Floodline Assessment Report*
- *Appendix D4: Visual Report*
- *Appendix D5: Heritage Screening Report for visual exemption*

Appendix E: Public Participation
- *Appendix E1: Adverts and Site Notices*
- *Appendix E2: Stakeholder Correspondence*
- *Appendix E3: List of registered I&APs*
- *Appendix E4: Comments Received*
- *Appendix E5: Comments and response report*

Appendix F: Environmental Management Programme (EMPr)
- *Appendix A: Key Legislation applicable to the development*
- *Appendix B: Eskom - Erosion Control Guidelines*
- *Appendix C: Eskom – Vegetation management guideline*
- *Appendix D: Grievance Mechanism*

Appendix G: EAP Declaration and CVs
- *Appendix G1: EAP DEA Declaration*
- *Appendix G2: EAP Affirmation*
- *Appendix G3: Staff CVs*
- *Appendix G4: Specialist CVs*

Appendix H: Specialist Declarations

Appendix I: Additional Information
- *Appendix I1: Substation Coordinates*

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBA	Critical Biodiversity Area
DEA	National Department of Environmental Affairs
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ESA	Ecologically Sensitive Area
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IPP	Independent Power Producer
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MVA	Mega Volt Ampere
MW	Mega Watt
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NFEPA Wetland	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NWA	National Water Act (Act No. 36 of 1998)
RE	Remaining Extent
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework

SUMMARY AND PROJECT OVERVIEW

1. OVERVIEW OF THE PROPOSED PROJECT

The Northern Cape, and in particular the north east, region as a whole has been earmarked for the development of various mining developments and operations. With an increase of such developments, the region of Olifantshoek has undergone rapid population expansion, and as a result there is greater pressure being placed on existing electrification networks and services to meet the current capacity demands of the region. Eskom Holdings SOC Limited (Eskom) is therefore proposing to establish a new 10MVA 132/11kV substation, to be known as the 132/11kV Olifantshoek Substation, to connect a proposed 132 kV power line[1] between the existing Eskom Emil Substation and the new 132/11kV Olifantshoek Substation. The new Olifantshoek Substation will replace the existing substation due to the current substation not having sufficient capacity to cater for the town of Olifantshoek.

The proposed project will consist of the following activities:

- A new 10MVA 132/11kV Olifantshoek Substation (approximately 100m x 100m in extent) and ancillaries (including a metering station, control building, admin building, workshop and associated infrastructure). Access roads of 5m in width will also be established.
- Decommissioning of the existing 22/11kV 2.5MVA Olifantshoek Substation including all site rehabilitation.

The assessment of the new 132/11kV Olifantshoek Substation formed part of an application previously undertaken for the project which included the assessment of both the 132/11KV Olifantshoek Power Line and the new Substation (DEA ref.: 14/12/16/3/3/1/1781) within one consolidated application. However, due to the fact that the Gamagara Local Municipality will be constructing and operating the proposed substation (even though Eskom is the applicant) it was decided by Eskom to apply for a separate Environmental Authorisation from the Department of Environmental Affairs for the 132/11kV Olifantshoek Substation such that a separate Authorisation for this infrastructure could be obtained.

The period for which the Environmental Authorisation is required for the 132/11kV Olifantshoek Substation is five (5) years. The timeframe for the completion of the activity is the last quarter of 2023.

1.1. Project Alternatives

Two alternative substation sites are being considered within this Basic Assessment Report (**Appendix A1**). Both alternatives are located within the urban edge of the town of Olifantshoek and are referred to as the Preferred Substation location and the Alternative Substation location. The Preferred Substation location is located further away from the town of Olifantshoek with the Alternative Substation location located in close proximity to the town and the existing Olifantshoek Substation to be decommissioned.

[1] The proposed 132kV Olifantshoek Power Line is being assessed as part of a separate application for Environmental Authorisation (DEA ref.: 14/12/16/3/3/1/1781).

1.2. Site Location

The sites for the proposed Preferred and Alternative Olifantshoek substation locations and ancillary infrastructure are located approximately 35 km north east of Kathu (refer to **Figure 1**) and fall within the Gamagara Local Municipality and the greater John Taolo Gaetsewe District Municipality. Both alternatives are located within the urban edge of the town of Olifantshoek, with the Preferred Substation location located further from the residential area of Olifantshoek and in close proximity to the N14 national road and the Alternative Substation location located in close proximity to the residential area of Olifantshoek and the existing Olifantshoek Substation to be commissioned. Both substation locations can be accessed via the N14 in the town of Olifantshoek.

Table 1: Location of the study area

Province	Northern Cape Province	
District Municipality	John Taolo Gaetsewe	
Local Municipality	Gamagara Local Municipality	
Ward number(s)	Ward 3 and Ward 4	
Nearest town(s)	Olifantshoek and Kathu	
Farm Name/Portion and 21 Digit SG Code Preferred Substation site	**FARM NAME** Portion 1 of Farm Neylan 574	**PORTION NUMBER** C04100000000057400001
Farm Name/Portion and 21 Digit SG Code Alternative Substation site	**FARM NAME** Erf 155	**21 DIGIT SG CODE** C04100040000015500000
Farm Name/Portion and 21 Digit SG Code Substation to be decomissioned	**FARM NAME** Erf 155 C04100040000015500000	**21 DIGIT SG CODE**

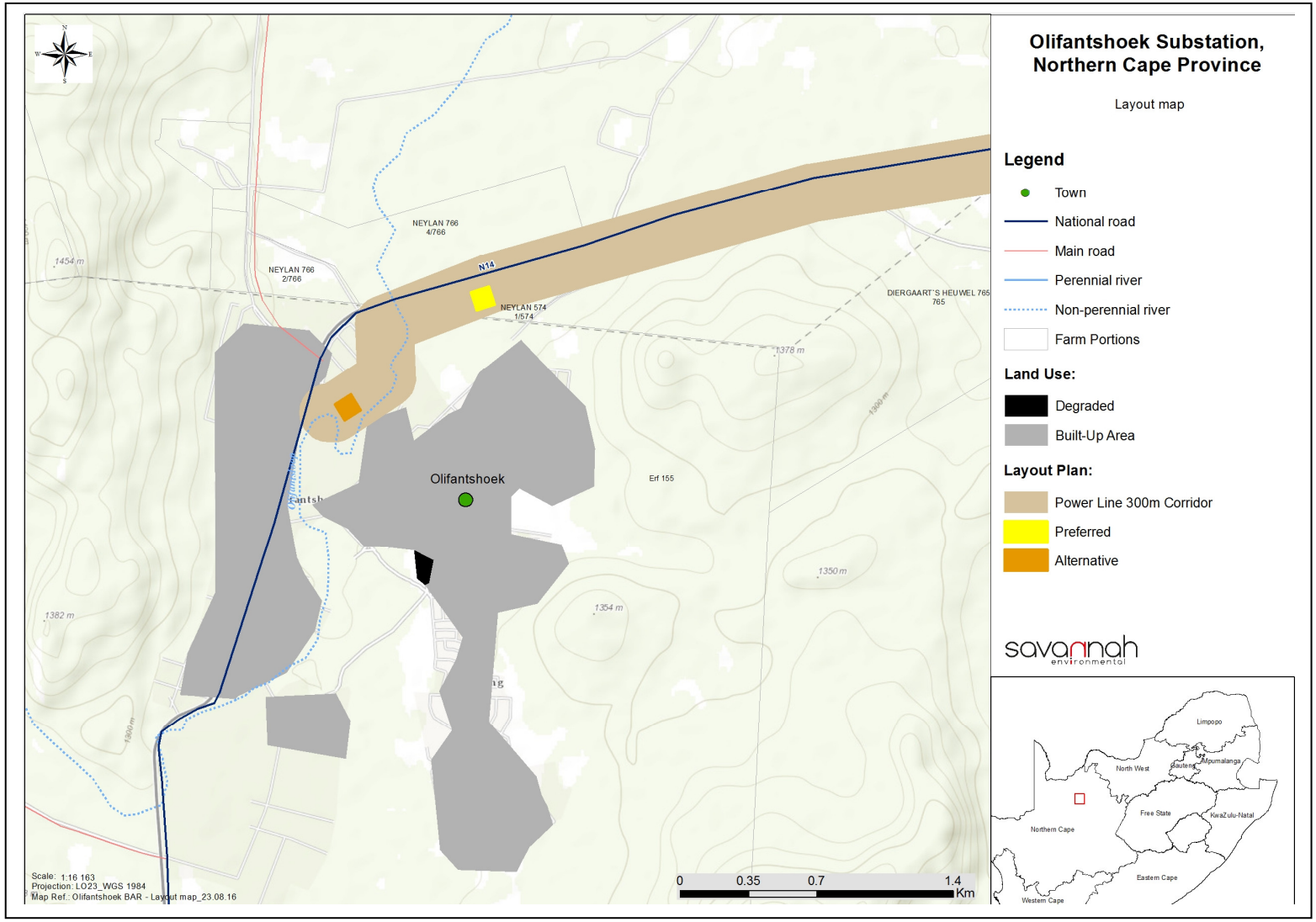

Figure 1: Locality map showing the location of the Preferred Substation location and the Alternative Substation location in relation to the town of Olifantshoek (**Appendix A1**)

2. NEED AND DESIRABILITY FOR THE PROPOSED INFRASTRUCTURE

The need for this project is based on the requirement to replace the current substation in Olifantshoek, which has reached its economic end, with a substation of a greater Mega Volt Amphere to accommodate a stronger power line for the distribution of power to the town of Olifantshoek. Currently Olifantshoek has a very poor electrification output to meet the basic needs for socio-economic development and upliftment in the area. In a broader sense, the proposed project may support various Renewable Energy Independent Power Producer Procurement (REIPPP) Programme projects requiring a strong grid connection.

From an overall environmental sensitivity and planning perspective, the proposed grid connection infrastructure supports the broader strategic context of the municipality as it is directly linked to the strategic objective of the municipality, which is a stronger and more reliable electrification network. Moreover, a stronger network is considered a driver for economic growth in the region as per the John Taolo Gaetsewe District Municipality's Integrated Development Plan. No exceedance of social, ecological, hydrological, visual or avifaunal limits will result from the construction of the proposed 132/11kV Olifantshoek Substation and no detrimental impact is expected, as detailed in this Basic Assessment Report.

3. REQUIREMENTS FOR A BASIC ASSESSMENT PROCESS

In terms of the Environmental Impact Assessment (EIA) Regulations published in terms of Section 24(5) of the National Environmental Management Act (NEMA, Act No. 107 of 1998), Eskom Holdings SOC Ltd requires authorisation for the construction and operation of the substation and the decommissioning of the existing Olifantshoek substation. In terms of sections 24 and 24D of the National Environmental Management Act (No 107 of 1998), as read with the newly gazetted EIA Regulations, 2014, of GN R327, 325 and 324 of April 2017, a Basic Assessment process is triggered by the proposed project.

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. Eskom is a State-Owned Corporation (SOC), and the proposed project triggers a Basic Assessment Process, the National Department of Environmental Affairs (DEA) is identified as the competent authority[2] and the Northern Cape Department of Environmental and Nature Conservation (NC DENC) will act as the commenting authority.

3.1. Listed Activities triggered by the proposed project

Eskom requires Environmental Authorisation for the proposed project in terms of Sections 24 and 24D of the National Environmental Management Act (No 107 of 1998), as read with the EIA Regulations of 2014, GN R. 326, 327 and 324. The following Listed Activities are applicable to the project.

[2] The National Department of Environmental Affairs is the competent authority due to the fact that Eskom is a State owned Enterprise.

Table 2: Listed Activities triggered by the proposed 132/11kV Olifantshoek Substation

Activity listed in GNR 327, 325 and 324	Relevance to the project
GN327, Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from- (i) a watercourse	The development of the Alternative Substation will result in the excavation of soil of more than 10 cubic meters from the riparian fringe associated with the Olifantsloop non-perennial watercourse. This may include the construction of the access road (5m in width) to the Alternative Substation.
GN327, Activity 27: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.	The construction of the 132/11kV Olifantshoek Substation will require the clearance of 1 ha of indigenous vegetation.
GN324, Activity 4(g)(iii)(aa): The development of a road wider than 4 meters with a reserve less than 13.5 meters in (g) the Northern Cape (iii) inside urban areas and within (aa) areas zoned for use as public open space	The construction of the 132/11kV Olifantshoek Substation will require the development of access roads with a width of 5m inside the urban edge of Olifantshoek which is zoned as open space.
GN324, Activity 10(g)(iv)(aa): The development and related operation 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 meters in (g) the Northern Cape (iv) inside urban areas and within (aa) areas zoned for use as public open space.	The construction and operation of the 132/11kV Olifantshoek Substation will require the storage of more than 30 cubic meters of oils and fuels within the urban edge of Olifantshoek which is zoned as open space.
GN324, Activity 12(g)(iv): The clearance of an area of 300 square meters or more of indigenous vegetation in (g) the Northern Cape (iv) on land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	The construction of the new 132/11kV Olifantshoek Substation will require the removal of 1ha of indigenous vegetation. The alternative substation locations are both located within an area zoned as open space.
GN324, Activity 14(ii)(a)(c)(g)(iii)(aa): The development of (ii) infrastructure or structures with a physical footprint of 10 square meters or more where such development occur (a) within a watercourse ; (c) or within 32 meters of a watercourse, measured from the edge of a watercourse in (g) the Northern Cape (iii) inside urban areas and within (aa) areas zoned for use as public open space.	The construction and operation of the 132/11kV Olifantshoek Substation within the alternative location may result in the establishment of access roads within a watercourse or within 32m of a watercourse (i.e. the Olifantsloop River). The location of the alternative substation is located within the Olifantshoek urban edge and an area zoned for open space.

The nature and extent of the proposed project, and the potential environmental impacts associated with the construction, operation and decommissioning phases are explored in more detail in this final Basic Assessment Report. This report has been compiled in accordance with the requirements of the EIA Regulations and includes details of the activity description; the site, area and property description; the public participation process; the impact assessment; as well as the recommendations proposed by the Environmental Assessment Practitioner.

3.2. Legal Requirements

Table 3: Legal Requirements of the EIA Regulations, 2014, as amended in April 2017

NEMA REGULATION GNR 326, SECTION 19 REQUIREMENTS FOR THE CONTENT OF BASIC ASSESSMENT REPORTS AS PER APPENDIX 1	CROSS REFERENCE IN THIS REPORT (refer to the following parts in the report)
(1) A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include—	Summary and Project overview, section 4
(a) details of—	
(i) the EAP who prepared the report; and	
(ii) the expertise of the EAP, including a curriculum vitae;	Appendix G3
(b) the location of the activity, including:	Chapter 1, section 1
(i) the 21 digit Surveyor General code of each cadastral land parcel;	
(ii) where available, the physical address and farm name;	Chapter 1, section 1
(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Chapter 1, section 1
(c) a plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale;	Figure 1
or, if it is—	N/A - this is not a linear activity
(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
(d) a description of the scope of the proposed activity, including—	Chapter 1, section 1.2 and 1.3
(i) all listed and specified activities triggered and being applied for; and	
(ii) a description of the activities to be undertaken including associated structures and infrastructure ;	
(e) a description of the policy and legislative context within which the development is proposed including—	Chapter 1, section 2
(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and	
(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Chapter 1, section 2
(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;	Chapter 1, section 1.4
(g) a motivation for the preferred site, activity and technology alternative;	Chapter 1, section 1.1
(h) a full description of the process followed to reach the proposed preferred alternative within the site, including:	Chapter 1, section 1.1 Chapter 3 Appendix E
(i) details of all the alternatives considered;	
(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
(iii) a summary of the issues raised by interested and affected parties,	

NEMA REGULATION GNR 326, SECTION 19 REQUIREMENTS FOR THE CONTENT OF BASIC ASSESSMENT REPORTS AS PER APPENDIX 1	CROSS REFERENCE IN THIS REPORT (refer to the following parts in the report)
and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	
(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 2
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts— (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Chapter 4
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Chapter 4, section 1
(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 1, section 1.1 Chapter 4
(viii) the possible mitigation measures that could be applied and level of residual risk;	Chapter 4 Appendix F
(ix) the outcome of the site selection matrix;	N/A – the site selection process was based on technical considerations which was then assessed from an environment perspective
(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and	Chapter 1, section 1.1
(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Chapter 4, section 9.5
(i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including— (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and	Chapter 4
(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;	Chapter 4
(j) an assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable	Chapter 4

NEMA REGULATION GNR 326, SECTION 19 REQUIREMENTS FOR THE CONTENT OF BASIC ASSESSMENT REPORTS AS PER APPENDIX 1	CROSS REFERENCE IN THIS REPORT (refer to the following parts in the report)
loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	
(k) where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Chapter 4 Appendix F
(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 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;	Chapter 4, section 8 and 9
(m) based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Appendix F
(n) 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;	N/A
(o) a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Summary and Project Overview, section 5
(p) 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;	Chapter 5, section 2
(q) where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	N/A
(r) an undertaking under oath or affirmation by the EAP in relation to: (i) the correctness of the information provided in the reports; (ii) the inclusion of comments and inputs from stakeholders and I&APs; (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties; and	Appendix G2
(s) where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t) any specific information that may be required by the competent authority; and	N/A
(u) any other matters required in terms of section 24(4)(a) and (b) of the Act.	N/A

4. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND EXPERTISE TO CONDUCT THE BASIC ASSESSMENT

The Savannah Environmental staff has acquired considerable experience in environmental management from working in this field for more than 19 years, and have been actively involved in undertaking environmental studies for a wide variety of projects throughout South Africa and neighbouring countries.

Savannah Environmental is currently responsible for environmental assessment and environmental management services on a number of built infrastructure projects throughout South Africa, including several renewable energy projects.

Table 4 provides a summary of the experience and expertise of the Savannah Environmental project team, as well as credentials of the specialists contracted to undertake the necessary studies.

Table 4: Project Team details

Team Member and Role	Position in Team	Experience
Savannah Environmental		
Jo-Anne Thomas	Director, Project Manager, EAP	Registered with the South African Council for Natural Science Professions (SACNSP) as an Environmental Scientist, holds a Masters of Sciences degree in Botany and has over 19 years' experience in the environmental management field. Responsible for the management of environmental compliance monitoring on various projects over the past 10 years. Currently responsible for the management of various EIA processes across the country
Lisa Opperman	GIS consultant	Holds a Bachelor degree with Honours in Environmental Management and has 2 years of experience in the environmental field. Her key focus is on environmental impact assessments, public participation, environmental management plans and programmes, as well as mapping using ArcGIS for a variety of environmental projects.
Gabriele Wood	Public participation consultant	Holds an Honours Degree in Anthropology, with 6 years consulting experience in public participation and social research. 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 and Basic Assessments undertaken by Savannah Environmental.
Specialist Inputs		
Simon Todd of Simon Todd Consulting	Ecology Impact Study	Simon Todd has extensive experience in biodiversity management and ecological assessment, having provided assessments for more than 100 different developments. This includes a large number of power lines and associated infrastructure distributed widely across South Africa. In addition, Simon Todd was the contributing ecologist on the Strategic Environmental Assessment (SEA) for both the Eskom Grid Infrastructure, as well as the Renewable Energy Development Zones. Simon Todd is a recognised ecological expert and is a past chairman of the Arid-Zone Ecology Forum and has 18 years' experience working throughout the country. Simon Todd is

Team Member and Role	Position in Team	Experience
		registered with the South African Council for Natural Scientific Professions (No. 400425/11).
Gerhard Botha	Avifaunal and Wetland Delineation Impact Study	Gerhard is a SACNASP Registered Professional with 6 years of experience. His Specific responsibilities are as an Ecological Specialist and Environmental Consultant include, inter alia, professional execution of specialist consulting services (including flora, wetland, avifaunal and fauna studies, where required), impact assessment reporting, walk through surveys/ground-truthing to inform final design, compilation of management plans, compliance monitoring and audit reporting, in-house ecological awareness training to on-site personnel, and the development of project proposals for procuring new work/projects
Jenna Lavin of Cedar Tower Consulting	Heritage Impact Study	Jenna holds a Masters in Archaeology from the University of Cape Town and has 10 years' experience in the Environmental Sector. Jenna is a Registered member of Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee, Association for Southern African Professional Archaeologists (ASAPA), the Association of Professional Heritage Practitioners (APHP), the Palaeontological Society of South Africa (PSSA) and ICOMOS South Africa, for which she is the Vice-President of the Board. Jenna is also a member of the International Committee for Archaeological Heritage Management (ICAHM).
Jon Marshall of Afzelia Environmental Consulting	Visual Impact Study	Jon is a qualified Landscape Architect at Cheltenham (UK), and is a Chartered Member of the Landscape Institute (UK) since 1986. He is also a registered Landscape Architect and Environmental Assessment Practitioner of South Africa. Jon has over 25 years of experience in the field and hold an Environmental Law degree from the University of KZN. Jon Registered member of the Professional Landscape Architect (South Africa) and is a certified Environmental Assessment Practitioner of South Africa. He is also a Member of the International Association of Impact Assessment, South Africa.

Savannah Environmental has gained extensive knowledge and experience on potential environmental impacts associated with electricity generation, transmission and distribution projects through their involvement in related EIA processes. Savannah Environmental has completed the EIA process and received environmental authorisations for numerous energy-related projects and their associated infrastructure. Curricula vitae for the Savannah Environmental project team consultants and specialist consultants are included in **Appendix G**.

5. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are applicable to the studies undertaken within this Basic Assessment Process:

» All information provided by the proponent to the environmental team was correct and valid at the time it was provided.

- It is assumed that the substation development sites identified by the proponent represents technically suitable sites for the establishment of the proposed project (taking into account that optimisation of the layout might be required based on geotechnical investigations).
- Studies and overall conclusions made assume that any potential impacts on the environment associated with the proposed development will be avoided or mitigated accordingly based on the findings of this Basic Assessment Report and the associated Specialist Studies.

Refer to the specialist studies in **Appendices D1 – D5** for specific limitations.

