

Proposed upgrade of the Gordonia- Avondale 132KV transmission line, Upington, Northern Cape

2nd Draft Basic Assessment Report
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Document control record

Document prepared by:

Zutari (Pty) Ltd

Reg No 1977/003711/07

Aurecon Centre, 1 Century City Drive
Waterford Precinct, Century City, Cape Town
South Africa

PO Box 494, Cape Town, 8000



Docex: DX 204

T +27 21 526 9400

E capetown@zutari.com

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Name		Candice Dürr		Name		Wynand Loftus
Title		Environmental Consultant		Title		Senior Environmental Consultant

NEMA requirements for Basic Assessment Reports		
ZUTARI		
Appendix 1	Content as required by NEMA	Section/Chapter
3(a)	(i) details of the EAP who prepared the report; and	Control sheet, Section 1.2, Annexure A
	(ii) details of the expertise of the EAP, including a curriculum vitae.	
(b)	the location of the activity, including-	Section 4.1 and 4.2, Chapter 4.
	(i) the 21-digit Surveyor General code of each cadastral land parcel;	
	(ii) where available, the physical address and farm name;	
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	N/A
(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	Section, 1.1 and Chapter 4
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	Chapter 4 and Annexure F
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	NA
(d)	a description of the scope of the proposed activity, including-	Chapter 4
	(i) all listed and specified activities triggered;	Section 2.2
	(ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Chapter 4.
(e)	a description of the policy and legislative context within which the development is proposed including <ul style="list-style-type: none"> i. an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process; ii. how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments; 	Chapter 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;	Section 4.5
(g)	a motivation for the preferred site, activity and technology alternative;	Chapter 5
(h)	a full description of the process followed to reach the proposed preferred alternative within the site, including -	Chapter 5
	(i) details of all the alternatives considered;	Section 3.3, Section 3.4, Annexure C
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 3.5, Annexure C
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 6
(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - <ul style="list-style-type: none"> (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and 	Chapter 6.	

	(cc) can be avoided, managed or mitigated;	
	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Chapter 3 Section 3.2.2
	(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 6
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Chapter 6
	(ix) the outcome of the site selection matrix;	Chapter 5
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	Chapter 5
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Chapter 1,
(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 (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 6
(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 loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Chapter 6
(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 6 Annexure G
(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 7
(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;	Chapter 6 Annexure G
(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;	Chapter 6



(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.3
(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 7
(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;	NA.
(r)	an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (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 or affected parties;	Annexure A
(s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	NA
(t)	any specific information required by the competent authority; and	Email correspondence from the DFFE form part of Annexure B.
(2)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A



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GLOSSARY OF TERMS

Basic Assessment Report	A basic report assessing the potential significant impacts of issues identified during scoping.
Environment	The surroundings (biophysical, social and economic) within which humans exist and that are made up of <ul style="list-style-type: none"> i. the land, water and atmosphere of the earth; ii. micro-organisms, plant and animal life; iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action. A systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes Basic Assessment and S&EIR
Environmental impact	An environmental change caused by some human act.
Environmental Management Programme (EMPr)	A document that provides procedures for mitigating and monitoring environmental impacts, during the pre-construction, construction, operation and decommissioning phases.
Public Participation Process	A process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development.

ABBREVIATIONS

BA	Basic Assessment
BAR	Basic Assessment Report
BFD	Bird Flight Diverter
BLSA	Bird Life South Africa
CAA	Civil Aviation Authority
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
CRR	Comments and Response Report
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning (Western Cape)
DENC	Department of Environment and Nature Conservation
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DWS	Department of Water and Sanitation
DSI	Department of Science and Innovation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (Act 73 of 1989)
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EMPr	Environmental Management Programme
EMF	Environmental Management Framework
EMI	Electromagnetic Interference
ESA	Ecological Support Area
EWT	Endangered Wildlife Trust
GN	Government Notice
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
IPP	Independent Power Producer
IRP	Integrated Resource Plan
KCAAA	Karoo Central Astronomy Advantage Areas
kV	Kilo Volt
LM	Local Municipality
NCDAERL	Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform
NCNCA	Northern Cape Nature Conservation Act (Act 9 of 2009)
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystems Priority Areas
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (Act 36 of 1998)
NWI	National Wetland Inventory
OHL	Overhead Powerline (Transmission Line)
PES	Present Ecological State
PPP	Public Participation Process
RMIPPPP	Risk Mitigation Independent Power Producer Procurement Programme
SAHRA	South African Heritage Resources Agency
SACNASP	South African Council for Natural Scientific Professions
SCC	Species of Conservation Concern

SDF Spatial Development Framework
SKA Square Kilometre Array
ToR Terms of Reference
WESSA Wildlife and Environment Society of South Africa
WULA Water Use License Application



1 INTRODUCTION

Umoyilanga (Pty) Ltd appointed Zutari (Pty) Ltd (formerly Aurecon South Africa (Pty) Ltd)) to undertake the requisite Basic Assessment (BA) process for the upgrading of the Gardonia-Avondale transmission line (Figure 1-1, refer to Annexure I1 for A3 map).