BASIC ASSESSMENT FOR PUBLIC COMMENT

The Basic Assessment Report was made available for a 30-day review period to all relevant authorities, key stakeholders, I&APs and the public. This process was undertaken in support of an application for Environmental Authorisation to the National Department of Environmental Affairs (DEA). The 30-day review period of the Basic Assessment Report was from 15 November 2017 to 15 December 2017. The report was made available for public review at the Olifantshoek Public Library and the Savannah Environmental website (www.savannahsa.com).

All comments received during the 30-day review period was recorded, included and responded to in this final Basic Assessment report and the comments and responses report (**Appendix E5**).

CHAPTER 1: INTRODUCTION AND PROJECT DESCRIPTION

This chapter provides an introduction to the proposed 132/11kV Olifantshoek Substation as well as a description of the project location and project characteristics.

1. PROJECT DESCRIPTION

The existing 132kV Olifantshoek substation has reached its operational end (threshold), and can no longer service the growing demand for electrification and networks in the region. To rectify this *status quo* Eskom is proposing to construct a new substation (*132/11kV Olifantshoek Substation*) with a greater Mega Volt Ampere (MVA) to be connected via the proposed 132kV Olifantshoek Power Line[3] to the existing Eskom Emil Switching Station. With the commissioning of the proposed 132/11kV Olifantshoek Substation, the existing Olifantshoek Substation, which is currently providing insufficient capacity, will be decommissioned. Refer to **Figure 1**.

ɳThe proposed project falls within Ward 3 and Ward 4 of the Gamagara Local Municipality of the greater The proposed project falls within Ward 3 and Ward 4 of the Gamagara Local Municipality of the greater John Taolo Gaetsewe District Municipality, between the outskirts of the towns of Olifantshoek and Kathu. There are three main roads that provide general access to the alternative substation locations, i.e. R385, R325 and the N14. Apart from these, farm entrances and gravel roads, including the existing power line service roads, can be used where permissible. The landscape is flat in sections with a few undulating hills.

Eskom is proposing the following 2 aspects of works to be undertaken as part of the project:

- Construction of a new 10MVA 132/11kV Olifantshoek Substation (approximately 100m x 100m in extent) and ancillaries (including a metering station, control building, admin building, workshop and associated infrastructure). Access roads of 5m in width will also be established.
- Decommissioning of the existing 22/11kV 2.5MVA Olifantshoek Substation including all site rehabilitation and preservation.

Two alternative sites for the establishment of the new substation have been identified for investigation. Photographs of the substation sites, the general location and specific features have been included in **Appendix B**. A facility illustration providing a concept of how the development will look is included as **Appendix C**.

[3] The proposed 132kV Olifantshoek Power Line is being assessed as part of a separate application for Environmental Authorisation.

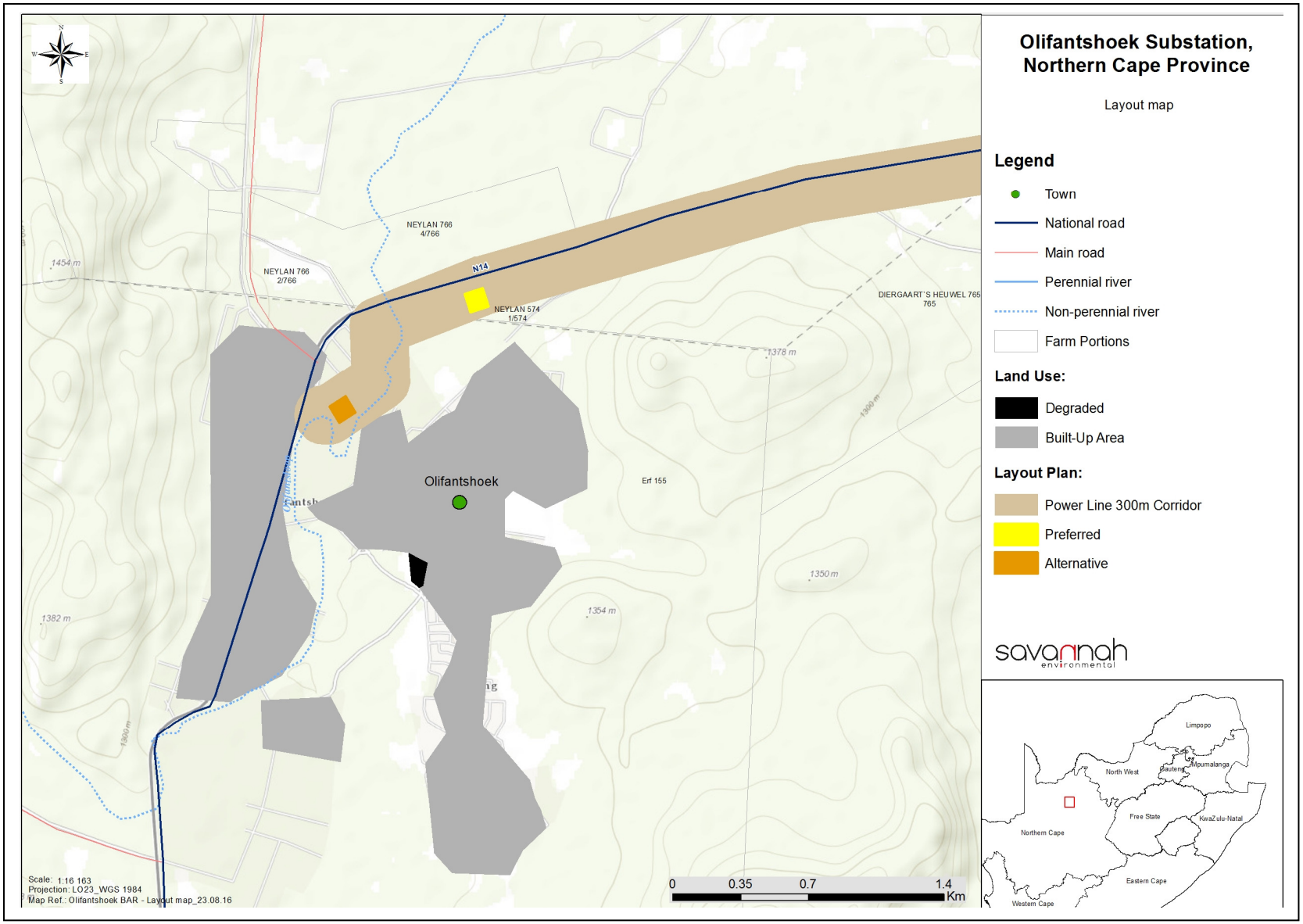

Figure 2: Locality map showing the location of the Preferred Substation location and the Alternative Substation location in relation to the town of Olifantshoek (**Appendix A1**)

The table below provides the details of the location of the 132/11kV Olifantshoek Substation options.

Province	Northern Cape Province	
District Municipality	John Taolo Gaetsewe	
Local Municipality	Gamagara Local Municipality	
Ward number(s)	Ward 3 and Ward 4	
Nearest town(s)	Olifantshoek and Kathu	
Farm Name/Portion and 21 Digit SG Code Preferred Substation site	**FARM NAME** Portion 1 of Farm Neylan 574	**PORTION NUMBER** C04100000000057400001
Farm Name/Portion and 21 Digit SG Code Alternative Substation site	**FARM NAME** Erf 155	**21 DIGIT SG CODE** C04100040000015500000
Farm Name/Portion and 21 Digit SG Code Substation to be decomissioned	**FARM NAME** Erf 155 C04100040000015500000	**21 DIGIT SG CODE**

1.1 Project Alternatives

The section below described the alternatives which have been considered and assessed as part of the project. The alternatives considered include site alternatives, layout alternatives, technology alternatives, substation insulation alternatives and the no-go alternative. There are no site alternatives associated with the decommissioning of the existing Olifantshoek Substation. The sections which follow therefore only consider the new substation.

1.1.1 Site alternatives

Two technically feasible substation site alternatives have been identified by Eskom, both located within the urban edge of the town of Olifantshoek. The sites were identified by the applicant as technically feasible which will ensure the efficiency of the project and the distribution of the much needed electricity to the town. The two substation site alternatives are referred to as the Preferred Substation location and the Alternative Substation location. The table below provides a description of each alternative within its proposed location and well as the advantages and disadvantages for each option.

Alternative	Description	Advantage	Disadvantage
Preferred	The Preferred Substation location is situated within the urban edge of the town of Olifantshoek and just south of the N14 national road. The affected property within which the Alternative Substation location is located in is owned by a private landowner.	» Technically viable » Easy access to the site via the N14 » Environmentally preferred » Less environmental impact	» Further away from the existing substation which will result in more extensive cabling required from the Municipality during construction
	Site Co-ordinates	27°56'11.26"S	22°44'28.96"E
	Size	100x100m / 10 000m^2 / 1ha	
Alternative	The Alternative Substation location is situated within the urban edge and in close proximity to the existing Olifantshoek Substation, which is planned to be decommissioned as part of this process. The affected property within which the	» Technically viable » Located close to the existing Olifantshoek Substation ensuring easier construction for the Municipality in	» Located within the Olifantsloop Riparian area » Presence of sensitive riparian woodland of the Olifantsloop River

	Alternative Substation location is located in is owned by the Gamagara Local Municipality. This option is located closer to the built-up area of the town of Olifantshoek with residential developments located close-by.	terms of cabling	» More environmentally sensitive » Not preferred from an environmental sensitivity perspective
	Site Co-ordinates	27°55'53.30"S	22°44'54.41"E
	Size	100x100m / 10 000m^2 / 1ha	

1.1.2 Layout alternatives

The design and layout of the Eskom substation alternatives must conform to Eskom's technical standards as it forms part of the national electricity supply network and must fit in with the existing network systems, technology and infrastructure. Therefore no alternative substation layouts have been considered.

1.1.3 Technology alternatives

No feasible technological alternatives exist for the distribution of electricity and as a result thereof no alternative has been assessed in this regard.

1.1.4 Design Alternatives

The design of the substation will be based on widely proven and accepted industry standards and does not significantly affect the environmental impact of the proposed development in any way as its footprint will not exceed the specifications or extend beyond the substation site of 100m x 100m. The substation must be constructed according to the authorised standards approved by Eskom Holdings SOC Ltd.

Air Insulated Substation VS Gas Insulated Substation

Air Insulated Substation (AIS) - Preferred
AIS are generally used where there is an overhead network. For the nature of this project, AIS is preferred for the following reasons: » The substation is compatible with overhead power lines
Gas Insulated Substation (GIS) - Alternative
GIS is typically used on underground cable networks, however due to the nature of the terrain, the impracticality and cost expense associated with using underground cables to connect the substation, GIS is not considered to be feasible.

1.1.5 No-go alternative

The No-go option implies that the **Project does not proceed**. This means that the *status quo* of the environment would remain unchanged and no impacts would occur.

However, the implementation of the No-go alternative will result in a situation where Eskom will not be able to meet the current capacity demands of the region. Ultimately, the project will improve the performance of the supply to the region, in-turn contributing to a greater availability of electricity to residents and industry in Olifantshoek. By not increasing the supply to the greater area, development will be constrained. This is not seen as desirable from a technical perspective as the existing substation is

operating at near-capacity and will not be able to accommodate any greater load that may be required any future developments.

This alternative is assessed within this Basic Assessment Report.

1.2 Project Activities

The following activities will be undertaken as part of the construction, operation and decommissioning phases of the project.

1.2.1 Construction Phase

The following sequence will be followed with the construction of the 132/11kV Olifantshoek Substation:

Step 1: Conduct geotechnical investigations to determine founding conditions;
Step 2: Conduct site survey;
Step 3: Vegetation clearance and construction of access road;
Step 4: Site grading and levelling;
Step 5: Construction of foundations;
Step 6: Import of switching station components;
Step 7: Construction of substation;
Step 8: Rehabilitation of disturbed area and protection of erosion sensitive areas; and
Step 9: Testing and commissioning

i) <u>Technical Details of the Substation</u>

The footprint of the substation may include a metering station, control building, admin building, workshop and associated infrastructure. The construction of ancillary infrastructure will follow a similar sequence as that of the substation described above. The table below provides an overview of the technical details of the substation components to be constructed.

Table 5: Technical details of the substation components to be constructed and operated

Project Component	Specification
Mega Volt Ampere	10
Size of the substation	71m x 49m within a footprint of 100m x 100m
Distance between equipment	9m
Footprint of the development	100m x 100m
Number of transformers	One 10 MVA transformer

ii) <u>Access</u>

Ready access is not currently available at the substation sites and as such minor access roads (of 5m in width) will need to be constructed as part of the construction phase.

The preferred substation site is located further from the town of Olifantshoek with no direct access. Access to the preferred substation site would therefore need to be constructed. Proposed access to the preferred

substation site will be a left turn onto Industrial Road, directly off the N14 from the direction of Kathu. The area generally consists of business property, industrial property and agricultural property. Access off Industrial Road is preferred over direct access via the N14 national road. A small 215m road track of 5 m in width (blue line on **Figure 2**) would need to be cleared for access from the Industrial road. The proposed access road will be gravel in nature for low-bed trucks and maintenance trucks and is expected to have no impact on the surrounding environment since this land is already cleared and disturbed.

The alternative substation site will be accessed via the N14 and minor access roads with a width of up to 5m will be established.

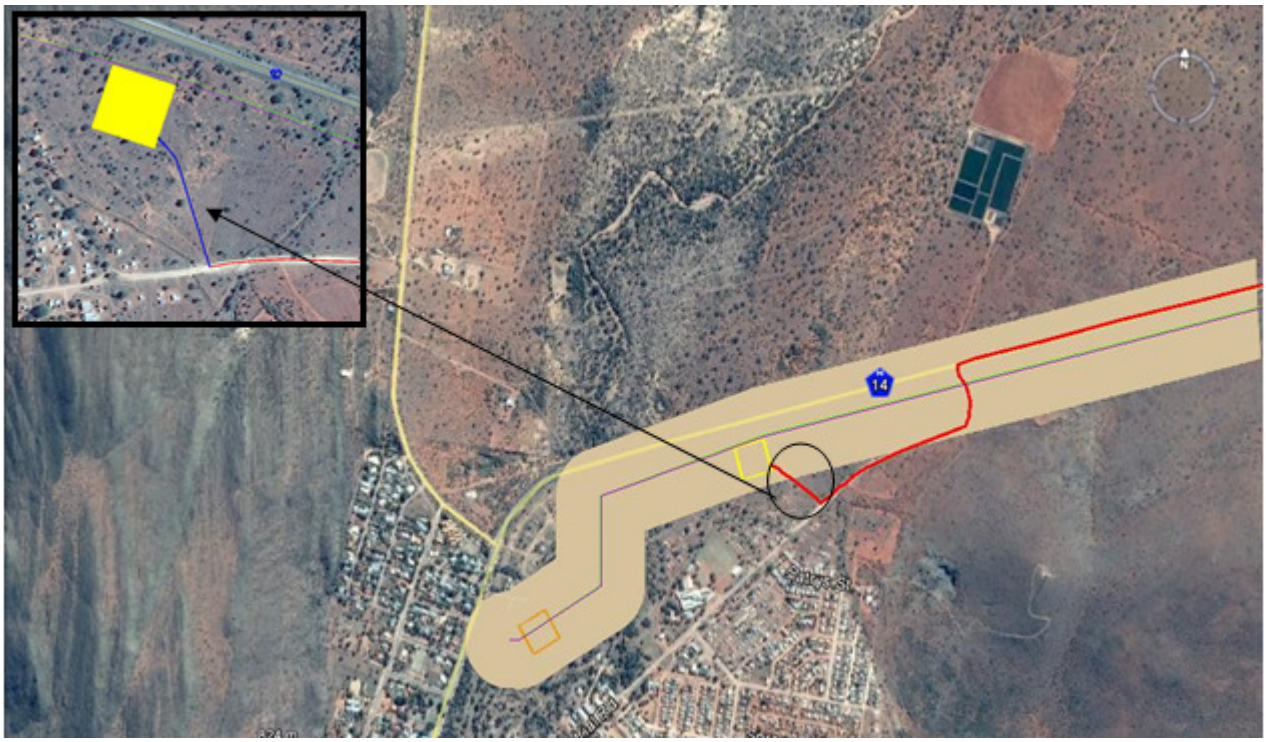

Figure 2: Google Earth image depicting the preferred access corridor to the preferred substation site (yellow). The proposed access road route is depicted as a red line, and as a blue line on the insert.

iii) Waste Management

It is anticipated that construction waste will be generated and will be mainly comprised of soil material from excavation activities as well as metal and cabling offcuts. Non-recyclable waste will be removed from site by a suitable contractor and will be transported to the nearest registered waste disposal facility for appropriate disposal. In order to comply with legal requirements, should there be excess solid construction waste after recycling options have been exhausted, the waste will be transported to the nearest registered waste disposal facility for appropriate disposal.

iv) Dust and Noise

During the construction phase, it is expected that there will be short term, localised dust generation and emissions from vehicles and machinery. However the dust and emissions will be of short term duration and have limited impact in terms of extent and severity. Appropriate dust suppression measures must be implemented to reduce the impacts. It is recommended that construction vehicles be serviced and kept in good mechanical condition in order to minimise possible exhaust emission.

Short term noise impacts are anticipated during the construction phase of the project. It is anticipated that the noise will be localised and contained within the construction area and its immediate surroundings. During operation, maintenance of the substation could potentially generate noise, however this is likely to be minimal. Moreover, the Preferred Substation location is isolated in the environmental and unlikely to pose any noise impacts on sensitive receptors.

v) Water Use

Should the Alternative Substation location be selected as the preferred location for the establishment of the new substation, a water use license (WUL) or General Authorisation would be required in terms of Section 21 of the Act due to the drainage line which could be impacted by the 132/11kV Olifantshoek Substation. A specialist has assessed the site and has undertaken a Risk Assessment as required by DWS (**Appendix D1**). This report will inform the process going forward. A pre-Application meeting was undertaken with the Department of Water and Sanitation on 12 June 2017 in Kimberley. No application has been lodged with the department as yet. This can only be undertaken once the final location of the substation has been established. Should the Preferred Substation location be selected as the preferred location for the establishment of the new substation, no water use license will be required.

1.2.2. Operation and Maintenance of the Substation

The 132/11kV Olifanatshoek Substation will be operational for more than 20 years and will require routine maintenance work throughout this period. The substation site will be accessed via existing roads where possible and where required access roads will be established during the construction phase. During the operation and maintenance phase, vegetation around the substation will require management only if it impacts on the safety and operational objectives of the project. Operation and maintenance of the substation will be undertaken by the Gamagara Local Municipality.

1.2.3 Decommissioning of the Existing Olifantshoek Substation, and future decommissioning of the proposed 132/11kV Olifantshoek substation

The existing Olifantshoek Substation (**Figure 3**) has reached the end of its economic life, and therefore must be decommissioned. The decommissioning of the existing substation will only take place with the commissioning of the proposed 132/11kV Olifantshoek Substation. Currently, this existing substation only supplies 2MVA power to the surrounding community, which is no longer sufficient. The following decommissioning activities are expected to be undertaken:

a) Site Preparation

Site preparation activities will include confirming the integrity of the access to the site to accommodate the required equipment and the mobilisation of decommissioning equipment.

b) Disassemble Components

The components would be disassembled, reused and recycled (where possible), or disposed of in accordance with regulatory requirements.

c) Rehabilitation

Following decommissioning and removal of all project material from the site, the disturbed areas will be rehabilitated to the pre-project land capability. Where possible, rehabilitation will be conducted concurrently with decommissioning. The following rehabilitation activities are relevant:

- The existing profiles of the land affected will be improved and stabilised thereby leaving profiles compatible with the topography of the area, which is essentially flat.
- Ripping of compacted soils will be done prior to adding topsoil, which will be done by mechanical means. It is expected that there will be a sufficient amount of topsoil and/or subsoil moved and stockpiled during the construction phase to facilitate rehabilitation. If required, areas or land for extracting topsoil or subsoil will be identified. The land capability characteristics of such areas should be similar to the affected soils (same texture, colour, permeability, etc.).
- Vegetation will be re-established. The plant species to be used will match those naturally occurring in the area. This will be conducted in consultation with a biodiversity specialist.

It is expected that the same decommissioning sequences will be undertaken as-and-when the proposed 132/11kV Olifantshoek Substation is no longer economically serviceable or required.

Figure 3: Existing Olifantshoek substation to be decommissioned

1.3 Applicable Listed Activities applied for in terms of the EIA Regulations, 2014, as amended

When considering the nature of the proposed development, the location of the proposed substation sites and the size of the development the following listed activities are required to be authorised in order for the development to be constructed and operated.

Activities relevant to the current application have been identified and are listed in the table below.

Activity listed in GNR 327, 325 and 324	Relevance to the project
GN327, Activity 19: The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from- (i) a watercourse	The development of the Alternative Substation will result in the excavation of soil of more than 10 cubic meters from the riparian fringe associated with the Olifantsloop non-perennial watercourse. This may include the construction of the access road (5m in width) to the Alternative Substation.
GN327, Activity 27: The clearance of an area of 1 hectares or more, but	The construction of the 132/11kV Olifantshoek Substation will

less than 20 hectares of indigenous vegetation.	require the clearance of 1 ha of indigenous vegetation.
GN324, Activity 4(g)(iii)(aa): The development of a road wider than 4 meters with a reserve less than 13.5 meters in (g) the Northern Cape (iii) inside urban areas and within (aa) areas zoned for use as public open space	The construction of the 132/11kV Olifantshoek Substation will require the development of access roads with a width of 5m inside the urban edge of Olifantshoek which is zoned as open space.
GN324, Activity 10(g)(iv)(aa): The development and related operation 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 meters in (g) the Northern Cape (iv) inside urban areas and within (aa) areas zoned for use as public open space.	The construction and operation of the 132/11kV Olifantshoek Substation will require the storage of more than 30 cubic meters of oils and fuels within the urban edge of Olifantshoek which is zoned as open space.
GN324, Activity 12(g)(iv): The clearance of an area of 300 square meters or more of indigenous vegetation in (g) the Northern Cape (iv) on land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning.	The construction of the new 132/11kV Olifantshoek Substation will require the removal of 1ha of indigenous vegetation. The alternative substation locations are both located within an area zoned as open space.
GN324, Activity 14(ii)(a)(c)(g)(iii)(aa): The development of (ii) infrastructure or structures with a physical footprint of 10 square meters or more where such development occur (a) within a watercourse ; (c) or within 32 meters of a watercourse, measured from the edge of a watercourse in (g) the Northern Cape (iii) inside urban areas and within (aa) areas zoned for use as public open space.	The construction and operation of the 132/11kV Olifantshoek Substation within the alternative location may result in the establishment of access roads within a watercourse or within 32m of a watercourse (i.e. the Olifantsloop River). The location of the alternative substation is located within the Olifantshoek urban edge and an area zoned for open space.