Eskom requires that Umoyilanga (Pty) Ltd, a preferred bidder selected as part of the DMRE Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP), upgrade a portion of the existing 132 kV Gordonia-Garona transmission line as part of the works required for connecting the new Avondale Hybrid Solar project to the grid.

The 1st Draft Basic Assessment Report (BAR) was compiled and made available for public review between 20 August 2021 and 20 September 2021. This review period included consultation with Eskom regarding the feasibility of the alternatives as presented in the 1st Draft BAR. Eskom highlighted the challenges with regards to the duration that the line can be out of service for the required upgrade and that the alternatives assessed in the 1st Draft BAR could not be constructed within the anticipated outage period. It was determined that the alternatives presented in the 1st Draft BAR are unfeasible and therefore, this 2nd Draft BAR has been compiled based on the new proposed alternatives that would allow the contractor to construct within the available timeframe.

This 2nd Draft BAR still pertains to the application for environmental authorisation to upgrade the above-mentioned portion of the 132 kV Gordonia-Garona transmission line. This portion of the transmission line is therefore **referred to as the 132 kV Gordonia-Avondale transmission line** as the line stretches from Gordonia to the new Avondale Hybrid Solar project.

This 2nd Draft BAR also is now being made available for a public review period of 30-days, after which any comments received will be considered and incorporated into the Final BAR for submission to and consideration by the competent authority (CA).

1.1 Project Description

The existing 132 kV Gordonia-Garona transmission line is approximately 30 years old and runs from Upington, Northern Cape in an easterly direction and then later south towards Groblershoop for an approximate distance of 32 kilometres.

It is proposed to upgrade the physical components (e.g. conductor, pylons, etc.) of the existing transmission line to prevent potential future capacity issues and failure of the infrastructure. The capacity of the line will remain 132 kV. In other words, no increase in line capacity is proposed. Only the physical components are to be upgraded and existing removed.

The line is located inside a registered servitude and comprises of ninety-two (92) lattice pylon structures over an approximate distance of 32 kilometres. The line is accessed via existing access/farm roads and a service track running underneath the line within the existing servitude. Eskom undertakes routine inspections and maintenance on the line via the existing service track.

The following alternatives **were initially** considered for the project in the 1st Draft BAR, **but have subsequently been found to be unfeasible and are no longer part of the project**, with the exception of the no-go option:

- 1) **Alternative 1 (preferred):** Replace the existing lattice structures with monopole structures at the same locations i.e. pylon placements remain the same. Only 88 pylons would have to be rebuilt.
- 2) **Alternative 2:** Construct a new 132 kV monopole transmission line to the south of, and parallel to, the existing line. A 31 m wide corridor has been identified for the potential construction of a new line should this alternative have to be implemented pending technical feedback from Eskom; and



3) **No-Go option** (i.e. use the OHL as it is, possibly subject to a full condition assessment).

Removing the existing lattice structures and replacing them with monopole structures at the same locations (Alternative 1 above) is not feasible within the available period that Eskom is able to hand the line over to the contractor. By first dismantling the existing lattice structures before constructing the new monopole structures, the downtime of the power line (i.e no electricity supply) will exceed what Eskom can accommodate. While this particular power line is not currently used to permanently to supply power to the surrounding areas, it is used intermittently when required. Constructing a new 132 kV monopole line parallel to and directly south of the existing line (Alternative 2 above) is also not feasible due to costs and time constraints associated with acquiring new land use rights.

Taking the above into account, the following **preferred alternatives** are considered as part of the project and are assessed and reported on in this 2nd Draft BAR (alternatives described in more detail in Section 4, also refer to the environmental sensitivities map in Annexure I2 which illustrates the proposed project visually):

- 1) **Alternative 1 (preferred):** Upgrade the transmission line by constructing new monopole structures along the existing centreline (existing lattice structures to be removed)
- 2) **No-Go option:** No change to existing line

The new preferred alternative, Alternative 1, will allow the contractor to finish construction within the available timeframe. It means that the contractor can construct the new foundations, transport parts to site and start assembly of new pylons at each location, prior to Eskom line handover/shutdown. When the line is handed over to the contractor, the old line and existing lattice structures can be taken down and the new monopole structures can be fully assembled and erected and the line can be strung.

Refer to Section 4 for more detail on the project description.





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Legend

- Existing Avondale-Gordonia Transmission Line (±32km)
- National Roads

Notes:
 Aerial Imagery: ESRI

Date: 2021/08/16 Version: 0



A3 scale: 1:200,000
 0 5 10 15 Kilometers

Job No: 1001408 Map by: WL
 Projection: GCS_WGS_1984

**Avondale-Gordonia Transmission Line - Basic Assessment
 Locality Plan**

Figure 1-1: Locality map of the proposed upgrading of the existing Gordonia-Avondale 132 kV transmission line East of Upington, Northern Cape (A3 map included in Annexure I1).