1.4 Activity Motivation: Need and Desirability

The need for this project is based on the requirement to replace the current substation in Olifantshoek, which has reached its economic end, with a substation of a greater Mega Volt Amphere to accommodate a stronger power line for the distribution of power to the town of Olifantshoek. Currently Olifantshoek has a very poor electrification output to meet the basic needs for socio-economic development and upliftment in the area. In a broader sense, the proposed project may support various Renewable Energy Independent Power Producer Procurement (REIPPP) Programme projects requiring a strong grid connection.

From an overall environmental sensitivity and planning perspective, the proposed grid connection infrastructure supports the broader strategic context of the municipality as it is directly linked to the strategic objective of the municipality, which is a stronger and more reliable electrification network. Moreover, a stronger network is considered a driver for economic growth in the region as per the John Taolo Gaetsewe District Municipality's Integrated Development Plan. No exceedance of social, ecological, hydrological, visual or avifaunal limits will result from the construction of the proposed 132/11kV Olifantshoek Substation and no detrimental impact is expected, as detailed in this Basic Assessment Report.

When considering the provincial and municipal planning strategies and policies for the area, as well as certain national considerations, the development of the substation is supported in terms of the Northern Cape Provincial Spatial Development Framework (NCPSDF), Northern Cape Environmental Implementation Plan (EIP), Gamagara Local Municipality Integrated Development Plan (IDP), John Taolo Gaetsewe District Municipality Environmental Management Framework (EMF), Strategic Infrastructure Projects (SIP) and the National Development Plan (NDP).

1.4.1 Northern Cape Provincial Spatial Development Framework (NCPSDF)

The Northern Cape Provincial Spatial Development Framework (NCPSDF) makes reference to 6 spatial planning categories, of which Section C refers to Agricultural Areas. C8 of the PSDF which is ensuring the development of efficient SPC F: Surface Infrastructure. This section notes that in order to promote economic growth in the Northern Cape the availability of grid infrastructure (including power lines and substations) is needed. The NCPSDF also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised. The proposed project will facilitate the improved supply of electricity to the Olifantshoek area, which will contribute towards this objective.

1.4.2 Northern Cape Environmental Implementation Plan (EIP)

An Environmental Implementation Plan (EIP) was compiled by the Northern Cape Province as NEMA calls for the development of a national and provincial Environmental Implementation Plans (EIPs) and Environmental management plans (EMPs). The EIP was compiled in order to encourage cooperative governance across departments. The EIP aims to ensure that land use decision-making is carried out using adequate available environmental resource information in order to ensure sustainable and appropriate environmental management to the benefit of its residents. One of the set goals for the EIP is ensuring that all environmental issues are appropriately addressed. This is achieved for this project through the execution of this Basic Assessment process within which sensitive and significant environmental features associated within the substation locations are considered and the option with the lease environmental intrusion and the most acceptability is implemented as part of the development.

1.4.3 John Taolo Gaetsewe District Municipality Environmental Management Framework (EMF)

The approval of this application will not compromise the John Taolo Gaetsewe District Municipality Environmental Management Framework. The District is mostly occupied by rural communities who have poor access to services and a low level of skills. John Taolo Gaetsewe District Municipality faces a number of challenges to economic growth and development. These challenges include:

- Commercial and subsistence farming
- Low skills levels
- Mismanagement of assets
- A growing mining sector
- Gravel roads in many areas
- Lack of tourism assets
- A desert-like environment

Through the development of the 132/11kV Olifantshoek Substation, improved capacity will be created within the area which will allow for broader social and economic growth due to an improved supply of electricity.

1.4.4 Gamagara Local Municipality IIntegrated Development Plan (IDP)

Due to the expansion of mining activities in the Gamagara municipal jurisdiction, there is a need for basic and bulk infrastructure. The population of the area has grown despite the mines retrenching workers. The increase was observed mostly in the informal settlement areas when compared to the formal towns. This has led to strain on the infrastructure which was not built to accommodate a high number of people and activities. Key among the most pressing need is the upgrading of the existing infrastructure, especially the sewerage system, water network, electrical capacity and roads.

With the development of the proposed 132/11kV Olifantshoek Substation, electrical infrastructure will be upgraded and expanded to ensure that the area can adapt to the growth experienced in the area.

1.4.5 Strategic Infrastructure Projects (SIP)

The development of the proposed 132/11kV Olifantshoek Substation will contribute to SIP 10, which involves expanding the distribution network to address historical imbalances by providing access to electricity for all. The proposed development will benefit the local communities by improving the reliability of the electricity supply in the area. In addition, a stable electricity supply will have a positive impact for the development potential in the area and promote economic growth. In addition, the proposed development could improve the lives of the local community due to the potential for improved and expanded electrification of the area.

1.4.6 National Development Plan (NDP), 2030

The National Development Plan for 2030 identified the following nine main challenges to be addressed by 2030:

1. Too few people work;
2. The standard of education for most black learners is of poor quality;
3. Infrastructure is poorly located, under-maintained and insufficient to foster higher growth;
4. Spatial patterns exclude the poor from the fruits of development;
5. The economy is overly and unsustainably resource intensive;
6. A widespread disease burden is compounded by a failing public health system;
7. Public services are uneven and often of poor quality;
8. Corruption is widespread; and
9. South Africa remains a divided society

The proposed project is aligned with the National Development Plan, as it will help promote local economic growth as a result of the strengthening of the local distribution grid. This improved electricity supply will facilitate development in the local area, which in turn could promote local job opportunities.

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

The following legislation, polies and guidelines are relevant to the development of the 132/11kV Olifantshoek Substation. Through the consideration of the relevant legislation, policies and guidelines associated with the project the necessary formal requirements are identified which needs to be complied with for the duration of the project. This is considered at a national, provincial and local level.

Table 6: Applicable Legislation, Policies and/or Guidelines associated with the development of the 132/11kV Olifantshoek Substation

Legislation / Policy / Guideline	Applicable Requirements	Relevant 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 GNR 983 and 985 of June 2010 a Basic Assessment Process is required to be undertaken for the proposed project.	» National Department of Environmental Affairs (DEA) » Northern Cape Department of Environment and Nature Conservation (NC DENC) – commenting authority	The listed activities triggered by the proposed project have been identified and assessed in the EIA process being undertaken (i.e. Basic Assessment). This Basic Assessment Report will be submitted to the competent and commenting authority in support of the application for authorisation.
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 a project is avoided, stopped or	» National Department of Environmental Affairs (DEA)	The implementation of mitigation measures are included as part of the EMPr and will continue to apply throughout the life cycle of the project.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	minimised.		
National Environmental Management: Biodiversity Act (Act No. 10 of 2004) and Alien Invasive Species Regulations 2014	In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007. In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase. The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and	» National Department of Environmental Affairs (DEA) » Northern Cape Department of Environment and Nature Conservation (NC DENC)	A Specialist Ecological Impact Assessment was undertaken as part of the Basic Assessment process (refer to **Appendix D1**). As such the potential occurrence of critically endangered, endangered, vulnerable, and protected species, as well as critically endangered (CR), endangered (EN), vulnerable (VU) or protected ecosystems and species and the potential for them to be affected has been considered. A permit is required to remove or relocate listed species affected by the project. This Basic Assessment report includes a Vegetation Management Guideline as part of the EMPr (**Appendix F**).

Legislation / Policy / Guideline	Applicable Requirements	Relevant 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, (GG 34809, GN 1002), 9 December 2011). Invasive Species are categorised into four categories: » **Category 1a** Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be combatted or eradicated. » **Category 1b** Listed Invasive Species are those species listed as such by notice in terms of section 70(1)(a) of the Act as species which must be controlled. » **Category 2** Listed Invasive Species are those species listed by notice in terms of section 70(1)(a) of the Act as species which require a permit to carry out a restricted activity within an area specified in the Notice or an area specified in the permit, as the case may be » **Category 3** Listed Invasive Species are species that are listed by notice in terms of section 70(1)(a) of the Act, as species which are subject to exemptions in terms of section 71(3) and prohibitions in terms of section 71A of Act, as specified in the Notice.		

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	○ Any plant species identified as a Category 3 Listed Invasive Species that occurs in riparian areas, must, for the purposes of these regulations, be considered to be a Category 1b Listed Invasive Species and must be managed according to regulation 3. Section 76 of the Act requires that all Protected Area Management Authorities and all other "Organs of State in all spheres of government", including all municipalities, draw up an "Invasive Species Monitoring, Control and Eradication Plan for land under their control." These plans have to cover all Listed Invasive Species in terms of Section 70(1) of this Act.		
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	» National Department of Environmental Affairs (DEA) » Northern Cape Department of Environment and Nature Conservation (NC DENC)	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 the Act, as detailed in the EMPr (refer to **Appendix F**).

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards. 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 breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.		
National Environmental Management: Air Quality Act (Act No. 39 of 2004)	S18, S19, and S20 of the Act allow certain areas to be declared and managed as "priority areas." Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards.	» National Department of Environmental Affairs (DEA) » Gamagara Local Municipality	Dust Control Regulations describe the measures for control and monitoring of dust, including penalties. These regulations might be applicable during the construction phase of the project. Dust management has also been accounted for in the EMPr (see **Appendix F**)

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas		
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. In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.	» Department of Water and Sanitation	A water use license (WUL) or General Authorisation may be required in terms of Section 21 of the Act due to the drainage lines which could be impacted by the proposed project, in particular for the Alternative Substation option. In terms of impacts to water sources, a GA or WUL will be undertaken based on the outcome of the risk assessment matrix.
Environment Conservation Act (Act No. 73 of 1989)	National Noise Control Regulations (GN R154 dated 10 January 1992)	» National Department of Environmental Affairs (DEA) » Northern Cape Department of Environment and Nature Conservation (NC DENC)	Noise impacts are expected to be associated with the construction phase of the project and are not likely to present a significant intrusion to the local community. There is no requirement for a noise permit in terms of the legislation.
Minerals and Petroleum Resources Development Act (Act No. 28 of 2002)	An Environmental Authorisation and 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.	» Department of Mineral Resources	As no borrow pits are expected to be required for project, no mining permit or Environmental Authorisation is required to be obtained for borrow pits.
National Heritage Resources Act (Act No. 25 of 1999)	» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;	» South African Heritage Resources Agency » Northern Cape Heritage Resources Authority	A permit may be required should any identified cultural/ heritage sites on site be required to be disturbed or destroyed as a result of the proposed development.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	» Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent » The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m^2; or the re-zoning of a site exceeding 10 000 m^2 in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided. » Standalone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.		
National Forests Act (Act No. 84 of 1998)	» In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to	» Department of Agriculture, Forestry and Fisheries	*Acacia erioloba* trees, protected in terms of this Act, were found to occur within the Preferred Substation Location. As such, a protected tree removal permit would need to be obtained for the removal of these trees.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	an (applicant and subject to such period and conditions as may be stipulated". » The list of protected tree species was published in GN 877 of 22 November 2013.		
National Veld and Forest Fire Act (Act 101 of 1998)	» In terms of S12 the landowner would be obliged to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land. » In terms of S12 the firebreak would need to be wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. » In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.	» Department of Agriculture, Forestry and Fisheries	While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction and operation phase of the project.
Conservation of Agricultural Resources Act (CARA) (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) » **Category 1** - prohibited and must be controlled; » **Category 2** – must be grown within a demarcated area under permit; and » **Category 3** - ornamental plants that may no longer be planted, but existing plants may remain provided that all	» Department of Agriculture, Forestry and Fisheries	Some alien plant species are present within the site. Alien plants are also likely to establish when the site is disturbed during construction. Mitigation measures have been recommended to avoid the risk of increased alien invasion during construction, operation and maintenance phases of project (**Appendix F**). All alien plants present at the site should be controlled using the best practice methods for the species present.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	reasonable steps are taken to prevent the spreading thereof, except within the floodlines of watercourses and wetlands		
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 to be Group I or Group II hazardous substance; » Group IV: any electronic product; » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.	» 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 site and in what operational context they are used, stored or handled. If applicable, a license could be required to be obtained from the Department of Health.
National Road Traffic Act	The technical recommendations for highways	» Provincial Department of	An abnormal load/vehicle permit may be required to

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
(Act No 93 of 1996)	(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.	Transport (provincial roads) » South African National Roads Agency Limited (national roads)	transport the various components to site for construction. These include route clearances and permits could be required for vehicles carrying abnormally heavy or abnormally dimensioned loads. Depending on the trailer configuration and height when loaded, some of the components may not meet the specified dimensional limitations (height and width) and would need to apply for the relevant permit/ clearance.
Provincial Policies / Legislation			
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	» Provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province. In terms of this act the	» Northern Cape Department of Environment and Nature Conservation (NC DENC)	A permit is required for any activities which involve species listed under schedule 1 or 2. The NC DENC permit office provides an integrated permit which can be used for all provincial and Threatened or Protected Species (TOPS)-related permit requirements.

Legislation / Policy / Guideline	Applicable Requirements	Relevant Authority	Compliance requirements
	following section may be relevant with regards to any security fencing the development may require. **Manipulation of boundary fences** 19. No Person may – (a) erect, alter remove or partly remove or cause to be erected, altered removed or partly removed, any fence, whether on a common boundary or on such person's own property, in such a manner that any wild animal which as a result thereof gains access or may gain access to the property or a camp on the property, cannot escape or is likely not to be able to escape therefrom; The Act also lists protected fauna and flora under 3 schedules ranging from Specially protected (Schedule 1), protected (schedule 2) to common (schedule 3). The majority of mammals, reptiles and amphibians are listed under Schedule 2, except for listed species which are under Schedule 1.		Provincially protected plant species were found within the study area. Therefore, a permit could be required for removal of such species. A permit could be required from the NC DENC to relocate protected plants and to clear natural vegetation at the substation site.

Various Guidelines have been consulted throughout this Basic Assessment Report. These include:

Eskom - Erosion Control Guidelines	Appendix B of the EMPr
Eskom – Vegetation management guideline	Appendix C of the EMPr

CHAPTER 2: DESCRIPTION OF THE RECEIVING ENVIRONMENT

This chapter provides a description of the environment within which the development of the proposed 132/11kV Olifantshoek Substation is located and that will be affected by the development. The description of the environment considers both biophysical aspects, as well as social and cultural aspects in order to provide a completed consideration of the features available.

1. LAND-USE AND GENERAL DESCRIPTION OF THE AREA

Land use within the broader study area mainly relates to farming activities. Farming practises consist mainly of cattle and game farming and to a lesser extent sheep and goats. Historically some areas have also been ploughed and irrigated, mainly for the cultivation of lucern, ranging in size between 2ha to 16ha on some farms that had high yielding boreholes. Apart from agricultural practices, mining forms the largest industrial activity in the area (e.g. Sishen to the west of the study area). The 132/11kV Olifantshoek Substation is not expected to impact on any existing agricultural or mining activities. The current land-use zoning of the preferred and alternative substation site is "Open Space".

Both the Preferred and Alternative Substation locations have a gradient of between 1:50 and 1:20 with a landform which can be described as a side slope of a hill and an undulating plain. Natural and agricultural areas, a dam, low and medium density residential development and water features occur within the broader are surrounding the substation options. Alien invasive species have also started encroaching is some areas surrounding the town of Olifantshoek.

There are also protected areas located within the broader area, including the farms Brooks and Bredenkamp located to the north of the substation options, which are in the process of being promulgated as a provincial nature reserve. However, neither the Preferred or Alternative Substation locations infringe on any protected areas.

2. THE BIOPHYSICAL ENVIRONMENT

This section describes the biophysical features present within the area which could be impacted on by the development.

2.1 Climate and Rainfall

The Olifantshoek/Kathu area is characterised by an arid summer rainfall climate with an average annual temperature of 18.6°C and an average rainfall of 395mm falling predominantly in late summer (highest in March: 74mm). The driest month is July with only 3mm of precipitation. With an average temperature of 25.3°C, January is the warmest month, whilst July is the coldest month with an average of 10.8°C (https://en.climate-data.org/location/27075/). Refer to **Figure 4 and Figure 5.**

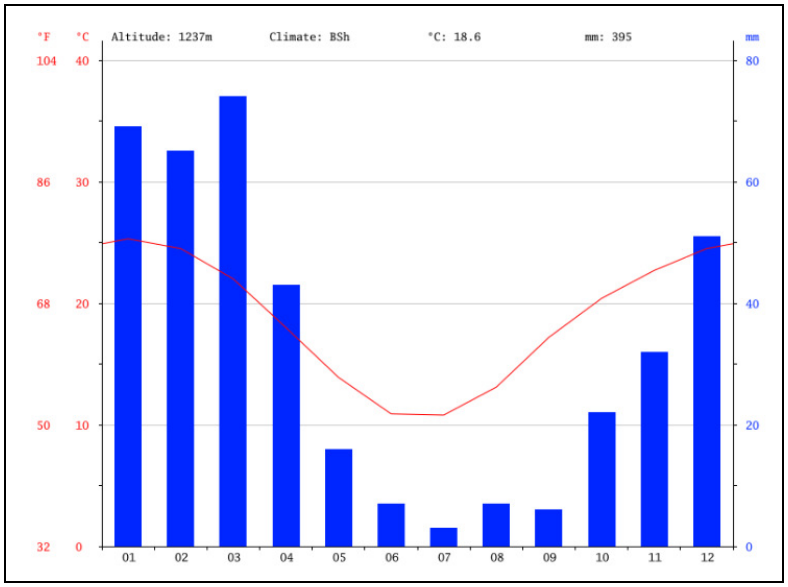

Figure 4: Climate graph of the Olifantshoek/Kathu region (https://en.climate-data.org/location/27075/)

month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Okt	Nov	Dec
mm	69	65	74	43	16	7	3	7	6	22	32	51
°C	25.3	24.5	22.0	18.0	13.9	10.9	10.8	13.1	17.2	20.4	22.7	24.5
°C (min)	18.0	17.4	15.2	10.5	5.8	2.4	2.1	4.2	8.4	12.1	14.8	16.9
°C (max)	32.6	31.6	28.9	25.6	22.1	19.5	19.5	22.0	26.0	28.7	30.7	32.2
°F	77.5	76.1	71.6	64.4	57.0	51.6	51.4	55.6	63.0	68.7	72.9	76.1
°F (min)	64.4	63.3	59.4	50.9	42.4	36.3	35.8	39.6	47.1	53.8	58.6	62.4
°F (max)	90.7	88.9	84.0	78.1	71.8	67.1	67.1	71.6	78.8	83.7	87.3	90.0

Figure 5: Climate table of the Olifantshoek/Kathu region (https://en.climate-data.org/location/27075/)

2.2 Topography, Soils and Drainage

The larger surrounding landscape can be described as a largely flat (to very slightly undulating) sandy plain broken to the west with more rugged, medium mountains of the Langeberge. Within the largely flat sandy plain small irregularities within the landscape can be attributed to small localised depressions, vegetated low dunes, calcrete patches, a low ridge to the south and the two non-perennial watercourses (Ga-Magara and Olifantsloop) that drain the valley towards the north. The Olifantsloop River (42.492km in length terminates into the Ga-magara River (88.037km in length) which in turns flows into the term Kuruman River, an important tributary of the Molopo. Due to the micro-topography of the underlying substrates (shallower soils over calcrete), small ephemeral pans have formed in isolated areas within this flat valley. The position of the substation options within this landscape can be described as follows:

- The Alternative Substation location is located within the pediment section of Langeberg mountain range and within the 1:100-year floodline of the Olifantsloop River (southern/upper portion). This area has a gentle slope towards the Olifantsloop River (south to south-western slope).
- The Preferred Substation location is located just south of the N14 within the flat sandy plain.

Both substation alternatives are situated within the Ae6 land type with the Ic2 land type found to the east and west where the landscape becomes more undulating and rugged.

» Ae land type refers to areas characterised by red-yellow apedal, freely drained soils (Red, high base status soils, deeper than 300mm without dunes). These moderately deep red, freely drained apedal soils occur in areas associated with low to moderate rainfall (300-700mm per annum) in the interior of South Africa and have a high fertility status. A wide range of texture occurs (usually sandy loam to sandy clay loam). Dominant soil forms include Hutton and Oakleaf. Isolated areas with shallow soils are characterised by the Mispah soil form.
» The Ic group of land types refers to land types with a soil pattern difficult to accommodate elsewhere. Diagnostic of this land type is that 60-80% of the surface is occupied by exposed rock and stones/boulders and the slopes are usually steep. The rest of the area comprises mostly shallow soils, directly underlain by hard or weathered rock. Dominant soil forms include Hutton (deep soils), Mispah (shallow soils) and exposed rock where soil is largely absent.

2.3 Ecological Profile

2.3.1 Broad-Scale Vegetation Patterns

According to the national vegetation map (Mucina & Rutherford 2006), there are two vegetation types present in the broader area around the substation options, but only one within the affected area (**Figure 6**). Both options fall within the Olifantshoek Plains Thornveld vegetation type.