In terms of the NEMA, the proposed project triggers a suite of listed activities which require authorisation from the competent environmental authority via a BA process before they can be undertaken. Since the project is for the transmission of energy, and energy projects are dealt with by the national authority, the competent authority is thus the National Department of Forestry, Fisheries and the Environment (DFFE). DFFE's decision will be based on the outcome of this BA process. The BA process entails a number of phases which are further detailed in Section 3.1.2.

The purpose of this BAR¹ is to set out and assess the environmental outcomes, impacts and residual risks of the proposed activity. Accordingly, the BAR includes the following chapters:

- Chapter 1 introduces the project and provides a description of the project. It also introduces the EIA project team and provides a summary of the main assumptions and limitations.
- Chapter 2 outlines an analysis of the legal framework relevant to the project.
- Chapter 3 focuses on the EIA methodology, detailing the phases of the BA process as well as the public participation process (PPP)
- Chapter 4 provides a project description specific to the Gordonia-Avondale transmission line.
- Chapter 5 provides the alternatives that have been considered.
- Chapter 6 describes the baseline environment i.e., current state of the environment, on site and surrounds, and assesses the potential impacts on the environment that may be caused by the project.
- Chapter 7 provides an Environmental Impacts Statement summarising the outcomes of the impact assessment and key issues and a
- Chapter 8 provides a conclusion and way forward in terms of the application for Environmental Authorisation (EA).

A number of annexures accompany this report and include the following:

- Annexure A, provides details on the Environmental Assessment Practitioners (EAP) who compiled this report;
- Annexure B, provides correspondence with DFFE to date;
- Annexure C, contains a Public Participation Plan which entails a comprehensive description of the public participation process and was approved by DFFE on 23 June 2021 as well as proof of PPP undertaken (full proofs to be submitted to DFFE as part of the Final BAR);
- Annexure D, includes specialist input, where this was submitted in a report format;
- Annexure E, DFFE Screening Tool Report;
- Annexure F, Bend Point Coordinates of Existing Line;
- Annexure G, Generic EMPr;
- Annexure H, Site photographs, General photos taken on 19 June 2021; and
- Annexure I, Maps.
- Annexure J, Specialist declarations

1.2 EIA Project Team

Zutari has selected a team of highly experienced specialists and multi-disciplinary practitioners to execute this project in a professional and unbiased manner. Please refer to Table 1-1 for a list of the team. Full CVs of the EIA and Project Management team are available in Annexure A. Should a CV of a Specialist be required that is not included in the relevant specialist report in Annexure D, this will be provided upon request from the Zutari Project Leader.

¹ Appendix 1 of amended EIA Regulations (GN R982) of NEMA lists the content required in a Basic Assessment Report. This has been listed for cross checking purposes on the page preceding the table of contents.

Table 1-1: BA Project Team

Role	Consultant	Company
EIA and Project Management		
Project Director	Stephan van den Berg	Zutari
Project Leader & Senior EAP	Wynand Loftus	Zutari
Project Staff	Candice Dürr	Zutari (sub-consultant)
Project Staff	David Rathobei	Zutari
Sub-consulting Specialists		
Avifauna (birds)	Owen Rhys Davies	Arcus Consulting Services South Africa (Pty) Ltd
Botanical	Dave MacDonald	Bergwind Botanical Surveys & Tours CC
Aquatic	Brian Colloty	EnviroSci (Pty) Ltd
Visual	Stephen Stead	Visual Resources Management (VRM) Africa
Agricultural potential	Johann Lanz	Private Consultant
Heritage (incl. archaeology)	JA van Schalkwyk	Private
Palaeontology	Prof Marion Bamford	Private
Electromagnetic Interference (EMI)	Callie Fouche	iTC Services (Pty) Ltd
Civil Aviation Authority and Obstruction Limitation Surface Assessment	Yolandi Foord	Zutari
Geotechnical Site Sensitivity Verification	Salona Seymour	Zutari
Animal Species and Terrestrial Biodiversity Compliance Statements	Dave MacDonald	Bergwind Botanical Surveys & Tours CC

1.2.1 Independence

The amended 2014 EIA Regulations pursuant to NEMA, provide general requirements for EAPs and specialists with the intention of reducing the potential for bias in the environmental process. The first requirement is that the EAP should be independent (Regulation 13(1)(a) of GN R982, as amended).

Neither Zutari nor any of its sub-consultants are subsidiaries of Umoyilanga (Pty) Ltd, nor is Umoyilanga (Pty) Ltd a subsidiary to Zutari.

1.3 Assumptions, Limitations and Gaps in Knowledge

In undertaking the investigation and compiling the BAR, the following has been assumed:

- The information provided by the client is accurate and no information that could change the outcome of the BA process has been withheld.
- The scope of this investigation is limited to assessing the environmental impacts associated with the proposed upgrading of the 132 kV transmission line.
- The BA process is based on Best Practice Guidelines which were available at the time of writing this report.
- Any requisite permits or authorisations in terms of other legislation will be dealt with by the developer.