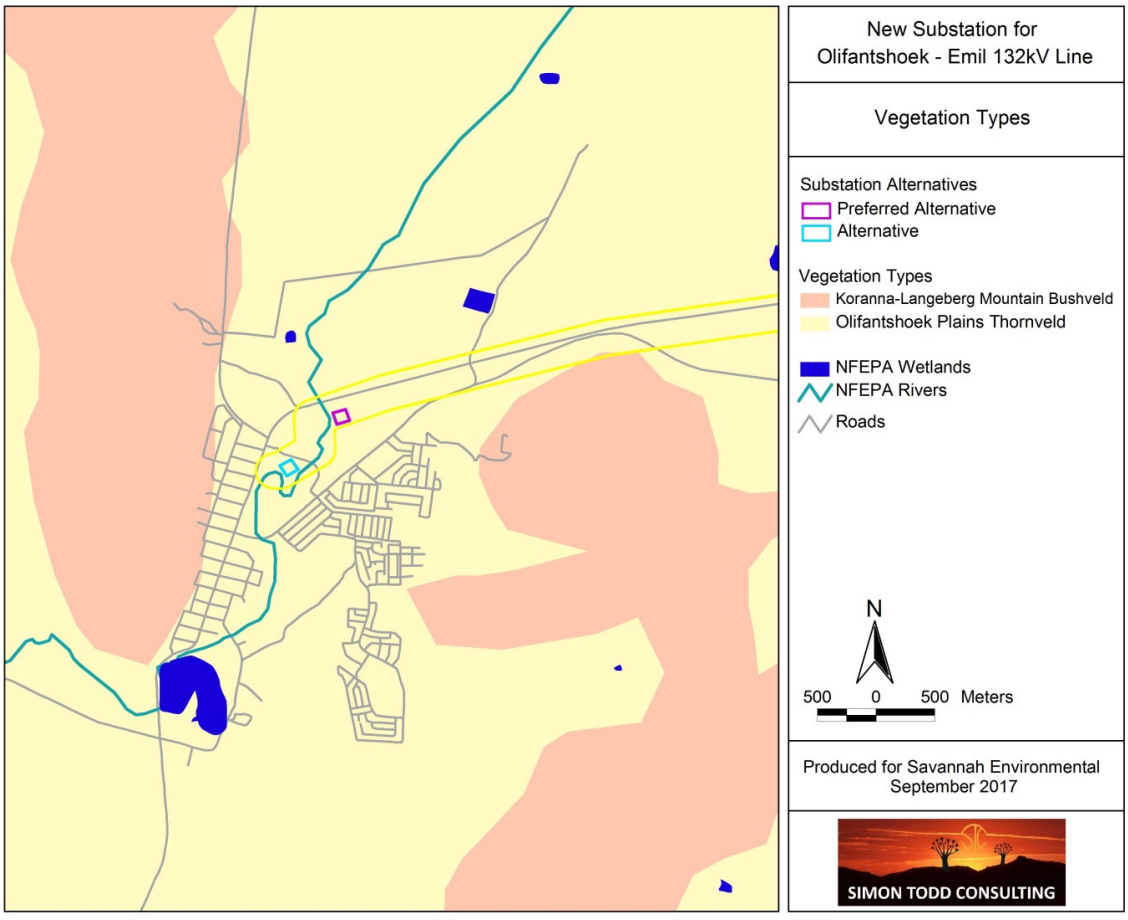

Figure 6: Broad-scale overview of the vegetation in and around the proposed 132/11kV Olifantshoek Substation locations. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006, 2012), and also includes NFEAP drainage lines and wetlands in the area.

Olifantshoek Plains Thornveld has a relatively limited extent of 8496 km^2 and occurs on most of the pediment areas of the Korannaberg, Langeberg and Asbestos Mountains as well as some ridges to the west of the Langeberg. It is described as a very wide and diverse unit on plains with usually open tree and shrub layers which vary in composition from place to place across the unit. It is classified as Least Threatened and has not been significantly impacted by transformation and about 99% of the original extent remains. It is however very poorly conserved and less than 1% is statutorily conserved in the Witsand Nature Reserve. No endemic species are known from this vegetation unit, which can be ascribed to its relatively limited extent and association with a relatively homogenous and unspecialised habitat.

2.3.2 Fine-Scale Vegetation Patterns

The Alternative Substation location supports a dense, tall thicket of *Acacia karoo* (reaching over 5m in height), a shrub layer comprising mostly *Ziziphus mucronata*, *Grewia flava* and some *Tarchonanthus camphoratus* (**Figure 7**). Although a few *Prosopis* individuals are present, the site appears relatively intact. The grass layer is dominated by *Stipagrostis uniplumis*, *Aristida stipitata* subsp. *stipitata, Elephantorrhiza elephantina*, *Hermannnia tomentosa* and *Gnidia polycephala*. The site is located in close proximity to the Olifantsloop River (non-perennial) and the presence of *Acacia karoo* suggests that this area is within the influence of the Olifantsloop River and is essentially part of the historical floodplain.

Figure 7: The Alternative Substation location is dominated by tall *Acacia karoo* trees and appears to be in a relatively natural state, despite numerous footpaths through the site.

The Preferred Alternative represents intact Olifantshoek Plains Thornveld habitat dominated by large *Acacia erioloba* (4 to 5m in height) (**Figure 8**). Other tree species present include the protected *Boscia albitrunca* (one individual), *Ziziphus mucronata* and shrubs such as *Acacia hebeclada* and *Acacia mellifera*. The ground layer is heavily grazed and includes species of grasses and shrubs such as *Stipagrostis uniplumis*, *Schmidtia pappophoroides*, *Chrysocoma ciliata*, *Pegolettia retrofracta*, *Geigeria filifolia*, *Leucas capensis*, *Senna italica subsp. arachoides*, *Elephantorrhiza elephantina*, *Felicia muricata subsp. muricata*, *Melolobium candicans*, *Asparagus retrofractus* and *Gazania krebsiana subsp. krebsiana*. No alien tree species were detected at the site, although some *Prosopis* trees were present in the vicinity.

Figure 8: The Preferred Substation location, which supports some large *Acacia erioloba* trees and occasional *Boscia albitrunca* with a heavily grazed grass layer. The informal settlement encroaching on the site is visible behind the trees.

2.3.3 Listed and Protected Plant Species

According to the SANBI POSA database, 223 indigenous plant species have been recorded from the quarter degree square 2722D. This includes 1 species of conservation concern. *Acacia erioloba* is no longer red listed, but is still nationally and provincially protected and is present at the site in fairly high numbers. *Boophone disticha* (Declining) is the only listed species known from the area and has been observed near the site but not within the development footprint. There are also additional species present which are either protected under the National Forests Act such as *Boscia albitrunca* or protected under the Northern Cape Nature Conservation Act of 2009, which includes *Boscia foetida*, all *Mesembryanthemaceae*, all species within the *Euphorbiaceae, Oxalidaceae* and *Iridaceae*, all species within the genera *Nemesi*a and *Jamesbrittenia*. There appears to be only a single individual of *Boscia albitrunca* within the development footprint and this is not considered to be a significant impact on this species which is common and abundant in the area.

2.3.4 Critical Biodiversity Areas (CBAs) and Broad-Scale Processes

According to the Northern Cape Conservation Plan, the Substation location alternatives do not fall within a CBA, but are located within an Ecological Support Areas (ESA) associated with the Olifantsloop drainage line (non-perennial river) (**Figure 9**). The presence of the substation would not compromise the functioning of the ESA in any way, especially given the low footprint of the substation (1ha) as well as the location within the urban edge of Olifantshoek. The impact of the development of the new Olifantshoek substation is not likely to result in significant disruption of any broad-scale ecological processes.

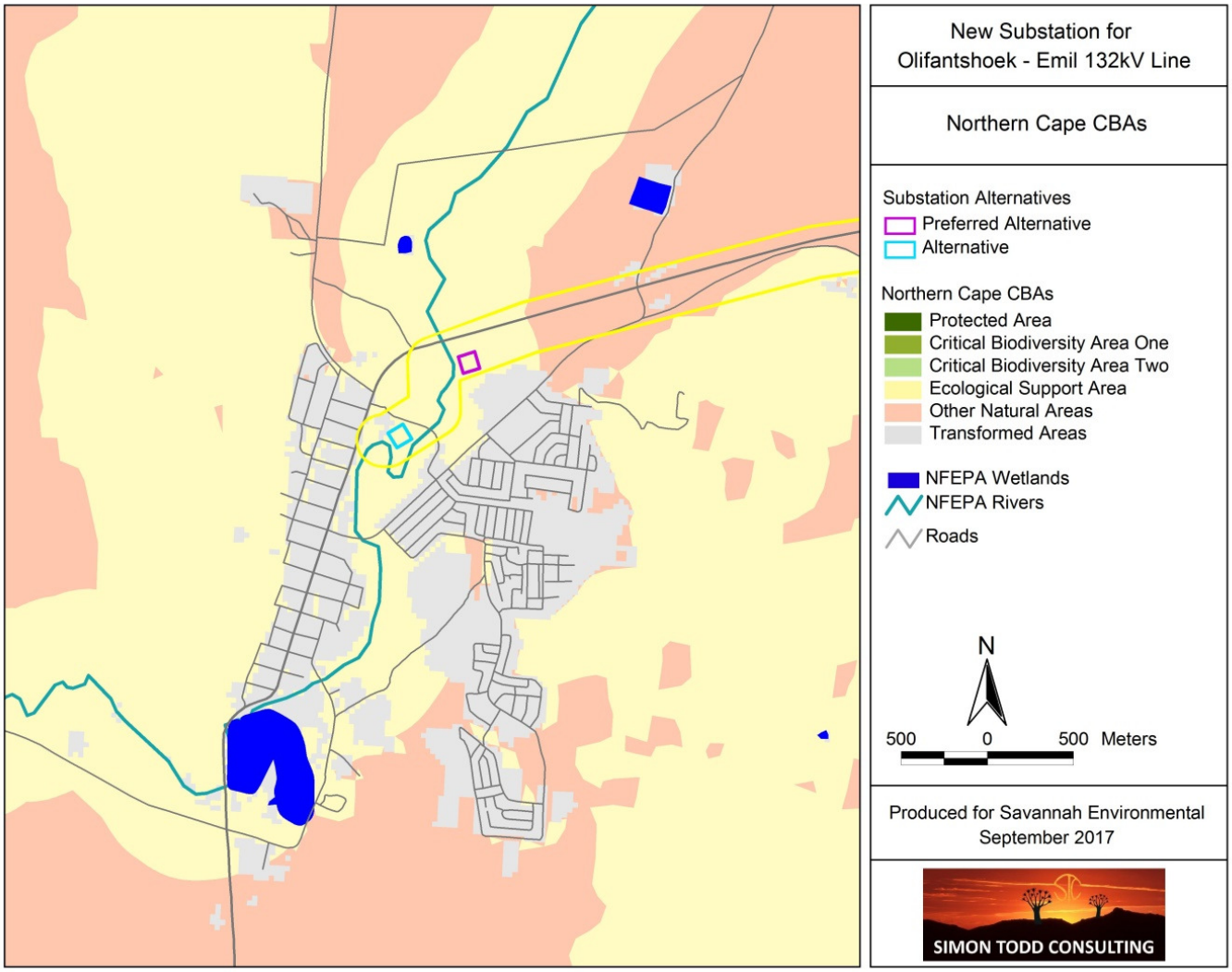

Figure 9: Broad-scale overview of the Critical Biodiversity Areas and Ecological Support Areas in and around the Olifantshoek substation site. The map is an extract of the Northern Cape Conservation Plan (Holness & Oosthuizen 2016).

2.3.5 Faunal Communities

Mammals

The substation options are located within the distribution range of 49 terrestrial mammals, indicating that the mammalian diversity in the area is of moderate to high potential. Habitat diversity within the area is however fairly low as there are no hills or rocky ridges present. Areas of specific significance for mammals are likely to be restricted to the Olifantsloop River (non-perennial) which provides greater cover as well as moisture and forage availability. However, given the proximity of the substation options to the town of Olifantshoek, the actual significance of the sites for mammals would be low.

The following species have been observed in the area: South African Ground Squirrel *Xerus inauris*, Springhare, Aardvark, Damaraland Mole-rat, Cape Porcupine, Cape Fox, Bat-eared Fox, Yellow Mongoose, Slender Mongoose, Suricate, Aardwolf, Steenbok, and Common Duiker as well as a variety of small mammals typical of the area. Four listed terrestrial mammals may occur in the area, the Honey Badger (Endangered), Brown Hyaena (Near Threatened), Southern African Hedgehog (Near Threatened)

and the African Pangolin (Vulnerable). However, none of these listed species are likely to be using the affected area given its location within the urban edge of Olifantshoek.

Reptiles

According to the SARCA and the reptile literature, 37 reptile species are known from the area suggesting that the reptile diversity within the site is likely to be moderate to low. Species observed in the area on prior site visits in the vicinity of the site include the Cape Cobra, Ground Agama, Spotted Sand Lizard, Variable Skink, Bibron's Blind Snake, Cape Gecko, Striped Skaapsteker, Boomslang and Spotted Sand Lizard. No species of conservation concern are known to occur in the area. Within the affected area, there are no large rocky outcrops or other specialised reptile habitats.

Amphibians

The substation options lie within the distribution range of 6 amphibian species. The nearby Olifantsloop River is the most important feature for amphibians in the immediate area. The proximity of the Substation options to the Olifantsloop River is a potential concern as the river could be impacted by erosion or pollution resulting from the development. The Olifantsloop River is however an ephemeral river and holds water only occasionally, as a result, the species prevalent in the area are likely to be those which are relatively independent of water such as the Karoo Toad and Power's Toad. The Giant Bull Frog (Near Threatened) is the only listed species and occupies shallow grassy pans, vleis and other rain-filled depressions in savannas and grasslands, with its habitat most at risk from transformation. There does not appear to be any breeding habitat for this species in the vicinity of the substation options and an impact on this species is not likely.

Avifauna

Four important avian micro-habitats have been identified to be associated with the substation options and the broader area:

- *Acacia tortilis – Acacia mellifera* Open Woodland
- Non-perennial watercourses
- *Acacia karroo* Thicket
- Olifantshoek sewage works (Artificial landscape)

1. Acacia tortilis – Acacia mellifera Open Woodland

This micro-habitat covers the area just south of the N14 which is characterised by a low ridge transitioning into a flatter area with moderate shallow soils towards the town of Olifantshoek. The preferred substation option is located within this avian micro habitat. The vegetation structure of this habitat can be described as a short to medium open tree layer with a mixture of dwarf shrubs and grasses forming the ground layer.

This micro-habitat is utilised primarily by the same passerine species utilising the more extensive *Tarchonanthus camphoratus – Acacia mellifera* Woodland habitat surrounding this micro-habitat, with avifaunal movement between these habitats occurring frequently. Diversity within this micro-habitat can be described as moderate to moderate-low with disturbances such as the N14 Road, the informal settlement to the south and potential high human movement within the study area, contributing to the

levels of diversity. Key species include the Northern Black Korhaan (*Afrotis afraoides*), Lark species (Family: *Alaudidae*) and species such as Chats, Thrushes and Scrub-Robbin which will move around within the taller shrubby areas. Probably the most abundant species recorded within this habitat was Chestnut-vented Warbler (*Sylvia subcaerulea*), Kalahari Scrub Robin (Cercotrichas paean), Sociable Weaver (*Philetairus socius*) and Scaly-feathered Weaver (*Sporopipes squamifrons*). The denser encroached *Acacia mellifera* patches also provide nesting habitat for smaller species such as the Yellow-bellied Eremomela (*Eremomela ictyropygialis*), Black-chested Prinia (*Prinia flavicans*), Rufous-eared Warbler (*Malcorus pectoralis*) and also Pririt Batis (*Batis pririt*).

2. Non-perennial Watercourses

As a result of disturbances that have taken place within the area almost none of the avifaunal species recorded within this habitat, reside permanently within the habitat. Most species seek refuge, nest, roost and fulfil most of their activities within the fringing Thicket micro-habitat. The open grassy/weedy river bed is rather frequently visited for very short periods of time by mainly small granivorous passerines in search of ripe grass seeds and nesting material as well as a few insectivorous species in search of prey attracted to moisture and flowering herbs and weeds. These species do not remain long in this habitat after which they return to the fringing thicket. Such avifaunal species include: Granivorous species: Cape Sparrow (*Passer melanurus*), Speckled Pigeon (*Columba guinea*), White-browed Sparrow-Weaver (*Plocepasser mahali*), Blue Waxbill (*Uraeginthus angolensis*), Village Indigobird (*Vidua chalybeate*), Laughing Dove (*Spilopelia senegalensis*) and Cape Turtle-Dove (*Streptopelia capicola*); Insectivorous Species: European Bee-eater (*Merops apiaster*), Pririt Batis (*Batis pririt*), Bokmakierie (*Telophorus zeylonus*), Common Fiscal (*Lanius collaris*), African Hoopoe (*Upupa africana*), Kalahari Scrub Robin (*Erythropygia paena*) and Chestnut-vented Tit-Babbler (*Sylvia subcaerulea*). The only permanent residents within this open area is the Blacksmith Lapwing (*Vanellus armatus*). Additional features providing additional niches within this micro-habitat are the large Eucalyptus trees as well as the steeply eroded banks. The Eucalyptus trees provide roosting and nesting sites as well as foraging areas for avifaunal species such as the Golden-tailed Woodpecker (*Campethera abingoni*), Speckled Pigeon (*Columba guinea*), Southern Yellow-billed Hornbill (*Tockus nasutus*), Gape Turtle-Dove (*Streptopelia capicola*) and Common Cuckoo (*Cuculus canorus*). The steep riverbanks may serve as nesting sites (excavated burrows) for European Bee-eater (*Merops apiaster*), Horus Swift (*Apus horus*) and also potentially the Brown-Throated Martin (*Riparia paludicola*).

3. Acacia Karroo Thicket

This micro-habitat will only be affected by the Alternative Substation option. This habitat is characterised by tall *Acacia karroo* specimens forming a dense thicket type of structure fringing this part of the Olifantsloop River.

Avifaunal diversity within this habitat can be regarded as moderate-high. Key species noted within this unit included: Speckled Pigeon (*Coluba guinea*), various pigeon species, Swallow-tailed Bee-eater (*Merops hirundineus*) European Bee-Eater (*Merops apiaster*), Southern Yellow-billed Hornbill (*Tockus leucomelas*), Acacia Pied Barbet (*Tricholaema leucomelas*), Golden-tailed Woodpecker (*Compethera abingani*), Bokmakierie (*Telophorus zeylonus*), Chestnut-vented Warbler (*Sylvia subcaerulea*), Blue Waxbill (*Uraeginthus angolensis*), Village Indigobird (*Viclua chalybeata*) and Golden Breasted Bunting *(Emberiza flaviventris*).

4. Olifantshoek Sewage Works

Even though this area is located outside of the servitude area it is still important to take this artificial habitat into account as it is a permanent source of water creating a habitat for water fowls, waders, herons and other bird species associated with such habitats. These species route between this water source and the gravel dam located to the south of the town and may cross the proposed substation locations (preferred and alternative). As the location of the alternative substation option will directly result in the lengthening of this section of power line across this potential migratory route, it is worth mentioning the potential impact, resulting from the power line on these species (and can therefore subsequently be regarded as an indirect increase in the potential risk area for bird collision). Species noted within this artificial habitat included: Egyptian Goose (*Alopechen aegyptianca*), South African Shelduck (*Tadorna cana*), Yellow-Billed Duck (*Anas undulata*), Cape Shoveler (*Anas smithii*), Red-billed Teal (*Anas erythrorhyncha*), Little Grebe (*Tachybaptus ruficollis*), Crowned Lapwing (*Vanellus coronatus*), Kittlitz's Plover (*Charadrius pecuarius*) and Three-banded Plover (*Charadrius ticollaris*).

A total of 228 species were recorded in 2722DD and DC by SABAP1 & 2, with 11 species classified as Red Data species (Barnes 2014). These include Near Threatened Species such as the Black Stork (*Ciconia nigra*), Secretarybird (*Sagittarius serpentarius*) and Black Harrier (*Circus maurus*) and Vulnerable species such as the Cape Vulture (*Gyps coprotheres*), White-backed Vulture (*Gyps africanus*), Lappet-faced Vulture (*Torgos tracheliotus*), Tawny Eagle (*Aquila rapas*), Martial Eagle (*Polemaetus bellicosus*), Corn Crake (*Crex crex*), Kori Bustard (*Ardeotis kori*) and Ludwig's Bustard (*Neotis ludwigii*). Furthermore, 22 species are southern African endemics and 38 are near-endemics (26%).

During the site survey, a total of 36 bird species were recorded within the area with 4 species being endemic and 9 being near-endemic.

The most commonly recorded species within the area were passerine and near passerine species which includes the Bokmakierie (*Telophorus zeylonus*), Lesser Grey Shrike *(Lanius minor*), Fork-tailed Drongo (*Dicrurus adsimilis*), Monotonous Lark (*Mirafra passerine*), Black-chested Prinia (*Prinia flavicans*), Yellow-bellied Eremomela (*Eremomela icteropygialis*), Kalahari Scrub Robin (*Cercotrichas coryphoeus*), Ant-eating Chat (*Myrmecocichla formicivora*), Sociable Weaver (*Philetairus socius*), Scaly-feathered Weaver (*Sporopipes squamifrons*), and Chestnut-vented Warbler (*Sylvia subcaerulea*).

Endemic species recorded during the site survey included the White-backed Mousebird (*Colius colius*), Ant-eating Chat (*Myrmecocichla formicivora*), Rufous-eared Warbler (*Malcorus pectoralis*), Bokmakierie (*Telophorus zeylonys*) and Sociable weaver (*Philetairus socius*).

Red listed species recorded within the greater surrounding environment included the White-backed Vulture - *Gyps africanus* (Endangered), Martial Eagle – *Polemaetus bellicosus* (Endangered) and the Red-footed Falcon – *Falco vespertinus* (Global: Near Threatened). Listed avifaunal species not recorded within the site although highly likely to occur within the area include the Kori Bustard - *Ardeotis kori* (Near Threatened), Secretary Bird - *Sagittarius serpentarius* (Vulnerable), Lanner Falcon – *Falco biarmicus* (Vulnerable) and Peregrine Falcon - *Falco peregrinus* (Near Threatened).

Table 7 provides a guideline of the Red Data species that have and could potentially be encountered anywhere within the pentad where suitable habitat is available.