Any gaps that have been encountered by the specialists are identified in their respective assessments (Annexure D).



The DFFE, and other authorities, will be requested to issue their comments. Undertaking the BA process in parallel with the technical planning process does have a number of benefits, which include integrating environmental aspects into the layout and design and therefore ultimately encouraging a more environmentally responsive and sustainable project. The assumptions, limitations and gaps in knowledge will not affect the EAPs assessment or findings of the proposed grid connection infrastructure.



2 LEGAL AND PLANNING CONTEXT

There are a host of legal and policy documents and guidelines to consider when undertaking such a project. These have been detailed in the sections that follow.

2.1 Relevant Legislation

An overview of the relevant legislation is provided in Table 2-1.

Table 2-1: Legislation considered in preparation of the BAR

Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
National Environmental Management Act, Act No. 107 of 1998 (NEMA), as amended	Department of Forestry, Fisheries, and the Environment (DFFE)	Several listed activities in terms of NEMA GN No R983 and R985 in the Government Gazette of 4 December 2014 (as amended on 7 April 2017), have been triggered and need to be authorised for the proposed project (also see Table 2-2). Based on the listed activities triggered, the application for environmental authorisation will follow the BA process as set out in Regulations 19-20 of GN R982.
National Environmental Management: Biodiversity Act, Act No. 10 of 2004 (NEMBA)	Department of Forestry, Fisheries, and the Environment (DFFE)	The act calls for the management of all biodiversity within South Africa. All indigenous fauna is protected under the NCNCA (refer further below in this table). 58 pylons that are proposed to be upgraded fall within a CBA. See Figure 2-1.
Environmental Conservation Act, Act No. 73 of 1989 (ECA)	Department of Forestry, Fisheries, and the Environment (DFFE)	Noise impacts associated with transmission lines are generally confined to the construction phase and low level noise “humming” during operation. In terms of section 25 of the ECA, the national Noise Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCR) was promulgated. The NCRs were revised under Government Notice Number R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Currently, no provincial or local regulations exist in the Northern Cape and no approval is required. Mitigation measures are included in the EMPr.
National Water Act, Act No. 36 of 1998 (NWA)	Department of Water Affairs and Sanitation (DWS)	Section 21 of the NWA recognises water uses that require authorisation by DWS before they commence. Aerial imagery suggests that a number of pylons may be located inside a defined watercourse authorisation is therefore required in terms of Section 21 (c) and (i) in the form of either a General Authorisation or Water Use License Application (WULA). The information required by the DWS for this application has been included in the aquatic ecology assessment in Annexure D. No water use may begin without the appropriate authorisation.



Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
National Heritage Resources Act, Act No. 25 of 1999 (NHRA)	South African Heritage Resources Agency (SAHRA), and Northern Cape Provincial Heritage Resources Authority Ngwao Boswa Kapa Bokone (NBKB)	Section 38 of the NHRA is applicable due to the length of the proposed transmission line. As such, a Heritage Impact Assessment and Palaeontological Assessment has been undertaken as required by the NHRA. Comment on the project will be obtained from NBKB and SAHRA during the PPP and appropriate mitigation measures have been included in the BAR and EMPr.
Aviation Act, Act No 74 of 1962	Civil Aviation Authority (CAA)	Transmission lines may potentially interfere with radio navigation equipment. Transmission lines are also considered to be potential physical obstacles and may need to be fitted with aviation warning lights if required by the CAA. A Civil Aviation Compliance Assessment Report is attached in Annexure D
Conservation of Agricultural Resources Act, Act No. 43 of 1983 (CARA)	Northern Cape Department of Agriculture and Rural Development	The purpose of this Act is to ensure that natural agricultural resources of South Africa are conserved through maintaining the production potential of land, combating and preventing erosion, preventing the weakening or destruction of water sources, protecting vegetation, and combating weeds and invader plants. As such, as part of the BA process, recommendations will be made to ensure that measures are implemented to maintain the agricultural production of land, prevent soil erosion, and protect any water bodies and natural vegetation on site. The Proponent together with the relevant farmers should also ensure the control of any undesired aliens, declared weeds, and plant invaders listed in the regulation that may pose a problem because of the proposed project.
National Road Traffic Act, Act No. 93 of 1996 (NRTA)	Department of Transport, Northern Cape	Certain vehicles and loads cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed in the Regulations of the NRTA. Due to the large size of some of the transmission line components they will need to be transported via “abnormal loads”. As such, the Northern Cape Department of Roads and Public Works will be provided with an opportunity to review and comment on this BA process.
The National Energy Act, Act No. 34 of 2008	Department of Energy (DoE)	The REIPPPP is guided by the National Energy Act, one of the purposes of which is to promote sustainable development of renewable energy infrastructure for which the transmission lines will form part of.
Northern Cape Nature Conservation Act	Northern Cape Department: Agriculture, Environmental Affairs,	Numerous sections (specifically sections 50-51) under NCNCA deal with indigenous and protected plants. The protected status of various species that may be located on the site requires a permit under NCNCA in order for



Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
Act No. 9 of 2009 (NCNCA)	Rural Development and Land Reform	the plants to be removed or destroyed i.e. a permit is required before development may commence.
Astronomy Geographic Advantage Act, Act No. 21 of 2007 (AGA), and associated Regulations	Department of Science and Innovation (DSI)	<p>In terms of Schedule D of the Regulations on the Protection of the Karoo Central Astronomy Advantage Areas (KCAAA)(GN 1411 of 15 December 2017), transmission lines located more than 50km away from the SKA Infrastructure Territory are exempt from requiring a permit from the DSI unless the operation of such infrastructure are found to cause interference with the SKA. The proposed infrastructure is more than 50km away from the SKA Infrastructure Territory and is thus exempt from the AGA permitting requirements.</p> <p>Specific KCAAA requirements for transmission of power include:</p> <p>5. Additional conditions for distribution or transmission power systems</p> <p>(1) In addition to the conditions in regulation 3 of these regulations, no person may construct or install any new overhead distribution or transmission power systems with a voltage rating –</p> <p>(2) (a) equal or greater to sixty-six thousand Volts (66 000 V) within sixteen km of SKA Infrastructure Territory; and</p> <p>(b) less than sixty-six thousand Volts (66 000 V) within six km of SKA Infrastructure Territories.</p> <p>Despite compliance with sub-regulation (1), the distribution or transmission power system may not cause electromagnetic interference to SKA Infrastructure Territories which exceeds the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012.</p> <p>An Electro-magnetic interference (EMI) assessment has been undertaken to determine the potential impact on the SKA radio telescope. A comment on the project will also be obtained from SKA, for its inclusion in the BA process.</p>



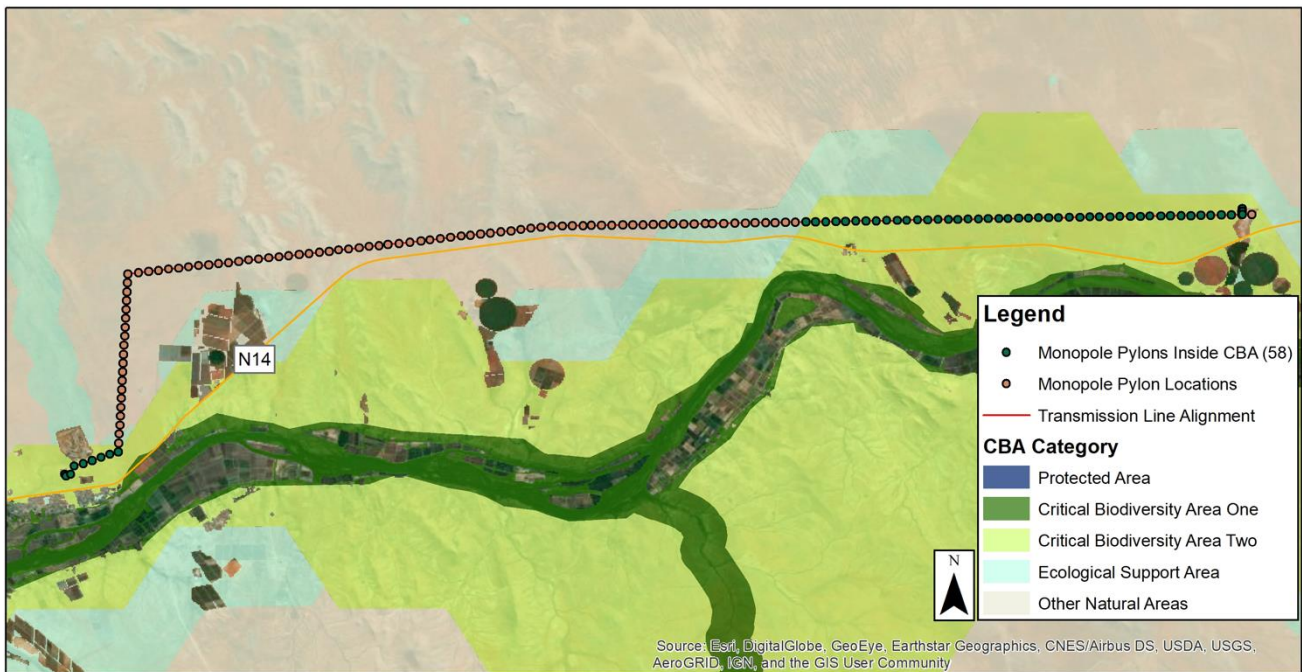


Figure 2-1: Map illustrating pylons inside and outside CBAs

2.2 Listed Activities in terms of NEMA

NEMA is the primary legislation tasked with the management of environmental resources and, accordingly, identifies activities that require authorisation prior to commencement. The two alternatives considered in this EIA process trigger different activities listed in the amended 2014 EIA Regulations (GN R982, as amended). These activities are detailed in Table 2-2 (preferred alternative).