Table 7: Red listed as well as one species that is not listed that has been recorded either within the relevant quarter degree squares, on site during survey or has a possibility of occurring within the area and which will potentially be affected by the proposed development (NT = Near Threatened; VU = Vulnerable; EN = Endangered; LC = Least Concern) (Species that are in bold were recorded during the site survey; X=impact is relevant to this species)

Name	**Conservation Status**	**Habitat**	**Likelihood of Occurence**		**Habitat Destruction**	**Disturbance**	**Collision with Power Line**	**Electrocution**	**Endemic**
			Preferred Substation Option	Alternative Substation Option					
Secretary Birds *Sagittarius serpentarius*	VU	Grassland/Open Woodland	Likely	Highly Unlikely	X	X	X		
Martial Eagle *Polemaetus bellicosus*	EN	Woodland/Savannah	Unlikely	Unlikely	X	X	X	X	
Kori Bustard *Ardeotis kori*	NT	Grassland/Thornveld	Likely	Highly Unlikely	X	X	X		
White-backed Vulture *Gyps africanus*	EN	Woodland/Savannah	Unlikely	Highly Unlikely	X	X	X	X	Near-Endemic
Red-footed Falcon *Falco vespertinus*	NT	Woodland/Savannah	Likely	Highly Likely		X		X	Endemic
Lanner Falcon *Falco biarmicus*	VU	Woodland/Savannah	Likely	Unlikely		X		X	
Peregrine Falcon *Falco peregrinus*	NT	Woodland/Savannah	Likely	Highly Likely		X		X	

2.3.6 Hydrology

The substation alternatives are located within the Lower Vaal River Water Management Area and within the D41J quaternary catchment area. The most prominent river system within the region is the ephemeral (non-perennial) Gamagara River which is a tributary of the Kuruman River (also non-perennial). According to the Present Ecological State (DWS PES, 1999) the condition of the Gamagara River is classified as Class B, which indicates that the river is still largely in a natural state. The same PES classification (Class B) was provided for the Olifantsloop River, a non-perennial tributary of the Gamagara River.

The entire study area is drained by the Olifantsloop River (42.492km). The Olifantsloop River originates within Langeberg Mountain range, west of the town of Olifantshoek. The watercourse flows in an eastern direction until reaching Olifantshoek, after which it flows in a north-eastern direction to terminate into the Gamagara River (~1.1km south-east of the point where the proposed powerline will cross the Gamagara River).

Groundwater is the only reliable resource of water supply in the area. According to Viviers (2016) there are a number of important hydrogeological zones with the affected landscape namely:

- The Gamagara River Alluvial Aquifer that consists of sediments containing gravel, calcrete and clay. The riverbed is underlain by clay in some sections.
- The surficial Kalahari beds that consists of clacrete, sand and clay as well as gravel. The Kalahari beds are underlain by a thick clay layer towards the west where the Sishen Mine is located.
- The weathered/fractured and solid/fractured lava underlies the Kalahari Beds and forms weathered basins where groundwater was historically developed.
- The lava formations are underlain by quartzite, shale, banded iron formation and dolomite. The banded iron formation forms the major regional aquifer in the area.
- The lava contains geological structures that are inferred as dolerite dykes and/or fault zones that strike mainly north-east to south-west.

The water levels according to the study conducted by Viviers (2016) indicated that water levels in the Gamagara River Alluvial Aquifer were historically much shallower at 1m to 2m as it was recharged by flooding from the river every 5 – 8 years. These water levels are now around 6m to 8m deep. The cause of the deeper water levels in the Gamagara River Alluvial Aquifer has been confirmed to be due to leakage of the river into the Sishen Compartment that is partially dewatered by mining. Concerns were also raised within the study that the Olifantsloop drainage could also be affected by the impact on the Gamagara River.

Olifantsloop Non-Perennial Watercourse and Riparian Fringe

The Olifantsloop River is a non-perennial or ephemeral system (42.492km long) which originates in the Langeberg Mountains west of the town of Olifantshoek and terminates into the Gamagara River (also non-perennial). The portion of the watercourse flowing through the urban area is characterised by a developed channel which may become relatively deep in areas (over 3m) (**Figure 10**). These deep channels normally consist out of fine sand and silt and are normally devoid of vegetation (unstable conditions due to high velocity streamflow during rainfall events and the effects of erosion). Where flow velocities are not so intense the channels are normally shallower and may not even be prominent. These areas are normally vegetated with a mixed grass and herb layer with numerous exotic plant species.

As the river enters the town of Olifantshoek, flow has been altered through the presence of a gravel dam. Downstream of this dam structure (within the boundaries of the urban area and immediate downstream areas) the watercourse has undergone numerous alterations and transformations affecting the hydrology, geomorphology and vegetation structure.

Due to the disturbances, the following on site alterations have occurred within the non-perennial watercourse:

- Erosion: Areas with deep eroded channels and relatively high banks (prone to bank erosion)
- Increase in flow velocities: Due to the removal of vegetation and channelisation of flowing water (e.g. deep eroded channels and through road culverts)
- Change in peak flows: Due to the removal of vegetation and deep channels, surface water flows rapidly away from these areas and therefore inundation occurs for a very short period.
- Invasion with weeds and invasive plants: Disturbed and overgrazed areas have been severely invaded with such plants.

This section of the Olifantsloop River is characterised by a varying riparian fringe. Due to disturbances, much of this area has been transformed. Typically, this section is characterised by a relatively open tree cover (predominantly *Acacia karroo*) which may, where conditions are suitable, become very dense with an almost closed canopy (monotonous communities comprising out of almost only *A. karroo*), although such areas are small in extent and rather form isolated patches within the more open riparian fringe. Such a riparian fringe plays an important role in habitat diversity and buffer against severe flooding events. Due to the transformation of this habitat this area provides limited ecological functions.

The Present Ecological State scores (PES) for this portion of the watercourse and associated riparian fringe were rated as C/D (Largely modified) due to activities described above.

This portion of the Olifantsloop non-perennial watercourse as well as its associated riparian fringe will only be impacted on by the project if the alternative substation is selected as the final position. The preferred location for the substation is located outside of this habitat. Furthermore, even though the watercourse and riparian fringe in this section are highly degraded and transformed, these areas do still provide some valuable functions, such as habitat diversity, flow attenuation (although limited), grazing etc. and are subsequently regarded as High sensitivity areas.

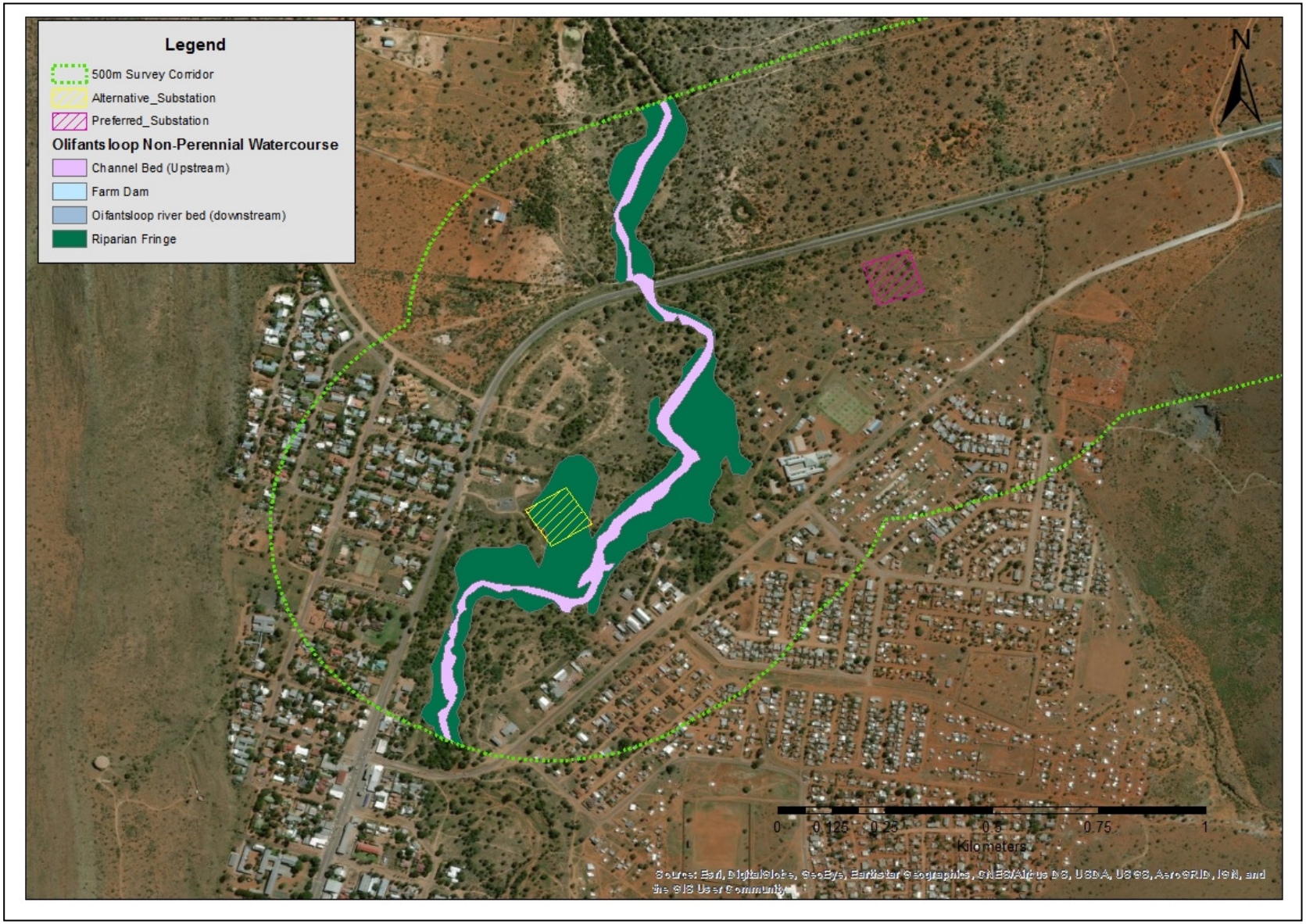

Figure 10: Upper portion of the Olifantsloop non-perennial watercourse and associated riparian fringe

3. THE SOCIAL ENVIRONMENT

3.1 Landscape Character and Visual Receptors

3.1.1 Landscape Character

Landscape character is defined by the UK Guidelines as "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another".

Landscape Character is a composite of a number of influencing factors including:

- Landform and drainage - Both substation options are be located within the rocky terrain of the Langberg. This rugged topography could help to screen longer views of the development.
- Nature and density of development - The population density of the area immediately surrounding the proposed development varies.
- Vegetation patterns – The vegetation pattern is mostly open tree and shrub cover with a sparse grass layer.

3.1.2 Visual Receptors

Visual Receptors are defined as "individuals and / or defined groups of people who have the potential to be affected by the proposal".

This section highlights Receptors within the landscape, which due to use, could be sensitive to landscape change. They include;

- Area Receptors include the urban area of Olifantshoek.
- Point Receptors include homesteads that are scattered throughout the area. It is likely that the focus for this area is agricultural production. Unless farms have diversified into the tourism market it is unlikely that this group of receptors will be overly sensitive to the likely landscape change as long as it does not impact on agricultural productivity.
- Linear Receptors that include the N14 and or local routes through the area. The N14 is a primary tourism route. Local routes surrounding the development are likely to be mainly used by local people and relate to agricultural activities.

3.2 Heritage Resources

It was concluded in a Heritage Screener undertaken by Cedar Tower Heritage Consultants, that due to the disturbed nature of the proposed development area as well as the extensive HIA coverage for the area from previous assessments, it is unlikely that the proposed 132/11kV Olifantshoek Substation will impact on any significant heritage resources. As such it was recommended that no further heritage studies are required (this is supported by the final comment submitted by SAHRA on 19 October 2017). Should any heritage resources be discovered during the construction phase of the substation work must cease and the SAHRA APM unit should be contacted immediately.

3.3 Socio-Economic Character

Gamagara Local Municipality

According to the Gamagara Local Municipality Final IDP (2016/2017), the majority of employed people in the municipal jurisdiction are male, while female are the most unemployed and discouraged work-seekers. Females also constitute a large number of those that are not economically active. StatsSA (2011) indicates that 17.7% of the population of Gamagara were not employed and 65% of those constitute youth. The high unemployment rate for both the District and Local Municipalities can be explained by the high illiteracy of the population and the population's dependency on seasonal employment brought on by the agricultural sector.

For the local municipality, there is a high number of people who have a secondary school education (14000- 14500 people), followed by those who have matric (10 000 people). The number of those with no schooling has increased from the 2007 survey to 2011 and is currently 3500 – 4000 people. The 2011 Stats SA indicated that 10,5% of the population aged 20 and above had No schooling, and that 12,6%of this demographic has a higher education. 26,5% of the population ages 20+ have a matric.

Gamagara Local Municipality has become an important contributor to South Africa's mining sector, and international mining value chain. The municipality concentrates on development by providing relevant and up to date infrastructure to accommodate needs. The municipality's infrastructure investment drives and incentivises the town's economic development trajectory which in turn stimulates job creation and employment. The economic pull and push factors for the municipality are education and training, research, entrepreneurship, community image and the arts.

John Taolo Gaetsewe District Municipality

The District's 2012 – 2017 IDP recorded that a total of 91 618 people in the area (40.8%) had no recordable income. The majority of the people in John Taolo Gaetsewe District Municipality (formerly Kgalagadi) live in rural areas with basic infrastructure backlogs. The economic nodes and employment opportunities are concentrated in towns such as Kuruman and Kathu. The decline of mining employment has had a strong impact on the socio-economic situation of the region.

The educational levels among the population of the District are relatively low. 4% of the population has no formal education, while only 71% has some school education. Only 2% of the population has some tertiary education. These statistics have obvious implications for the employment potential of the population, and therefore also for the District's local economic development and job creation initiatives.

CHAPTER 3: PUBLIC PARTICIPATION AND BASIC ASSESSMENT PROCESS

The public participation process followed for the 132/11kV Olifanthoek Substation has been undertaken in line with Regulation 39, 40, 41, 42, 43 and 44 of the EIA Regulations, 2014, as amended April 2017.

Public participation is an essential and regulatory requirement for an environmental authorisation process and is guided by Regulations under NEMA, specifically the EIA Regulations. The sharing of information forms the basis of the public participation process and offers the opportunity to Interested and Affected Parties (I&APs) to become actively involved in the EIA Process from the outset. The public participation process is designed to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

» identify issues of concern and suggestions for enhanced benefits;
» assist in identifying reasonable alternatives; and
» contribute relevant local information and knowledge to the environmental assessment.

The sections below detail the tasks which were undertaken as part of the public participation process within the Basic Assessment Process to date, as well as the process followed as part of the Basic Assessment.

The assessment of the new 132/11kV Olifantshoek Substation formed part of an application previously undertaken for the project which included the assessment of both the 132/11KV Olifantshoek Power Line and the new Substation (DEA ref.: 14/12/16/3/3/1/1781) within one consolidated application. However, due to the fact that the Gamagara Local Municipality will be constructing and operating the proposed substation (even though Eskom is the applicant) it was decided by Eskom to apply for a separate Environmental Authorisation from the Department of Environmental Affairs for the 132/11kV Olifantshoek Substation such that a separate Authorisation for this infrastructure could be obtained.

1. BASIC ASSESSMENT PROCESS

The following process was followed during the undertaking of the Basic Assessment Process:

» The compilation and submission of an application for Environmental Authorisation to the DEA together with a declaration of independence from the consultant.
» Independent specialist studies were undertaken by specialists in order to assess the impact of the development on the respective environmental fields (i.e. ecology, avifauna, wetlands, heritage and visual).
» The impacts associated with the development of the 132/11kV Olifantshoek Substation have been assessed in terms of the requirements of Appendix 1 of the EIA Regulations, 2014, as amended in April 2017 (including an assessment of the nature, extent, duration, probability and significance).
» An Environmental Management Programme (EMPr) for all life-cycle phases of the substation has been prepared in accordance within Appendix 4 of the EIA Regulations, 2014, as amended in April 2017.
» A public participation process in line with the EIA Regulations, 2014, as amended in April 2017, has been undertaken as detailed in the section below.

Following the 30-day review period of the Basic Assessment Report all comments and issues raised have been included and collated into this final Basic Assessment Report for the consideration by the National Department of Environmental Affairs (DEA).

2. PUBLIC PARTICIPATION PROCESS

In order to ensure effective participation, the public participation process included the following:

- Distribution of project related information in the form of notification letters at the time of the release of the draft Basic Assessment Report.
- Identification of potential I&APs including:
  - State departments that administer a law relating to matters affecting the environment relevant to an application for an environmental authorisation;
  - all organs of state which have jurisdiction in respect of the activity to which the application for environmental authorisation relates;
  - owners, person in control of and occupiers of the site where the activity is to be undertaken or to any alternative site where the activity is to be undertaken;
  - owners, person in control of, and occupiers of land adjacent to the site where the activity is to be undertaken or to any alternative site where the activity is to be undertaken;
  - the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;
  - the municipality which has jurisdiction in the area.
- Placement of site notices at the affected property/properties and any alternative properties being considered.
- Placement of an advertisement in a local newspaper.
- Compilation of an I&AP database which is updated throughout the Basic Assessment process.
- On-going consultation with all registered I&APs regarding the progress in the Basic Assessment process through stakeholder consultation via notification letters, written correspondence and telephone calls where required.
- Release of the draft Basic Assessment report for a 30-day review period.

3. STAKEHOLDER IDENTIFICATION

The first step undertaken as part of the public participation process was the identification of potential I&APs. I&APs were identified through a process of networking and referral, obtaining information from Savannah Environmental's existing stakeholder database, liaison with potentially affected parties in the study area and a registration process involving the completion of a registration and comment sheet. Key stakeholders and affected and surrounding landowners were identified and registered on the project database as per Regulation 42 of the EIA Regulations, 2014 (as amended in April 2017). Other stakeholders were required to formally register as stakeholders or interested and affected parties (I&APs) for the EIA process.

Refer to **Appendix E3** for a list of all registered interested and affected parties, including key stakeholders, on the project database. The register of I&APs contains the names, contact details and addresses of:

- all persons who requested to be registered on the database in writing;
- all organs of state which hold jurisdiction in respect of the activity to which the application relates; and

» all persons who submitted written comments or attended meetings during the public participation process.

While I&APs were encouraged to register their interest in the EIA process from the onset, the identification and registration of I&APs was on-going for the duration of the EIA process. The register of I&APs was updated throughout the EIA process, and acted as a record of the parties involved in the public participation process.

4. ADVERTISEMENT AND NOTIFICATION

The Basic Assessment Process was announced in June 2017 (as a consolidated application for both the substation and power line) with the invitation to Organs of State, potentially affected and neighbouring landowners and the general public to register as I&APs and to actively participate in the Basic Assessment process.

With the 132/11kV Olifantshoek Substation being undertaken as a separate application a notification letter was distributed to all I&APs with the submission of the Application to the DEA as well as the 30-day review period within which the Basic Assessment Report was made available for review. Proof of distribution of the notification letter will be included in **Appendix E2**.

The table below provides the details of the advertisement placed at the onset of the public participation process undertaken in June 2017 as part of the previous BA process. However, as the 132/11kV Olifantshoek Substation was be undertaken under a separate application for Environmental Authorisation a new advertisement was placed in the Gemsbok Koerant at the commencement of the 30-day review period and the details and proof have been included in the report.

Publication name	Die Gemsbok Koerant	
Date published	**9 June 2017** – Public Participation Process and review period of the BAR inclusive of two power line alternatives and the new Olifantshoek Substation **24 November 2017** – Notification of the availability of the Basic Assessment Report for review and the duration of the 30-day review period for the 132/11kV Olifantshoek Substation	
Site notice position at:	**Latitude**	**Longitude**
Emil Switching Station	27°44'10.28"S	22°55'12.20"E
Olifantshoek Substation Fence	27°56'10.05"S	22°44'23.56"E
Date placed	11 October 2017	

Refer to **Appendix E1** for proof of the advertisements and site notices placed for the 132/11kV Olifantshoek substation.

5. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Through the public participation process for the Basic Assessment undertaken to date comments were raised by I&APs through the various opportunities provided to them, which includes:

- The 30-day review period which was made available for the 132/11KV Olifantshoek Power Line and Substation (DEA ref.: 14/12/16/3/3/1/1781) from 30 May 2017 – 30 June 2017.
- The key stakeholder focus group meetings held on 12 June 2017 – 13 June 2017 for the 132/11KV Olifantshoek Power Line and Substation (DEA ref.: 14/12/16/3/3/1/1781).
- The Landowners focus group meeting held on 11 October 2017 to present the separate applications to the affected landowners.

All comments and concerns raised, which are considered relevant to the 132/11kv Olifantshoek Substation, during the above opportunities have been considered and assessed throughout this Basic Assessment Process.

With the 30-day review period of the 132/11kV Olifantshoek Substation Basic Assessment Report, undertaken from 15 November 2017 – 15 December 2017, all issues and comments raised were collected, recorded and addressed in this final Basic Assessment Report.

All comments received have been included in **Appendix E4**, and the meeting minutes have also been included as part of **Appendix E4**.

6. COMMENTS AND RESPONSE REPORT

All comments received from the I&APs as part of the Basic Assessment process for the 132/11kV Olifantshoek substation has been collated into a Comments and Responses Report which include the details of the comments submitted as well as the responses from the EAP.

Comments received during the 30-day review period have been included and responded to in the Comments and Responses report. Refer to **Appendix E5**.

CHAPTER 4: IMPACT ASSESSMENT

This chapter provides an assessment of the impacts anticipated to be associated with the development of the 132/11kV Olifantshoek Substation.

A summary and anticipated significance of the potential impacts that are likely to occur as a result of the Planning and Design, Construction Phase, Operation Phase, Decommissioning Phase and the No-Go Option of the 132/11kV Olifantshoek Substation are provided in the tables which follow.

1. ASSESSMENT METHODOLOGY

The Environmental Impact Assessment methodology assists in the evaluation of the overall effect of a proposed activity on the environment. This includes an assessment of the significant direct, indirect, and cumulative impacts. The significance of environmental impacts is to be assessed by means of the criteria of extent (scale), duration, magnitude (severity), probability (certainty) and direction (negative, neutral or positive).

- The **nature**, which includes 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) or regional, and a value between 1 and 5 was assigned as appropriate (with 1 being low and 5 being high).
- The **duration**, wherein it was 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; or
  - permanent – assigned a score of 5;
- The **magnitude**, quantified on a scale from 0 – 10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which describes the likelihood of the impact actually occurring. Probability was estimated on a scale of 1 -5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- The **significance**, was determined through a synthesis of the characteristics described above and can be assessed as **LOW**, **MEDIUM** or **HIGH**; and
- the **status**, which was described as either positive, negative or neutral.
- the degree of 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 was calculated 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 the 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).