Table 2-2: Listed activities triggered by the preferred alternative for the proposed project

Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended	Description of how the proposed project is applicable to the listed activity relates.
GN R983 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 a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving will occur behind a development setback; is for maintenance purposes undertaken in accordance with a maintenance management plan; falls within the ambit of activity 21 in this Notice, in which case that activity applies; occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.	A number of the existing pylons are located inside a defined watercourse and removal of the existing foundations would result in the movement of more than 10m ³ of soil within a watercourse. During the final design stage, the locations of the monopole structures will be fixed by the engineers and must avoid all aquatic features as delineated by the aquatic specialist and illustrated in the sensitivity maps.
GN R983 Activity 48	The expansion of infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more; where such expansion occurs (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists,	Upgrading of the line will result in the expansion of pylon footprints in excess of 100m ² and will take place within 32m of the watercourses at the site as delineated by the aquatic specialist.



	<p>within 32 metres of a watercourse, measured from the edge of a watercourse; excluding:</p> <p>(aa) the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such expansion activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies; (dd) where such expansion occurs within an urban area; or (ee) where such expansion occurs within existing roads, road reserves or railway line reserves.</p>	
Activity No(s):	Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended	Description of how the proposed project is applicable to the listed activity relates.
GN R985 Activity 12	<p>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</p> <p>g. Northern Cape ii. Within critical biodiversity areas identified in bioregional plans;</p>	<p>±58 of the existing pylons are located inside a CBA. Should the same number of new pylons be constructed inside a the CBA it would result in the clearance of 371m² of indigenous vegetation.</p>
GN R985 Activity 23	<p>The expansion of</p> <p>(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</p> <p>where such expansion occurs within a watercourse; in front of a development setback adopted in the prescribed manner; or if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; excluding the expansion of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour in Northern Cape Sensitive Areas.</p>	<p>Pylons to be upgraded inside a CBA are located within 32m, of a watercourse and the expansion of the pylon footprints in these areas would be in excess of 10m².</p>

2.2.1 DFFE Screening Tool

Government Notice 960, gazetted on 05 July 2019, in accordance with the NEMA EIA Regulations 2014 (as amended) requires that a National web based environmental screening tool is used to produce a report that should be submitted with an EA application to the DEA² from 05 October 2019 and onwards (i.e. 90 days following the date of publication of this notice). The downloaded report is appended in Annexure E. This report shows, on a high level, the site's sensitivity to transmission line development based on different environmental themes (including, inter alia, terrestrial ecology, avifauna, heritage) and identifies assessment protocols that must be undertaken depending on the environmental theme's sensitivity rating within the development site.

Assessment protocols that set out the "procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes in terms of section 24(5)(a) and (h) of the national environmental management act, 1998, when applying for environmental authorisation" were Gazetted on

² DEA is now referred to as DFFE effective 1 April 2021.



20 March 2020. These protocols in terms of reporting of identified environmental themes were met in terms NEMA.

The Screening Tool report is attached in annexure E.

2.3 Relevant Policies

South Africa's Constitution (1997), together with the three policies indicated in Figure 2-2 below, have been key in developing South Africa's renewable energy industry. The white paper on renewable energy is applicable to this project as the proposed 132 kV Gordonia-Avondale transmission line is required for the connection of the new Avondale Hybrid Solar project to the power grid.

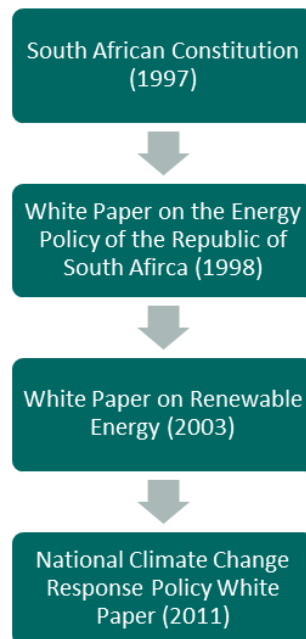


Figure 2-2: Key policies for initiating renewable energy in South Africa.

2.4 Relevant Guidelines

This BA process is informed by the series of national Environmental Guidelines where applicable and relevant:

- EIA Guideline for Renewable Energy Projects (DEA, 2015).
- Integrated Environmental Information Management (IEIM), Information Series 5: Companion to the NEMA EIA Regulations of 2010 (DEA, 2010).
- IEIM, Information Series 2: Scoping (Department of Environmental Affairs and Tourism (DEAT), 2002).
- IEIM, Information Series 3: Stakeholder Engagement (DEAT, 2002).
- IEIM, Information Series 4: Specialist Studies (DEAT, 2002).
- IEIM, Information Series 11: Criteria for determining Alternatives in EIA (DEAT, 2004).
- IEIM, Information Series 12: Environmental Management Plans (DEAT, 2004).
- IEM Guideline Series 7: Public Participation in the Environmental Impact Assessment Process (DEA, 2012)

The following guidelines from the Department of Environmental Affairs and Development Planning (Western Cape) (DEA&DP) were also taken into consideration as best-practice, even though the project is situated in the Northern Cape:

- Guideline for involving biodiversity specialists in EIA process (Brownlie. 2005).

- Guideline for involving heritage specialists in the Environmental Impact Report process (June Winter & Baumann, 2005).
- Guideline for involving visual and aesthetic specialists in the Environmental Impact Report process (Oberholzer.2005).
- Guideline for Environmental Management Plans (Lochner, 2005).
- Guideline for determining the scope of specialist involvement in EIA Processes (2005).
- Guideline for the review of specialist input into the EIA Process (June 2005).
- Guideline on Alternatives, EIA Guideline and Information Document Series. (DEA&DP, 2011).
- Guideline on Need and Desirability, EIA Guideline and Information Document Series. (DEA, 2012).
- Guideline on Public Participation, EIA Guideline and Information Document Series. (DEA&DP, 2011)



3 EIA METHODOLOGY

As outlined in Figure 3-1, there are two distinct phases in the BA process, namely Pre-Application Phase, and the BA Phase. A description of the activities which have been, and will be, undertaken during each phase is provided in the following sections. Note that this report covers the second phase, viz. the BA Phase.

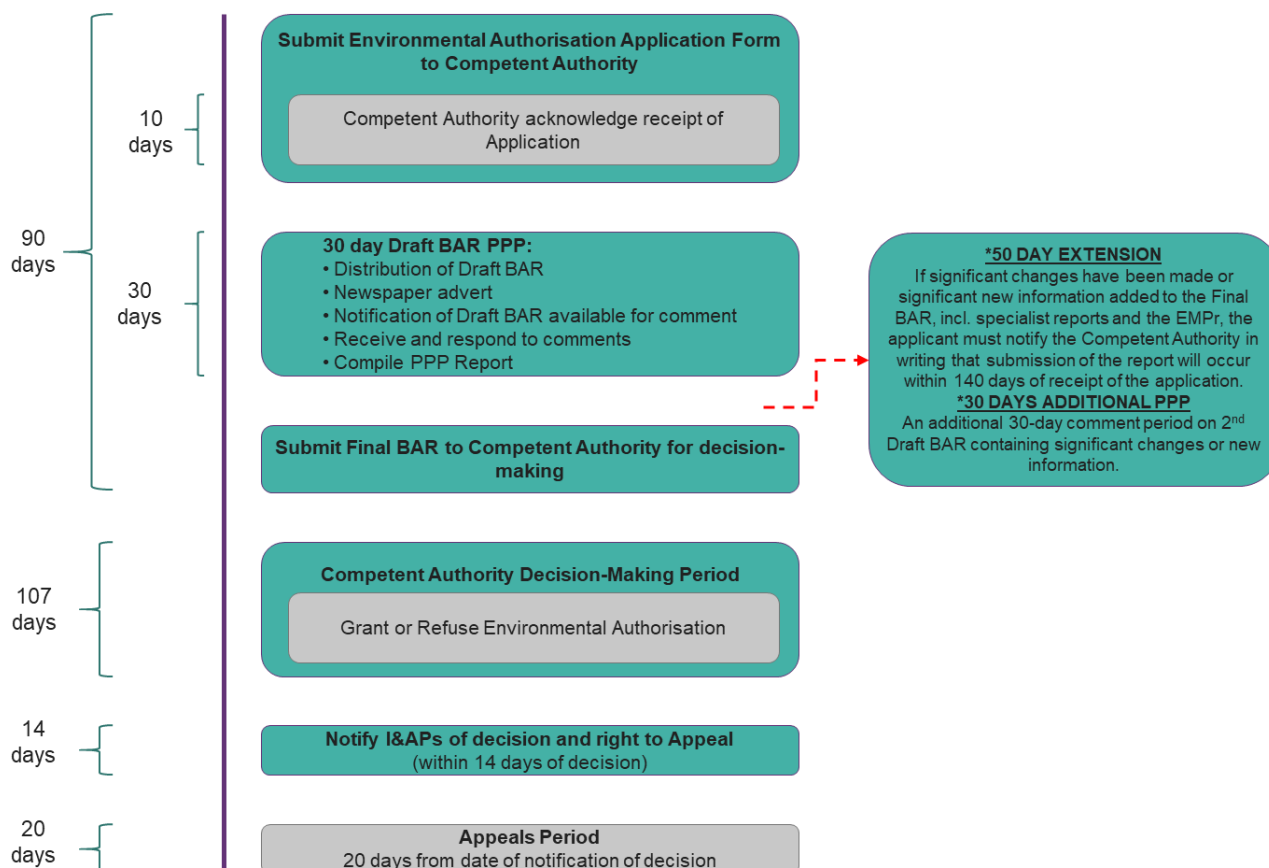


Figure 3-1: The BA process in terms of NEMA

As illustrated in Figure 3-1, only one stage of public participation is included in a BA process, i.e. comment period on the Draft BAR. However, as this is the 2nd Draft BAR, an additional 30 days of commenting period will be undertaken and a request for timeframe extension has been submitted to the DFFE (Final BAR to be submitted to DFFE for decision-making within 140-day from date of submission of the application form). More information on the Public Participation Process (PPP) is included in Section 3.3.