2. ASPECTS NOT REQUIRING ASSESSMENT

2.1 Heritage

The entire footprint of the Olifantshoek Substation project (inclucing the proposed substation and power line) has previously undergone a Heritage Impact Assessment (HIA) (Gaigher 2 014, N ID 1 61427 and Beaumont 2 007, N ID 4 600). Gaigher's assessment was conducted for the Solar-Ferrum 400kV Power Line (Case ID 5323). His report concluded that only ephemeral scatters of Stone Age artefacts of low significance were located in the vicinity of the power line, and he recorded no rock engravings or built environment sites - common site types to be found in this region. The only burial grounds site that Gaigher mentions is the Olifantshoek Cemetery (Site ID 95604), which will not be impacted by the proposed development. Beaumont's (2007) HIA located a burial ground (Site ID 44581) that he concluded to be from the early 1950's or late 1940's. He located some ephemeral stone age artefacts of low significance which he did not record, but found no archaeological or palaeontological sites of value.

It was therefore concluded in a Heritage Screener undertaken by Cedar Tower Heritage Consultants, that due to the disturbed nature of the proposed development area, as well as the extensive HIA coverage for the area from previous assessments, it is unlikely that the proposed 132/11kV Olifantshoek Substation will impact on any significant heritage resources. As such it is recommended that **NO FURTHER HERITAGE STUDIES ARE REQUIRED**. Should any heritage resources be discovered during the construction phase of the 132/11kV Olifantshoek Substation, work must cease and the SAHRA APM unit should be contacted immediately. The tables which follow therefore do not include an assessment of impacts on heritage sites.

2.2 Impacts on the hydrological features

The existing Olifantshoek Substation is located outside of any watercourse or riparian zone and as such will not impact on the identified watercourses and riparian zones, subsequently no assessment was deemed necessary. Furthermore, the Preferred Substation option is located well beyond the boundaries of any watercourse and/or riparian zone and therefore no impacts have been assessed for this option. Theerfore, potential hydrological impacts assessed are only applicable to the Alternative Substation option.

3. CONSTRUCTION PHASE IMPACTS

The following impacts have been identified, through this Basic Assessment Process, to be associated with the construction phase of the132/11kV Olifantshoek Substation.

3.1 Ecology

During the construction phase impacts on the ecology of the affected area is expected to occur (**Appendix D1**). Two impacts have been identified and include:

» *Impacts on vegetation and protected plant species* - Some vegetation loss will occur as a result of the development and it is also likely that at least some individuals of listed or protected plant species will be impacted by the development of the substation as a number of protected trees can be confirmed at the site. Although some individuals of *Acacia erioloba* and *Boscia albitrunca* are present at the site, impacts on these species are likely to be of relatively low significance as they are widespread and abundant in the area.

» *Direct Faunal impacts* – Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna during construction. Sensitive and shy fauna would move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals or reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the presence of construction personnel or greater site access. However, given the location of the site in the urban edge of Olifantshoek, it is not likely to be used by many larger or more shy fauna and impacts are likely to be restricted to some local habitat loss for the more tolerant resident species.

Impacts on vegetation an protected plant species during construction

Impact Nature: Impacts on vegetation and protected plant species will occur due to vegetation clearing and disturbance associated with the construction of the substation. There are some protected trees species confirmed present at the substation sites. However, there are no highly sensitive features within the sites and overall post-mitigation impacts are likely to be **Low**.				
	Without Mitigation		**With Mitigation**	
	Preferred	**Alternative**	**Preferred**	**Alternative**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)	Low (3)	Low (4)
Probability	Highly Probable (4)	Highly Probable (4)	Probable (3)	Probable (3)
Significance	**Medium (36)**	**Medium (36)**	**Low (24)**	**Low (27)**
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources	No	No	No	No
Can impacts be mitigated?	Impacts on protected plant species can to some extent be mitigated through avoidance, but some impact on vegetation and protected species is inevitable and cannot be avoided by the development.			
Mitigation » A preconstruction walk-through of the development footprint is required in order to locate species of conservation concern that can be translocated or avoided, as well as to comply with Northern Cape				

Conservation Act permit conditions.

- » Vegetation clearing to commence only after the walk-through has been conducted and the necessary permits obtained.
- » Preconstruction environmental induction for all construction staff on site is required to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, remaining within the demarcated construction areas etc.
- » The Environmental Control Officer or specialist to provide supervision and oversight of vegetation clearing activities near sensitive areas.
- » Vegetation clearing to be kept to a minimum. No unnecessary vegetation to be cleared.
- » All construction vehicles should adhere to clearly defined and demarcated roads. No off-road driving to be allowed.
- » Temporary laydown areas should be located within the development footprint or within areas that have been identified as being of low sensitivity. These areas should be rehabilitated after use.
- » A permit from DENC is required for any vegetation clearing, destruction or translocation of listed or protected plant species.
- » Existing tracks should be used for access wherever possible.
- » Access roads and other infrastructure should be kept out of the Olifantsloop River.

Cumulative Impacts

The potential for cumulative impacts is low given the small footprint of the substation and the low ecological value of the site due to its proximity to Olifantshoek.

Residual Impacts

Some residual habitat loss will result from the development, equivalent to the operational footprint of the facility (1ha).

Faunal impacts during construction

Impact Nature: Disturbance, transformation and loss of habitat will have a negative effect on resident fauna during construction. There are fauna resident within the site and these will be impacted during the construction of the facility. However, faunal diversity and density within the site is low and post mitigation impacts are likely to be **Low** and of **Local** significance only.

	Without Mitigation		**With Mitigation**	
	Preferred	**Alternative**	**Preferred**	**Alternative**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)	Low (3)	Low (3)
Probability	Highly Probable (4)	Highly Probable (4)	Probable (3)	Probable (3)
Significance	**Low (28)**	**Low (28)**	**Low (18)**	**Low (18)**
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources	No	No	No	No
Can impacts be mitigated?	Large amounts of noise and disturbance at the site during construction is largely unavoidable, but would be of local impact only as the affected area is located within the urban environment edge of Olifantshoek.			

Mitigation

- » The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.
- » All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes and tortoises which are often persecuted out of superstition, or pangolin which are traded illegally.
- » Any fauna threatened by the construction activities should be removed to safety by an appropriately qualified person in line with the required permit.
- » All construction vehicles should adhere to a low speed limit to avoid collisions with susceptible species such as snakes and tortoises.

» All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
Cumulative Impacts During the construction phase, the activity would contribute to cumulative fauna disturbance and disruption in the area, but the impact would be of local extent and not of high significance with mitigation.
Residual Impacts There will be minimal residual impact as the facility will have low operational impacts on fauna, after the construction phase.

3.2 Avifauna

Impacts expected to occur on the avifauna within the area during the construction phase includes:

» Habitat destruction
» Disturbance

During the construction phase of the substation, disturbance levels will be significantly higher in the immediate vicinity than previously experienced. This disturbance will result from machinery and vehicle disturbance as well as other construction activities. Refer to **Appendix D2**.

The impacts are considered to be the same for both substation alternatives.

Habitat destruction

Nature: Habitat Destruction
During the **construction** of the substation, some habitat destruction and alteration will occur, although this is will be limited. These activities may have a very slight impact on foraging, breeding and roosting ecology of avian species within the area through modification of habitat.

It is envisaged that the only Red Data specie that may be potentially displaced (temporarily) by the activities and habitat transformation that will take place as a result of construction are Kori bustard (*Ardeotis kori*). This displacement will only be from a very restricted area. The impact on smaller, non-Red Data species that are potentially breeding in the area will be local and very restricted in extent, and will not have a significant effect on regional or national populations.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Minor (2)	Small (0)
Probability	Highly Probable (4)	Probable (3)
Significance	**Low (28)**	**Low (15)**
Status	Negative	
Reversibility	High	
Irreplaceable loss of resources	Only very slight loss of resources	
Can impacts be mitigated?	Yes.	

Mitigation
» The temporal and spatial footprint of the development should be 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.
» Provide adequate briefing for site personnel on the possible important (Red Data) species occurring and/or

nesting in the area and the procedures to be followed (for example notification of ECO and avoidance of area until appropriate recommendations have been provided by a specialist).
» The above measures must be covered in a site specific EMPr and monitored by an ECO.

Cumulative Impacts
The cumulative impact will be low due to the size of the proposed development.

Residual Impacts
There will be minimal residual impacts, especially with the implementation of the preferred substation site.

Disturbance

Nature: Disturbance
The disturbance of avifauna during the **construction** of the substation may occur. Species sensitive to disturbance include 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.

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 are Kori Bustard. Other small avian species do occur within the development footprint but these species are non-Red Data species.

The proposed site is located within an agricultural habitat close to National and Domestic roads. Therefore, species within this landscape often experience disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. The relatively small scale of the development (in relation to the large agricultural landscape) is unlikely to have a significant impact on avifauna. However, species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operation (maintenance) phases.

	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	
Reversibility	High reversibility	
Irreplaceable loss of resources	Only a slight loss of resources	
Can impacts be mitigated?	Impacts can be mitigated to a large extent.	

Mitigation
» Strict control must be maintained over all activities during construction, in line with an approved construction EMPr.
» During construction, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.
» The construction equipment camps must be as close to the site as possible.
» Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted.
» Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.

3.3 Hydrology

The following impacts are expected to occur during the construction phase (**Appendix D3**):

» Loss of riparian systems and alluvial water courses
» Potential impact on localised surface water quality
» Impact on riparian systems through the possible increase in surface water runoff on riparian form and function

It must be noted that the impacts below only relate to the construction of the Alternative Substation option due to the fact that the Preferred Substation option will not have any impact on hydrological features as a result of its location.

Loss of riparian systems and alluvial watercourses

Impact Nature: The physical removal of riparian zones within the footprint area and disturbance of any alluvial watercourses, being replaced by hard engineered surfaces during construction.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Highly Probable (4)
Significance	**Medium (45)**	**Medium (36)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes, to a limited extent	
Mitigation » This potential impact can be avoided by selecting the preferred substation option as this option is located well outside of any watercourse and riparian boundary. » No vehicles to refuel within watercourses / riparian vegetation. » Ensure the vegetation removal is minimised to an absolute minimum, restricted only to the footprint area.		
Cumulative Impacts Increase in the surface run-off velocities, reduction in the potential for groundwater infiltration and the spread of erosion into downstream wetlands.		
Residual Impacts Possible impact on the remaining catchment due to changes in the run-off characteristics in the development site.		

Impact on localised surface water quality

Impact Nature: During preconstruction, construction and to a **limited degree** the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet concrete, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems. Appropriate ablution facilities should be provided for the construction workers during the construction phase of the substation and on-site staff during the operation phase of the substation.		
	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)

Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Low (21)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	Medium	Low
Can impacts be mitigated?	Yes, to a large extent.	

Mitigation

» This potential impact can be avoided by selecting the preferred substation option as this option is located well outside of any watercourse and riparian boundary.
» Implement appropriate measures to ensure strict use and management of all hazardous materials used on site.
» Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter hydrocarbons from vehicles and machinery, cement during construction etc.).
» Implement appropriate measures to ensure the containment of all contaminated water by means of careful run-off management on the development site.
» Implement appropriate measures to ensure strict control over the behavior of construction workers.
» Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.

Cumulative Impacts

None

Residual Impacts

Residual impacts will be negligible after appropriate mitigation.

Increase in sedimentation erosion

Impact Nature:

Increase in sedimentation and erosion within the development footprint. This may alter the local watercourse morphology and influence water quality downstream.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Very Short (1)
Magnitude	Low (2)	Small (0)
Probability	Probable (3)	Improbable (2)
Significance	**Low (21)**	**Low (4)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

» This potential impact can be avoided by selecting the preferred substation option as this option is located well outside of any watercourse and riparian boundary.
» Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the soil and limit erosion potential.
» Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
» Topsoil should be removed and stored separately and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.
» There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of

bogging down has decreased.
Cumulative Impacts Downstream erosion and sedimentation of the downstream systems. During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) may be vulnerable to erosion. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.
Residual Impacts Altered streambed morphology, however due to the extent and nature of the development this residual impact is unlikely to occur.

3.4 Visual

During the construction phase visual impacts are expected to occur and includes (**Appendix D4**):

» An impact on the General Landscape Character

Impact of the proposed development on the General Landscape Character

Nature of impact: Degradation of the character of the existing landscape. This is particularly relevant to existing natural and urban areas where there is a possibility that the development could introduce industrial components.		
	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long term, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Moderate, (6) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Low, (4) **Preferred Substation Location** Minor, (2)
Probability	**Alternative Substation Location** Highly probable, (4) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Improbable, (2)
Significance	**Alternative Substation Location** Medium, (48) **Preferred Substation Location** Medium, (30)	**Alternative Substation Location** Medium, (30) **Preferred Substation Location** Low, (16)
Status	The character of the urban and rural landscape will be changed. It is likely that the influence of industrial elements will not be highly obvious to the majority of people. It is likely that the majority of people will not consider the sight of a substation as a negative impact. Neutral - negative	Neutral - negative
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be	Yes	

mitigated?	

Mitigation / Management:

» Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.
» Ensure that vegetation is not unnecessarily removed during the construction period.
» Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.
» Plan and implement screening for the substation.
» Plan to use motion sensor triggered lighting at the substation.
» Ensure that lighting is focused on the development with no light spillage outside the site.
» Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities.

Cumulative Impact

The cumulative impact will be low due to the size of the development as well as the location and other infrastructure located within the surrounding area.

Residual Risks:

Lack of rehabilitation on decommissioning is likely to result in landscape degradation.

4. OPERATION PHASE IMPACTS

The following impacts are expected to occur with the operation and maintenance of the substation.

4.1 Ecology

During the operation phase of the substation, as well as the maintenance required for the facility ecological impacts are expected and include (**Appendix D1**):

» *Degradation of ecosystems* - Maintenance activities such as vegetation clearing around the substation or access roads as well as the large amount of disturbance created during construction will leave the site vulnerable to degradation through alien plant invasion and soil erosion. This is of potential concern especially given the proximity of the sites to the Olifantsloop River and the potential for erosion and alien plant invasion to affect this ecosystem.

Degradation of ecosystems

Impact Nature: Disturbance is likely to increase the vulnerability of the disturbed areas to erosion. Furthermore, these areas are likely to remain vulnerable to alien plant invasion for some time following construction and alien species could invade suitable sites created during the construction disturbance.

	Without Mitigation		**With Mitigation**	
	Preferred	**Alternative**	**Preferred**	**Alternative**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Medium-term (3)	Medium-term (3)
Magnitude	Low (4)	Low (4)	Low (3)	Low (4)
Probability	Probable (3)	Highly Probable (4)	Improbable (2)	Improbable (2)
Significance	**Low (27)**	**Medium (36)**	**Low (14)**	**Low (16)**
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	High	High
Irreplaceable loss of resources	No	No	No	No
Can impacts be mitigated?	Yes			

Mitigation

» Erosion control measures should be implemented in areas where soil has been disturbed due to construction

activities.
» Due to the disturbance at the site as well as the increased runoff generated at the site, alien plant species are likely to be a problem at the site after construction. A control plan will need to be implemented and regular monitoring for alien plants within the development footprint should be undertaken.
» Regular alien clearing should be conducted using the best-practice methods for the species concerned.

Cumulative Impacts
Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then the cumulative impact from alien species would not be significant.

Residual Impacts
If erosion and alien species at the site are controlled, then there will be very little residual impact.

4.2 Avifauna

During the operation phase of the substation there will be some vehicle activity when maintenance of the infrastructure is carried out (**Appendix D2**).

Avifaunal impacts associated with the operation of the substation include:

» Disturbance
» Electrocution of birds on the substation infrastructure

The impacts below are considered to be associated with both alternatives.

Disturbance

Nature: Disturbance during Operation Phase due to maintenance activities
The disturbance of avifauna during the operation of the substation may occur. Species sensitive to disturbance include 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.

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 are Kori Bustard. Other small avian species do occur within the development footprint but these species are non-Red Data species.

The proposed site is located within an agricultural habitat close to National and Domestic roads. Therefore, species within this landscape often experience disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. The relatively small scale of the development (in relation to the large agricultural landscape) is unlikely to have a significant impact on avifauna. However, species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operation (maintenance) phases.

	Without Mitigation	**With Mitigation**
Extent	Low (1)	Low (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Probable (3)
Significance	**Low (27)**	**Low (21)**
Status	Negative	
Reversibility	High reversibility	

Irreplaceable loss of resources	Only slight loss of resources	
Can impacts be mitigated?	Yes.	

Mitigation

» Strict control must be maintained over all activities during operation, in line with an approved operation EMPr.
» Vehicle movements must be restricted to existing roads and a speed limit of 30km/h must be implemented on all roads associated with the substation during the operation phase.
» Contractors and working staff should remain within the development footprint and movement outside these areas, especially into avian micro-habitats, must be restricted.

Cumulative Impact

The cumulative impact is expected to be low due to the size of the development as well as the location within the urban edge.

Residual Impacts

The residual impact is considered to be low.

Electrocution of birds on the substation infrastructure

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 a phase and earth resulting in electrocution. However, very few electrocutions have been recorded on substations. Species likely to be affected are crows, ravens and other species that are tolerant of disturbance. Small raptors such as Lanner Falcons are sometimes attracted into substation yards in pursuit of species nesting there such as sparrows and canaries and may be susceptible to electrocutions.

The impact assessment found the impact of electrocution from substation infrastructure to be of a much lower significance once mitigation in the form of bird friendly structures and bird deterrent measures have been put in place. Species likely to be affected are crows and other non-threatened species with the majority of threatened species avoiding the substation yard as they are sensitive to disturbances.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Minor (2)
Probability	Probable (3)	Improbable (2)
Significance	**Low (30)**	**Low (14)**
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 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 Impact

The cumulative impact will be low, subject to the implementation of the recommended mitigation measures.

Residual Impact

The residual impact is considered to be low.

4.3 Hydrology

During the operation phase of the substation one impact is expected to occur on the hydrology of the area and includes (**Appendix D3**):

» Impact on riparian systems

It must be noted that the impacts below only relate to the operation of the Alternative Substation option due to the fact that the Preferred Substation option will not have any impact on hydrological features as a result of its location.

Impact on riparian systems

Impact Nature: Impact on riparian systems during operation as a result of hard engineered surfaces and the removal of vegetation during construction. This could possibly increase the surface water runoff on the riparian form and function.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (33)**	**Low (27)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	
Mitigation » Avoid the alternative substation option as this option will impact on the riparian habitat fringing the upper reaches (within the town boundary) of the Olifantsloop River. » If the alternative substation option is selected, any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduced flow velocities. » Ensure the vegetation removal is minimised to an absolute minimum, restricted only to the footprint area.		
Cumulative Impacts Downstream erosion and sedimentation of the downstream systems. During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) may be vulnerable to erosion. However due to a low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.		
Residual Impacts Altered streambed morphology, however due to the extent and nature of the development this residual impact is unlikely to occur.		

4.4 Visual

During the operation phase of the 132/11kV Olifantshoek Substation an impact is expected on identified sensitive receptors (**Appendix D3**). Potential visual impacts on sensitive receptors include:

» The visibility of the facility to and visual impact on local homesteads.
» The visibility of the facility to and visual impact on the N14.
» The visibility of the facility to and visual impact on urban residential areas.
» The impact of lighting.

The visibility of the facility to and the visual impact on local homesteads

Nature of impact:

The Alternative Substation location is located approximately 580m from the closest homestead, however there is urban development between the homestead and the proposed site.

The Preferred Substation location is located approximately 750m from the closest homestead. Existing vegetation is sufficiently dense that whilst glimpses of the development may be possible through the trees, the bulk of the development will be screened.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long Term, (4)	**Both Substation Alternatives** Long Term, (4)
Magnitude	**Alternative Substation Location** Small, (0) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Small, (0) **Preferred Substation Location** Small, (0)
Probability	**Alternative Substation Location** Very improbable, (1) **Preferred Substation Location** Improbable, (2)	**Alternative Substation Location** Very improbable, (1) **Preferred Substation Location** Very improbable, (1)
Significance	**Alternative Substation Location** Low, (6) **Preferred Substation Location** Low, (20)	**Alternative Substation Location** Low, (6) **Preferred Substation Location** Low, (6)
Status	It is likely that the majority of people will not consider a small partial view of a substation as a negative intrusion. Neutral to negative.	Neutral to negative.
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	

Mitigation / Management:

- Ensure that vegetation is not unnecessarily removed.
- Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required.
- Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude.
- Rehabilitate all disturbed areas immediately after the completion of maintenance works.
- Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish.
- Screen planting that was specifically established to minimise the intrusiveness of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and throughout operation.

Residual Risks:
Lack of rehabilitation on decommissioning is likely to result in degraded areas.
Cumulative Impacts
The cumulative impact regarding the local homesteads will be low.

The visibility of the facility to and visual impact on the N14

Nature of impact:

The proposed substation is likely to be visible to the N14. The Alternative location will be located away from the road but a short view will be possible through vegetation and buildings. The Preferred location will be located closer to the road on the urban edge. Existing vegetation is likely to result in views of this alternative only being obvious as the viewer is close to and opposite the facility but without additional mitigation the full extent of the substation is likely to be open to view from a short section of road parallel to the site.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long term, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Small to minor, (1) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Small, (0) **Preferred Substation Location** Minor, (2)
Probability	**Alternative Substation Location** Improbable, (2) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Improbable, (2) **Preferred Substation Location** Improbable, (2)
Significance	**Alternative Substation Location** Low, (14) **Preferred Substation Location** Medium, (30)	**Alternative Substation Location** Low, (12) **Preferred Substation Location** Low, (16)
Status	The character of the rural landscape adjacent to the affected section of the N14 will be modified. It is likely that the majority of people will not consider the sight of a substation close to the road on the urban edge as a negative intrusion. Neutral to negative	Neutral to negative
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	

Mitigation / Management:

- Ensure that vegetation is not unnecessarily removed.
- Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required.

» Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude. » Rehabilitate all disturbed areas immediately after the completion of maintenance works. » Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish » Screen planting that was specifically established to minimise the intrusiveness of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and though out operation.
Residual Risks: Lack of rehabilitation on decommissioning is likely to result in degraded areas.
Cumulative Impact: The cumulative impact will be low due to the size and nature of the development.

The visibility of the facility to and visual impact on urban residential areas

Nature of impact:
The Alternative Substation Location is located within the urban area close to existing homes. The Preferred Substation Location is located approximately 80m from and will be visible to a small number of dwellings within an existing informal area on the edge of Olifantshoek.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long term, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Low, (4) **Preferred Substation Location** Low to minor, (3)	**Alternative Substation Location** Minor to low, (3) **Preferred Substation Location** Minor, (2)
Probability	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Improbable, (2)
Significance	**Alternative Substation Location** Medium, (30) **Preferred Substation Location** Low, (27)	**Alternative Substation Location** Low, (27) **Preferred Substation Location** Low, (16)
Status	It is likely that the majority of people will consider the sight of a large substation in close proximity to a residential area as a negative impact. Negative	Negative
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	

Mitigation / Management:
» Ensure that vegetation is not unnecessarily removed during the operation or maintenance period.
» Restrict the activities and movement of workers and vehicles during maintenance and operation of the site and

make use of existing access roads. » Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities. » Reduce and control construction dust using approved dust suppression techniques as and when required. » Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude. » Rehabilitate all disturbed areas immediately after the completion of maintenance works. » Maintain the general appearance of the servitude as a whole » Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish » Screen planting that was specifically established to minimise the intrusiveness of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and though out operation.
Residual Risks: Lack of rehabilitation on decommissioning is likely to result in degraded areas.
Cumulative Impact: The cumulative impact will be low due to the decommissioning of the one substation and development of the new substation (i.e. the substation is only getting replaced).

Lighting impacts associated with the operation of the substation

Nature of impact:
Lighting may be associated with the substation in the form of flood lighting and / or possibly security lighting. The area within which the substations are located are either close to (Preferred Location) or within the urban area (Alternative Location), however both are located within the urban edge. The issue of light pollution within an otherwise dark night time landscape is therefore not relevant. More relevant however, it's the possibility that lighting could cause a nuisance to neighbours. No specific detail has been provided regarding lighting of the substation.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings (2)	**Both Substation Alternatives** Immediate surroundings (2)
Duration	**Both Substation Alternatives** Long term (4)	**Both Substation Alternatives** Long term (4)
Magnitude	**Alternative Substation Location** Low (4) **Preferred Substation Location** Minor, (2)	**Alternative Substation Location** Minor, (2) **Preferred Substation Location** Small, (0)
Probability	**Alternative Substation Location** Probable (3) **Preferred Substation Location** Improbable, (2)	**Alternative Substation Location** Improbable, (2) **Preferred Substation Location** Very improbable, (1)
Significance	**Alternative Substation Location** Medium (30) **Preferred Substation Location** Low (16)	**Alternative Substation Location** Low, (16) **Preferred Substation Location** Low, (6)
Status	Light spill that impacts on a residential area is likely to be seen by affected parties as a negative impact. Negative.	If the lights are generally not impacting on a residential area then the impact is likely to be seen is neutral. Neutral.
Irreplaceable	No irreplaceable loss.	No irreplaceable loss

loss		
Can impacts be mitigated?	Yes	
Mitigation / Management: » All lighting, especially perimeter security lighting at the substation must be shielded to minimise light spillage and pollution. No direct light sources must be seen from outside the site. » Plan to implement motion sensor triggered lighting; » Ensure that lighting is focused on the development with no light spillage outside the site		
Residual Risks: No residual risk has been identified.		
Cumulative Impacts: The cumulative impact will be low due to the replacement of the existing substation, no additional lighting impacts are expected.		

5. DECOMMISSIONING PHASE

The impacts included as part of the decommissioning phase relate to the decommissioning of the existing Olifantshoek Substation (to be decommissioned with the commissioning of the proposed 132/11kV Olifantshoek substation), as well as the decommissioning of the proposed 132/11kV Olifantshoek Substation after it has reached its economic life expiry.

5.1 Ecology

The ecological impacts associated with the decommissioning phase includes:

» *Direct faunal impacts* - Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna during decommissioning. Sensitive and shy fauna would move away from the area during decommissioning as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the decommissioning activities and might be killed. Some mammals or reptiles would be vulnerable to illegal collection or poaching during this phase as a result of the presence of construction personnel or greater site access. However, given the proximity of the substation sites to Olifantshoek and the encroachment of the urban edge to the substation, this is not likely to lead to any significant impacts in this area.

» *Degradation of ecosystems* - It is likely that decommissioning will generate moderate levels of disturbance that will leave the site vulnerable to degradation through alien plant invasion and soil erosion. Disturbance without follow-up maintenance activities would pose a risk of generating soil erosion and alien plant invasion problems. In addition, the use of heavy machinery to remove the infrastructure would also pose a risk of degradation through pollution impacts, especially to the adjacent Olifantsloop River.

The impacts included below are relevant to the decommissioning of the existing Olifantshoek Substation and the decommissioning of the new substation once it has researched the end of its economic life.

Faunal impacts during decommissioning

Impact Nature: Disturbance or persecution of fauna during the decommissioning phase may occur. Increased levels of noise, pollution, disturbance and human presence during decommissioning will be detrimental to fauna resident or utilising the site. Sensitive and shy fauna would move away from the area during the decommissioning

phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed. Some mammals and reptiles would also be vulnerable to illegal collection or poaching.

	Without Mitigation		With Mitigation	
	Preferred	**Alternative**	**Preferred**	**Alternative**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Low (4)	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)	Improbable (3)	Improbable (3)
Significance	**Low (21)**	**Low (21)**	**Low (15)**	**Low (15)**
Status	Negative	Negative	Negative	Negative
Reversibility	High	High	High	High
Irreplaceable loss of resources	No	No	No	No
Can impacts be mitigated?	Yes.			

Mitigation

- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.
- Any accidental chemical, fuel, and oil spills that occur at the site during decommissioning should be cleaned up in the appropriate manner as related to the nature of the spill.
- No open excavations, holes or pits should be left at the site as fauna can fall in and become trapped.
- All disturbed areas should be rehabilitated with a cover of indigenous plants.

Cumulative Impacts

Cumulative impacts at the decommissioning phase are likely to be low.

Residual Impacts

With avoidance measures there should be no residual impact on fauna.

Degradation of ecosystems following decommissioning

Impact Nature: Alien plants are likely to invade the site as a result of disturbance created during decommissioning, while this will also leave the site vulnerable to soil erosion.

	Without Mitigation		With Mitigation	
	Preferred	**Alternative**	**Preferred**	**Alternative**
Extent	Local (1)	Local (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Medium-term (3)	Medium-term (3)
Magnitude	Low (3)	Low (3)	Low (2)	Low (2)
Probability	Probable (3)	Probable (3)	Improbable (2)	Improbable (2)
Significance	**Low (24)**	**Low (24)**	**Low (12)**	**Low (12)**
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	High	High
Irreplaceable loss of resources	No	No	No	No
Can impacts be mitigated?	Yes			

Mitigation

- Due to the disturbance at the site during decommissioning, alien plant species are likely to invade the site and a long-term control plan will need to be implemented for several years after decommissioning
- Regular monitoring (bi-annual) for alien plants within the development footprint for 2-3 years after decommissioning.
- Regular alien clearing should be conducted for at least 3-5 years after decommissioning using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.
- Cleared and disturbed areas should be revegetated with a cover of indigenous grass or shrubs.

Cumulative Impacts

Alien invasion would contribute to cumulative habitat degradation in the area, but if alien species are controlled then cumulative impacts from alien species would not be significant.
Residual Impacts If alien species and erosion at the site are controlled, then there will be very little residual impact.

5.2 Avifauna

The main impact expected to occur during the decommissioning phase relating to avifauna is disturbance (**Appendix D2**).

The impacts included below are relevant to the decommissioning of the existing Olifantshoek Substation and the decommissioning of the new substation once it has researched the end of its economic life.

Disturbance during the decommissioning phase

Disturbance during Decommissioning Phase due to activities

The disturbance of avifauna during the decommissioning of the substation may occur. Species sensitive to disturbance include 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.

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 are Kori Bustard. Other small avian species do occur within the development footprint but these species are non-Red Data species.

The proposed site is located within an agricultural habitat close to National and Domestic roads. Therefore, species within this landscape often experience disturbance. As a result, disturbance of birds by the proposed substation is anticipated to be of low significance as birds will move away from the area temporarily. The relatively small scale of the development (in relation to the large agricultural landscape) is unlikely to have a significant impact on avifauna. However, species are particularly sensitive to disturbance during the breeding season and this must be borne in mind during both the construction and operation (maintenance) phases.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (4)	Minor (2)
Probability	Highly Probable (4)	Probable (3)
Significance	**Low (28)**	**Low (15)**
Status	Negative	
Reversibility	High reversibility	
Irreplaceable loss of resources	Only a slight loss of resources	
Can impacts be mitigated?	Impacts can be mitigated to a large extent.	

Mitigation

- Strict control must be maintained over all activities during decommissioning, in line with an approved EMPr.
- During decommissioning, if any of the Red Data species identified in this report are observed to be roosting and/or breeding in the vicinity, the ECO must be notified and were deemed necessary an appropriate buffer should be placed around the nests and/or roosting areas. If uncertain on the size of such a buffer the Environmental Officer (EO) may contact an avifaunal specialist for advice.
- The decommissioning equipment camps must be as close to the site as possible.

» Contractors and working staff should remain within the development footprint and movement outside these areas especially into avian micro-habitats must be restricted. » Driving must take place on existing roads and a speed limit of 30km/h must be implemented on all roads associated with the project during the construction phase.
Cumulative Impacts The cumulative impacts during decommissioning are expected to be low.
Residual Impacts Residual impacts could occur should rehabilitation efforts not be undertaken in an appropriate manner.

5.3 Hydrology

The following impacts are expected to occur during the decommissioning phase (**Appendix D3**):

» Loss of riparian systems and alluvial water courses
» Potential impact on localised surface water quality
» Impact on riparian systems through the possible increase in surface water runoff on riparian form and function

It must be noted that the impacts below only relate to the decommissioning of the Alternative Substation option due to the fact that the Preferred Substation option and existing substation will not have any impact on hydrological features as a result of its location.

Loss of riparian systems and alluvial watercourses

Impact Nature: The physical removal of riparian zones within the footprint area and disturbance of any alluvial watercourses.		
	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)
Probability	Definite (5)	Highly Probable (4)
Significance	**Medium (45)**	**Medium (36)**
Status	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources	Yes	Yes
Can impacts be mitigated?	Yes, to a limited extent	
Mitigation » This potential impact can be avoided by selecting the preferred substation option as this option is located well outside of any watercourse and riparian boundary. » No vehicles to refuel within watercourses / riparian vegetation. » Ensure the vegetation removal is minimised to an absolute minimum, restricted only to the footprint area.		
Cumulative Impacts Increase in the surface run-off velocities, reduction in the potential for groundwater infiltration and the spread of erosion into downstream wetlands.		
Residual Impacts Possible impact on the remaining catchment due to changes in the run-off characteristics in the development site.		

Impact on localised surface water quality

Impact Nature: During decommissioning, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement

powder, wet concrete, shutter-oil, etc.) associated with machinery and decommissioning activities could be washed downslope via the ephemeral systems. Appropriate ablution facilities should be provided for the workers during the decommissioning phase of the substation.

	Without Mitigation	**With Mitigation**
Extent	Local (2)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	**Medium (30)**	**Low (21)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	Medium	Low
Can impacts be mitigated?	Yes, to a large extent.	

Mitigation

» This potential impact can be avoided by selecting the preferred substation option as this option is located well outside of any watercourse and riparian boundary.
» Implement appropriate measures to ensure strict use and management of all hazardous materials used on site.
» Implement appropriate measures to ensure strict management of potential sources of pollutants (e.g. litter hydrocarbons from vehicles and machinery, cement during construction etc.).
» Implement appropriate measures to ensure the containment of all contaminated water by means of careful run-off management on the development site.
» Implement appropriate measures to ensure strict control over the behavior of construction workers.
» Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced.

Cumulative Impacts

None

Residual Impacts

Residual impacts will be negligible after appropriate mitigation.

Increase in sedimentation erosion

Impact Nature:

Increase in sedimentation and erosion within the development footprint. This may alter the local watercourse morphology and influence water quality downstream.

	Without Mitigation	**With Mitigation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Very Short (1)
Magnitude	Low (2)	Small (0)
Probability	Probable (3)	Improbable (2)
Significance	**Low (21)**	**Low (4)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes, to a large extent	

Mitigation

» This potential impact can be avoided by selecting the preferred substation option as this option is located well outside of any watercourse and riparian boundary.
» Any erosion problems observed to be associated with the project infrastructure should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
» All bare areas, as a result of the development, should be revegetated with locally occurring species, to bind the

soil and limit erosion potential. » Silt traps should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas. » Topsoil should be removed and stored separately and should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas. » There should be reduced activity at the site after large rainfall events when the soils are wet. No driving off of hardened roads should occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.
Cumulative Impacts Downstream erosion and sedimentation of the downstream systems. During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) may be vulnerable to erosion. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.
Residual Impacts Altered streambed morphology, however due to the extent and nature of the development this residual impact is unlikely to occur.

5.4 Visual

During the decommissioning phase visual impacts are expected to occur and includes (**Appendix D4**):

» An impact on the General Landscape Character

The impacts included below are relevant to the decommissioning of the existing Olifantshoek Substation and the decommissioning of the new substation once it has researched the end of its economic life.

Impact of the proposed development on the General Landscape Character

Nature of impact: Degradation of the character of the existing landscape. This is particularly relevant to existing natural and urban areas where there is a possibility that the development could alter these areas.		
	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long term, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Moderate, (6) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Low, (4) **Preferred Substation Location** Minor, (2)
Probability	**Alternative Substation Location** Highly probable, (4) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Improbable, (2)
Significance	**Alternative Substation Location** Medium, (48) **Preferred Substation Location** Medium, (30)	**Alternative Substation Location** Medium, (30) **Preferred Substation Location** Low, (16)

Status	The character of the urban and rural landscape will be changed. The decommissioning of the substation will result in the removal of the industrial components. Neutral	Neutral
Irreplaceable loss	No irreplaceable loss	No irreplaceable loss
Can impacts be mitigated?	Yes	
Mitigation / Management: » Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint. » Ensure that vegetation is not unnecessarily removed during the construction period. » Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources. » Plan and implement screening for the substation. » Plan to use motion sensor triggered lighting at the substation. » Ensure that lighting is focused on the development with no light spillage outside the site. » Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at appropriately licensed waste facilities.		
Residual Risks: Lack of rehabilitation on decommissioning is likely to result in landscape degradation.		
Cumulative Impacts: The cumulative impacts are expected to be low due to the ultimate decommissioning of the substation which will change the landscape character back to natural after rehabilitation.		

6. CUMULATIVE IMPACTS

6.1 Ecology

There are a number of cumulative impacts in the area, most notably the existing 275 and 400kV power lines as well as the extensive mining activity taking place towards Kathu. The mining activity is however largely associated with the rocky hills of the area with some infrastructure such as processing plants and railway infrastructure on the plains. The proposed substation will however contribute little to cumulative impact as the ground layer will remain intact and the loss of some trees is not considered likely to generate significant cumulative impact as trees such as *Acacia erioloba* are widespread and abundant in the area and the important areas in this regard are not present in the location of the proposed substation. The total direct habitat loss of around 1ha associated with the substation would be of little consequence in the broader context due to the limited extent of this loss as well as the location within an area that is not of high ecological value. Refer to **Appendix D1.**

Cumulative habitat loss and impacts on broad-scale ecological processes

Impact Nature: The substation would contribute to cumulative habitat loss and disruptions of broad-scale ecological processes in the area, the contribution is however likely to be low.

	Cumulative Contribution of Proposed Project		**Cumulative Impact without Proposed Project**	
	Preferred	**Alternative**	**Preferred**	**Alternative**
Extent	Locall (1)	Locall (1)	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)	Long-term (4)	Long-term (4)
Magnitude	Low (4)	Low (4)	Low (3)	Low (3)
Probability	Probable (3)	Probable (3)	Probable (3)	Probable (3)

Significance	**Low (27)**	**Low (27)**	**Low (24)**	**Low (24)**
Status	Negative	Negative	Negative	Negative
Reversibility	Moderate	Moderate	Moderate	Moderate
Irreplaceable loss of resources	No	No	No	No
Can impacts be mitigated?	To a large extent but some impact will remain due to vegetation clearing.			

Mitigation

- The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
- Mitigation measures of the current site should align with neighbouring sites and other developments in the area.

Residual Impacts

Residual impact would be restricted to a small amount of habitat loss and occasional disturbance due to maintenance associated with the substation.

6.2 Avifauna

Cumulative impact are expected to occur on the avifauna of the area and include the electrocution of birds due to the substation infrastructure (**Appendix D2**).

The impacts included below are relevant to the existing Olifantshoek Substation and the the new substation.

Electrocution of birds due to substation infrastructure

Potential cumulative impacts are regarded as low and no additional potential deaths of avifaunal species (including Red Data) will occur as this substation will not increase the threat, but will replace the existing substation and subsequently will only replace the threat. As such the substation will not contribute to cumulative impacts.

	Cumulative Contribution of Proposed Project	**Cumulative Impact without Proposed Project**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Small (0)	Small (0)
Probability	Improbable (2)	Improbable (2)
Significance	**Low (10)**	**Low (10)**
Status	Neutral	
Reversibility	High	
Irreplaceable loss of resources	No additional loss of resources expected	
Can impacts be mitigated?	Yes.	

Mitigation

- 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).

Residual Impacts

None

6.3 Hydrology

The development of the 132/11kV Olifantshoek Substation will result in cumulative impacts which includes (**Appendix D3**):

» Impacts on ecological processes, as well as ecological functioning of important habitats

The impacts below are relevant only to the alternative substation location.

Compromised ecological processes as well as ecological functioning of important habitats

Impact Nature:
Transformation of intact habitats could potentially compromise ecological processes as well as ecological functioning of important habitats and would contribute to habitat fragmentation and potentially disruption of the habitat connectivity and furthermore impair their ability to respond to environmental fluctuations. This is especially of relevance for larger watercourses and wetlands serving as important groundwater recharge and floodwater attenuation zones, important microhabitats for various organisms and important corridor zones for faunal movement (mostly located downstream, outside of study area and associated mainly with the Kuruman River).

	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects within the area**
Extent	Local (1)	Local (1)
Duration	Long Term (4)	Long Term (4)
Magnitude	Small (1)	Small (1)
Probability	Highly Improbable (1)	Highly Improbable (1)
Significance	**Low (6)**	**Low (6)**
Status	Negative	Negative
Reversibility	High	High
Irreplaceable loss of resources	No	No
Can impacts be mitigated?	Yes	

Mitigation
» The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas.
» Use existing service roads when crossing the watercourses.
» Avoid placing pylons within the boundaries of the watercourses.
» Avoid any activities within wetlands.
» Avoid clearing the fringing shrubby vegetation associated with wetlands.

6.4 Visual

Cumulative visual impacts are expected to occur with the development if the 132/11kV Olifantshoek substation (**Appendix D4**). The cumulative impacts include:

» General landscape change and degradation of the natural and urban landscape characteristics
» The visibility of the facility to, and the potential visual impact on rural homesteads
» The visibility of the facility to and the potential impact on the N14
» The visibility of the facility to and the potential visual impact on urban residential areas
» Lighting impacts

General landscape change and degradation of the natural and urban landscape characteristics

Nature of impact:
The affected urban area is also currently affected by existing electrical infrastructure including LV cables and an existing substation. The proposed substation Alternative Location will increase the extent of electrical infrastructure that is obvious within the urban area. The Preferred Alternative will largely impact the urban fringe / Upland LCA.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Immediate surroundings, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Low, (4) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Minor, (2) **Preferred Substation Location** Minor, (2)
Probability	**Alternative Substation Location** Highly probable, (4) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Improbable, (2)
Significance	**Alternative Substation Location** Medium, (40) **Preferred Substation Location** Medium, (30)	**Alternative Substation Location** Low, (24) **Preferred Substation Location** Low, (16)
Status	Negative	Negative
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	High	
Can impacts be mitigated?	Yes	

Mitigation / Management:
Planning and construction:
» Plan and implement screening for the substation.
» Ensure that the use of the decommissioned substation site is consistent with residential use.
» Rehabilitate decommissioned substation site and construction disturbance.
Operational:
» Maintain screen planting around the substation
Decommissioning:
» Remove infrastructure not required for the post-decommissioning use of the site.
» Rehabilitate disturbed areas.

The visibility of the facility to and the potential visual impact on rural homesteads

Nature of impact:
The Alternative Substation location is located approximately 580m from the closest homestead, however there is urban development between the homestead and the proposed site. The Preferred Substation location is located approximately 750m from the closest homestead. Existing vegetation is sufficiently dense, that whilst glimpses of the development may be possible through the trees, the bulk of the development will be screened. This small impact will be seen in the context of other urban development, the N14 and a 132kV power line.

	Without mitigation	With mitigation

Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long Term, (4)	**Both Substation Alternatives** Long Term, (4)
Magnitude	**Alternative Substation Location** Small, (0) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Small, (0) **Preferred Substation Location** Small, (0)
Probability	**Alternative Substation Location** Very improbable, (1) **Preferred Substation Location** Improbable, (2)	**Alternative Substation Location** Very improbable, (1) **Preferred Substation Location** Very improbable, (1)
Significance	**Alternative Substation Location** Low, (6) **Preferred Substation Location** Low, (20)	**Alternative Substation Location** Low, (6) **Preferred Substation Location** Low, (6)
Status	Neutral to negative.	Neutral to negative.
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	High	
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning and construction:

- Retain / re-establish and maintain natural vegetation in all areas outside of the development footprint.
- Ensure that vegetation is not unnecessarily removed during the construction period.
- Reduce the construction period as far as possible through careful logistical planning and productive implementation of resources.
- Plan and implement screening for the substation.
- Plan to use motion sensor triggered lighting at the substation.
- Ensure that lighting is focused on the development with no light spillage outside of the site.
- Rehabilitate disturbed areas.
- Ensure that vegetation is not unnecessarily removed.
- Ensure that rubble, litter, and maintenance materials are removed once maintenance is complete and discarded at appropriately licensed waste facilities.
- Reduce and control construction dust using approved dust suppression techniques as and when required.
- Restrict maintenance activities to daylight hours whenever possible in order to reduce lighting impacts along the servitude.
- Rehabilitate all disturbed areas immediately after the completion of maintenance works.
- Previously rehabilitated areas must be monitored to prevent the infestation of alien vegetation species that may establish.
- Screen planting that was specifically established to minimise the intrusiveness of the substation must be maintained and dead or sick plants replaced for a determinate period after construction and though out operation.

Decommissioning:

- Remove infrastructure not required for the post-decommissioning use of the site.
- Rehabilitate disturbed areas.

The visibility of the facility to and the potential visual impact on the N14

Nature of impact:

The Alternative Substation Location is within the urban area close to existing homes. The proposed development is significantly larger than the existing substation that it will replace. It will therefore increase the cumulative impact on the residential area. The Preferred Substation Location will be visible to a small number of dwellings within an existing informal area on the edge of Olifantshoek. The development will also result in the removal of the existing substation from within the residential area. It is likely therefore that this alternative will result in a positive cumulative impact.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long term, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Low, (4) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Minor to low, (3) **Preferred Substation Location** Moderate, (6)
Probability	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Highly probable, (4)
Significance	**Alternatives Substation Location** Medium, (30) **Preferred Substation Location** Medium, (30)	**Alternatives Substation Location** Low, (27) **Preferred Substation Location** Medium, (48)
Status	**Alternatives Substation Location** Negative **Preferred Substation Location** Positive	**Alternatives Substation Location** Negative **Preferred Substation Location** Positive
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	High	
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning and construction:

» Implement screen planting for substations.
» Rehabilitate decommissioned substation

Operations:

» Maintain screen planting around substations.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use of the site.
» Rehabilitate disturbed areas.

The visibility of the facility to and the potential visual impact on urban residential areas

Nature of impact:

The Alternative Substation Location is within the urban area close to existing homes. The proposed development is significantly larger than the existing substation that it will replace. It will therefore increase the cumulative impact on the residential area.

The Preferred Substation Location is located approximately 80m from and will be visible to a small number of dwellings within an existing informal area on the edge of Olifantshoek. The development will also result in the removal of the existing substation from within the residential area. It is likely therefore that this alternative will result in a positive cumulative impact.

	Without mitigation	With mitigation
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long term, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Low, (4) **Preferred Substation Location** Low, (4)	**Alternative Substation Location** Minor to low, (3) **Preferred Substation Location** Moderate, (6)
Probability	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Highly probable, (4)
Significance	**Alternatives Substation Location** Medium, (30) **Preferred Substation Location** Medium, (30)	**Alternatives Substation Location** Low, (27) **Preferred Substation Location** Medium, (48)
Status	**Alternatives Substation Location** Negative **Preferred Substation Location** Positive	**Alternatives Substation Location** Negative **Preferred Substation Location** Positive
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	High	
Can impacts be mitigated?	Yes	

Mitigation / Management:

Planning and construction:

» Implement screen planting for substations.
» Rehabilitate decommissioned substation

Operations:

» Maintain screen planting around substations.

Decommissioning:

» Remove infrastructure not required for the post-decommissioning use of the site.

» Rehabilitate disturbed areas.

Lighting impacts

Nature of impact: Lighting impacts are likely to be associated with nuisance caused by light spill from the substation lighting. The existing substation located close to the Alternative Substation Location already has floodlighting. The existing substation that is to be decommissioned is also located closer to existing houses than the Alternative Site. If planned appropriately, it is also possible that positive impacts could be associated with the Alternative Substation Location if appropriate mitigation is undertaken.		
	Without mitigation	**With mitigation**
Extent	**Both Substation Alternatives** Immediate surroundings, (2)	**Both Substation Alternatives** Immediate surroundings, (2)
Duration	**Both Substation Alternatives** Long term, (4)	**Both Substation Alternatives** Long term, (4)
Magnitude	**Alternative Substation Location** Small, (0) **Preferred Substation Location** Small, (0)	**Alternative Substation Location** Minor to low, (3) **Preferred Substation Location** Moderate, (6)
Probability	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Probable, (3)	**Alternative Substation Location** Probable, (3) **Preferred Substation Location** Probable, (3)
Significance	**Alternative Substation Location** Low, (18) **Preferred Substation Location** Low, (18)	**Alternative Substation Location** Low, (27) **Preferred Substation Location** Medium, (36)
Status	**Alternative Substation Location** Negative **Preferred Substation Location** Positive	**Alternative Substation Location** Positive **Preferred Substation Location** Positive
Reversibility	High	High
Loss of Resources?	No	No
Confidence in findings	Medium	
Can impacts be mitigated?	Yes	
Mitigation / Management: Planning and construction: » Plan to implement motion sensor triggered lighting; » Ensure that lighting is focused on the development with no light spillage outside the site.		

7. NO-GO ALTERNATIVE

The No-go option implies that the Project does not proceed. This means that the status quo of the environment would remain unchanged and no impacts would occur.

The implementation of the No go alternative will result in a situation where Eskom will not be able to meet the current capacity demands of the region. The project will improve the performance of the supply. By not increasing the supply to the greater area, development will be constrained. This is not seen as desirable as the existing substation is operating at near-capacity and will not be able to accommodate any greater load that may be required any future developments. As there are no impacts of high significance associated with the proposed new power line and substation, the implementation of the project is considered acceptable. The benefits of implementing the project (i.e. from a socio-economic perspective) are expected to outweigh the negative impacts. The no-go alternative is therefore not considered to be preferred.

Impacts associated with the No Go Alternative

Impact Nature: Lost opportunity for the community and the broader area if the Substation is not constructed due to the need for electrical infrastructure not being available to support economic growth and development.		
	Without Implementation	**With Implementation**
Extent	Local (1)	Local (1)
Duration	Long-term (4)	Long-term (4)
Magnitude	Moderate (6)	Low (4)
Probability	Definite (5)	Improbable (2)
Significance	**Medium (55)**	**Low (10)**
Status	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources	Yes	No
Can impacts be mitigated?	Yes	
Mitigation » This impact can be avoided through the construction and operation of the proposed 132/11kV Olifantshoek Substation		
Cumulative Impacts With the implementation of the 132/11kV Olifantshoek Substation the cumulative impact to the area will be positive and ensure future growth and development, subject to the strict implementation of appropriate mitigation measures.		

8. COMPARATIVE ASSESSMENT OF ALTERNATIVES

The table below provides a comparative assessment of the Preferred and Alternative Substation options in order to provide clarity on which option is preferred within which specialist fields, as assessed in the sections above.

Specialist Study	Preferred	Alternative	Conclusion
Ecology	Preferred	Less Preferred	The Preferred Substation option is located outside of the Olifantsloop River area and is seen as the preferred substation option as it will generate the lowest overall impact on fauna and flora. Although there are some protected trees within the footprint, the impact on these species would be low and is not considered significant. Although there is not a lot of difference between the two substation options, the Alternative Substation location is less preferred given its proximity to the Olifantsloop River as well as the dense vegetation within the site.
Avifauna	Preferred	Not Preferred	The Preferred Substation option will be constructed within an area where impacts will be contained in fewer habitat types, impacting on a lower number of avifaunal species. On the other hand, the alternative substation will result in a longer power line and will be situated within an additional habitat type (*A. karroo* riparian thicket) which is regarded as more sensitive in terms of avifauna habitat. Not only will the location pose a higher potential threat to an additional habitat but the alternative substation and additional power line may pose a potential threat to avifaunal species from adjacent habitat types (e.g. upper portion of the Olifantsloop watercourse, the sewage plant and dam located to the south of the town of Olifantsloop). The additional power line which will be the result of this alternative substation will cross a potential important route used by water fowl and waders moving between the sewage plant and the dam to the south, subsequently posing a collision threat to these species. Therefore, from an avifaunal perspective the alternative option should not be considered. The preferred option is therefore considered to be the only viable option.
Hydrology	Preferred	Not Preferred	The Preferred substation option is located well outside of any watercourse and riparian boundaries and will subsequently have no impact on these habitats. Furthermore, the selection of this site as the final option will result in a shorter power line which will cross the Olifantsloop River and its associated

Specialist Study	Preferred	Alternative	Conclusion
			riparian zone only once. On the other hand, the alternative substation option will result in the substation being constructed within the riparian zone of the Olifantsloop non-perennial River (upper portion of non-perennial watercourse) as well as the proposed power line crossing the Olifantsloop non-perennial River a second time. Construction within the riparian zone will lead to the loss of a section of this habitat which is characterised by a relatively dense *Acacia karroo* riparian thicket providing shelter for various faunal and avifaunal species. Furthermore, the development within this habitat (upper reaches of the Olifantsloop non-perennial River and associated Riparian Fringe) will result in the alteration of this habitat's ecosystem function.
Visual	Preferred	Acceptable	From a visual perspective the Preferred Substation location has the largest potential to provide positive impacts for the urban area due to the fact that it will replace the existing substation which currently impacts on dwellings located within the town of Olifantshoek. The preferred option reduces both lighting and daytime impacts on the settelments within the area. The Alternative substation location would be acceptable subject to adequate mitigation in the form of screen planting which will provide a buffer between the infrastructure and residents. s

From the above, it can be concluded that the Preferred Substation location is preferred by all specialist studies undertaken. The Preferred Substation location is therefore recommended for implementation.

9. SENSITIVITY ANALYSIS

Through the undertaking of the Basic Assessment and in consultation with the independent specialists sensitivities were identified to be associated with the development of both the Preferred Substation location and the Alternative substation location.

The main sensitivities located within the Alternative Substation location includes:

- The Olifantsloop River and the associated Riparian Fringe which is considered to be of a High Avifaunal Sensitivity and High Hydrological Sensitivity. The Alternative Substation location infringes on these features.
- The channel bed associated with the Olifantsloop River which is rated as being of a High Hydrological Sensitivity.

There are no features of a high sensitivity located within the development footprint or surrounding area of the Preferred Substation location. The area is characterised by disturbed veld of a Medium-Low Ecological Sensitivity.

Therefore, from an overall environmental sensitivity analysis the Preferred Substation location is considered as the most appropriate location for the construction and operation of the 132/11kV Olifantshoek Substation and will not result in detrimental environmental or social impacts.

An environmental sensitivity map was compiled using sensitivity data provided by the independent specialists to illustrate the sensitivities associated with the site, as well as provide a sensitivity rating to the features identified.

Figure 11 provides the environmental sensitivity map of the two substation options.

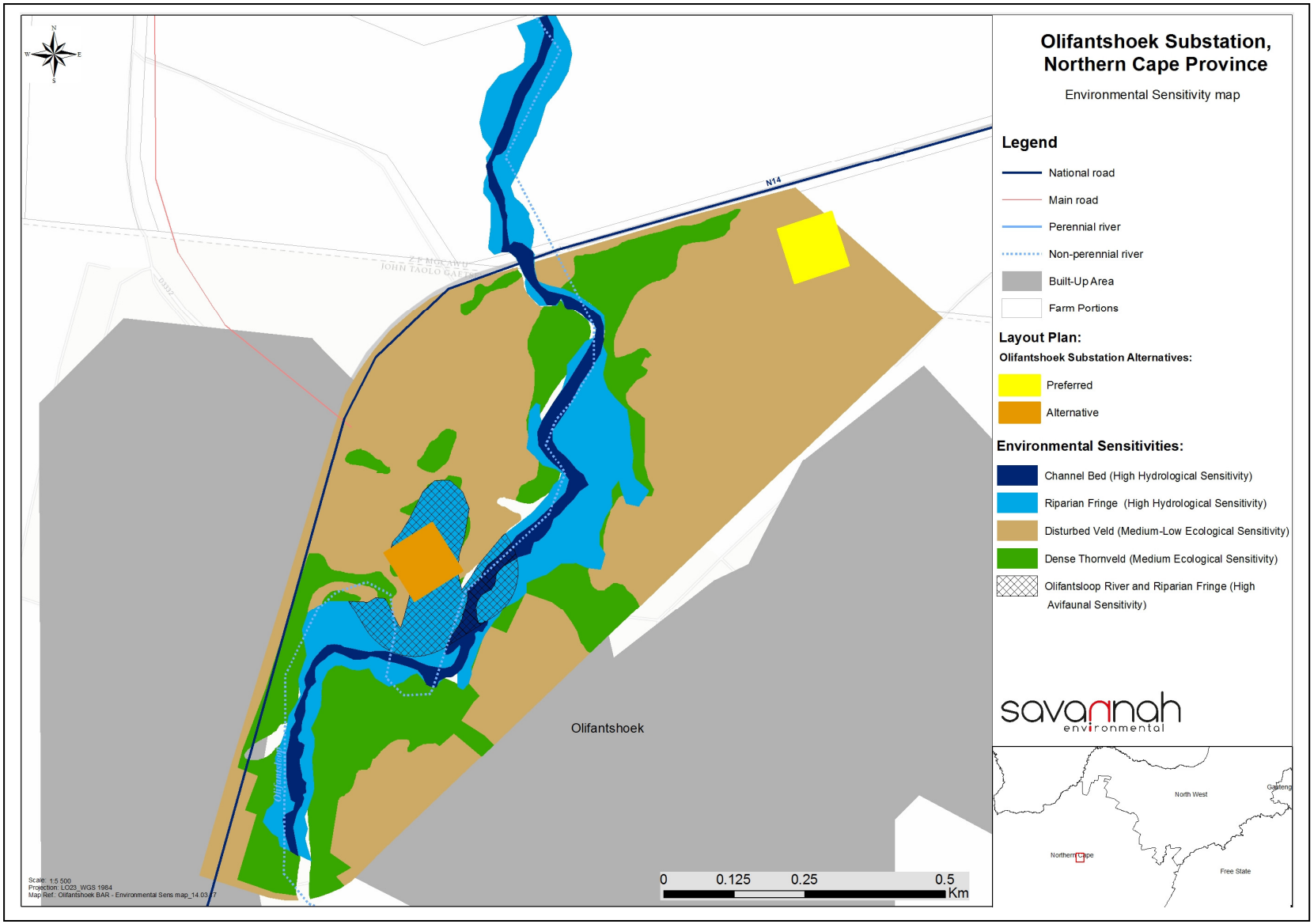

Figure 11: Environmental and sensitivity map of the Preferred substation location and the Alternative Substation location proposed for the development of the 132/11kV Olifantshoek Substation

10. ENVIRONMENTAL IMPACT STATEMENT

When considering the above impact assessment undertaken as part of the Basic Assessment Process for the proposed 132/11kV Olifantshoek Substation the following impact statement regarding the development has been identified.

10.1 Ecological Impact Statement

Ecological impacts identified to be associated with the development of the 132/11kV Olifantshoek substation have a low impact rating, subject to the implementation of the recommended mitigation measures. The impacts relate mainly to the clearance of vegetation as well as disturbance to the area.

From an ecological perspective it was concluded that the Preferred Substation location would be the preferred option for the development due to its location and avoidance of the Olifantsloop River which is considered to be a sensitive feature from an ecological perspective. As a result of the location of the Alternative Substation in close proximity to the Olifantsloop River it is less preferred and should not be implemented as part of the development.

During the decommissioning phase of both the existing and proposed substation the impacts on ecology will mainly relate to impacts on fauna due to the decommissioning activities and degradation on the ecosystem. The significance of the impacts have been identified as being low.

10.2 Avifauna Impact Statement

Avifauna impacts relating to the development of the 132/11kV Olifantshoek substation relate mainly to disturbance, habitat destruction and electrocution as a result of the substation infrastructure. However, the impacts associated with the development have been assessed as being of a low significance, subject to the implementation of the recommended mitigation measures.

When considering the impacts associated with the two substation alternatives the Preferred Substation location is considered to be the preferred option for the development as the impacts will be contained in fewer habitat types and will impact on a lower number of avifaunal species.

The decommissioning phase of both the existing and proposed substation will result in a disturbance on avifauna of the area due to the activities related to this phase. The significance of the impact has been identified as being low.

10.3 Hydrology Impact Statement

Due to the location of the Preferred Substation in relation to hydrological features, and the fact that this option will not infringe on any sensitive hydrological features the impact is considered to be negligible and therefore a full impact assessment of the Preferred Substation location was not undertaken.

A full impact assessment was however undertaken for the Alternative Substation location due to its proximity to the Olifantsloop River and the associated riparian fringe. The impacts identified to be associated with this option includes a loss of the riparian system, an impact on surface water quality, sedimentation erosion and an impact on the ecological functioning of the ecosystems. The significance

of the impacts have been assessed as ranging from medium impacts to low impacts, subject to the implementation of the recommended mitigation measures.

When considering the impacts associated with the two substation alternatives the Preferred Substation option is considered as the preferred for implementation due to its location which does not infringe on any sensitive hydrological features. The implementation of the Alternative Substation location is not preferred due to its location within the Olifantshoek River riparian zone and the associated impacts that would occur if the substation was to be developed within this location.

The decommissioning phase of the existing and new substation will result in hydrological impacts which include a loss of the riparian system, an impact on the water quality and an increase in surface water runoff. The impacts identified will be of a medium to low significance. It must however be noted that the decommissioning phase impact mentioned above only relate to the existing Olifansthoek Substation and the new substation alternative location due to the fact that the preferred location does not impact on any hydrological features.

10.4 Visual Impact Statement

From a visual perspective the impacts expected to occur with the development of the 132/11kV Olifantshoek Substation relate mainly to a change in the landscape character, a visual impact on the local homesteads, the residential areas and the roads located within and around the area. The impacts have been assessed to have a significance rating which ranges from medium to low depending on the impact and the alternative.

When considering the visual impacts in terms of the two substation options the Preferred Substation location is considered as the preferred option for the development due to the fact that it will replace the existing Olifantshoek Substation, which currently impacts on the residential area of the town of Olifantshoek, with a substation located further away from the residential buildings. The Alternative substation location is considered to be acceptable from a visual perspective, however more mitigation measures will have to be implemented to ensure that the impact will be acceptable.

During the decommissioning phase of the existing and the proposed substations visual impacts will relate mainly to a change in the landscape. The significance of the impact has been identified as being medium to low.

10.5 Overall Impact Statement

Overall, the impacts associated with the development of the 132/11kV Olifantshoek Substation are considered to be of an acceptable significance and can be mitigated successfully in order to ensure that the development will not create any detrimental environmental impacts that will be long-term and unacceptable.

From the assessment, and through a comparative assessment of the Preferred Substation location and the Alternative Substation location it is concluded that the Preferred Substation location is the least impact option for the development of the 132/11kV Olifantshoek Substation due to its location in relation to sensitive environmental features. The Alternative Substation location will impact on sensitive environmental

features that could be degraded through the development resulting in unacceptable impact. Therefore the Alternative Substation should not be implemented as part of the development.

When considering the decommissioning of the existing Olifantshoek Substation and the proposed substation the impacts mainly relate to a disturbance of the area through the undertaking of decommissioning activities. The decommissioning impacts have been identified as having a medium to low significance (with the implementation of the recommended mitigation measures as identified by the specialists).

CHAPTER 5: CONCLUSION AND RECOMMENDATION OF PRACTITIONER

1. CONCLUSION

The need and desirability for the project relates to a lack of electrical infrastructure within the area which needs to be upgraded in order to ensure on-going growth and development in the social and economic sectors. The development of the 132/11kV Olifantshoek Substation will assist with the need in this regard within the area.

From the Impact Statement for the 132/11kV Olifantshoek Substation presented within Chapter 4, it is concluded that the Preferred Substation location must be implemented and the Alternative substation location should not be considered for the development due to the environmental sensitivity associated with it. The Preferred substation location is suitable from an ecological, avifauna, hydrological and visual perspective and will not result in any detrimental impacts on the environment. This is also the preferred technical alternative.

2. PRACTITIONER RECOMMENDATION

It is recommended by the Environmental Assessment Practitioner that the Preferred Substation location be authorised for the development of the 132/11kV Olifantshoek Substation, subject to the implementation of the recommended mitigation measures.

The following recommendations are made with regards to mitigating the potential impacts of the proposed project and should be included within the Environmental Authorisation.

Construction Phase:

- The Preferred Substation alternative must be implemented.
- All relevant practical and reasonable mitigation measures detailed within this report and within the EMPr must be implemented.
- The implementation of this EMPr for all life cycle phases of the proposed project is considered key in achieving the appropriate environmental management standards as detailed in this report.
- 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.
- An ecological walkthrough survey should be undertaken prior construction by a qualified ecologist in order to ensure that the development does not impact on species of special concern. Moreover, the walk-through will make recommendations regarding any specific mitigation which is required to minimise impacts.
- Creation of new access tracks should be minimised as far as possible.
- All declared alien plants must be identified and managed in accordance with the relevant legislation. The implementation of an on-going monitoring programme in this regard is recommended.
- Care must be taken with the topsoil during and after construction on the site. If required, measures to reduce erosion to be employed, such as keeping the soil covered by straw, mulch, erosion control mats, etc., until a healthy plant cover is again established.
- Measures should be implemented to control and contain storm water run-off.
- Rehabilitate construction sites by establishing with indigenous grasses.

- Erosion control measures must be utilised during construction, operations, decommissioning and rehabilitation of the substation.
- Re-vegetation of the site as it is before construction must be undertaken after decommissioning of the substation.
- Contractors must be informed before construction starts on the possible types of heritage sites and cultural material they **may** encounter and the procedures to follow should they find sites.
- The developer should obtain all necessary permits prior to the commencement of construction.

Operation Phase:

The mitigation and management measures previously listed in this Basic Assessment Report should be implemented in order to minimise potential environmental impacts. The following mitigation measures should also be implemented.

- On-going monitoring of the development site to detect and restrict the spread of alien plant species.

Decommissioning Phase:

- All disturbed areas should be rehabilitated with a cover of indigenous plants
- Regular monitoring (bi-annual) for alien plants within the development footprint for 2-3 years after decommissioning.
- Strict control must be maintained over all activities during decommissioning, in line with an approved construction EMPr.