3.1.1 The Pre-Application Phase

An official pre-application phase was undertaken to, firstly, confirm the EIA process that is required and, secondly, confirm which listed activities are triggered by the proposed project. A meeting with the DFFE was held on 14 July 2021. The outcomes of this meeting have informed this BAR. The meeting minutes and all other correspondence with the DFFE are attached in Annexure B.

The project’s proposed PP Plan was presented during the pre-application meeting and was subsequently approved on 21 July 2021 by DFFE (Annexure B).



The COVID-19 Disaster Management Regulations, Directions Annexure 3: Services to be provided or obtained by proponent, applicants, environmental assessment practitioners (EAPs), specialists, professionals undertaking actions as part of the environmental authorisation process and organs of state as commenting authorities required in terms of the National Environmental Management Act, the National Environmental Management: Waste Act, and the Environmental Impact Assessment Regulations, (EIA Regulations) (Annexure 3) have been and will be followed.

3.1.2 BAR Phase

A site visit was undertaken to familiarise the EAP and the specialists with the site and to allow for a site survey, identifying potential areas of concern or opportunity. Site visits by an EAP were undertaken at inception of the BAR phase on 12 June 2021 on which day site notices were also placed.

The objective of the basic assessment process is to, through a consultative process -

a) determine the policy and legislative context within which the proposed activity is located and how the activity;

complies with and responds to the policy and legislative context;

b) identify the alternatives considered, including the activity, location, and technology alternatives;

c) describe the need and desirability of the proposed alternatives;

d) through the undertaking of an impact and risk assessment process, inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on these aspects to determine –

i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and;

ii) 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;

e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to i) identify and motivate a preferred site, activity and technology alternative;

i) identify suitable measures to avoid, manage or mitigate identified impacts; and

ii) identify residual risks that need to be managed and monitored.

Various methods and sources were utilised to identify the potential social and environmental aspects associated with the proposed project and to develop the ToRs for the specialist studies. The sources of information for the preparation of this report include, inter alia, the following:

- Collection of information specific to the project, as provided by the Proponent;
- Project description;
- Basic methodology for construction of the various project components;
- Basic methodology during operations and decommissioning;
- Expected timeframe for project development;
- Maps and figures, outlining the proposed facilities;
- Technical information relating to design;
- Other relevant BARS/ EIRs prepared for BAs/EIAs undertaken in the area;



- Environmental baseline literature and desktop spatial surveys for this site and surrounding areas;
- Environmental baseline surveys for this site and surrounding areas from site visits by specialists;
- Consultation with the project team (including specialists); and
- Consultation with I&APs, including authorities.

An application form for the project will be submitted to DFFE (in order to register the project on the Department's databases) along with the draft BAR which will be circulated for a 30-day public comment period. All comments received will be recorded and responded to in a Comments and Response section within the Public Participation Report (Annexure C), and the BAR will be updated to address I&AP comments, where appropriate. The final BARs will be submitted to DFFE for decision making, with the final BAR being submitted no later than 90 days from the receipt of the application form. The competent authority must then, within 107 days of receipt of the final BAR and generic EMPr, in writing –

(a) Grant environmental authorisation in respect of all or part of the activity applied for; or

(b) Refuse environmental authorisation.

Summary of the key dates of the BAR process:

- Site visit - 19 June 2021
- PP Plan approved by DFFE (21 July 2021)
- Placement of Site notices -12 June 2021
- Advertisement in Gemsbok Newspaper – 20 August 2021
- Lodging of 1st Draft BAR at Uppington public library and on Dropbox – 20 August 2021
- Notification of I&APs and state departments of availability of 1st Draft BAR – 20 August 2021
- Notification of I&APs and state departments of availability of 2nd Draft BAR for 30-day comment period due to new information coming to fore during PPP – 21 September 2021
- Last day to submit comment on 2nd Draft BAR – 22 October 2021
- Submit Final BAR to DFFE – 29 October 2021
- DFFE provide decision on application – 57-days from date of submission of Final BAR to issue decision.
- Notification of registered I&APs of DFFE decision and appeal process – upon receipt of DFFE decision.

3.2 Methodology

3.2.1 Specialist Assessments

To provide a scientific assessment that is transparent and robust, a clear methodology is required. Although each specialist required a methodology that was specific to their investigation (detailed in their reports in Annexure D), they were each given the following Terms of Reference (ToR):

- Undertake a site investigation to determine the status quo and identify any sensitive features or no-go areas;
- Provide shapefiles of all sensitive features;
- Assess all proposed site alternatives within an 80m buffer³ associated with the proposed project;
- Make use of the Zutari Impact Assessment Methodology (explained below in Section 3.2.2) when assessing impacts of the proposed project, as well as cumulative impacts (detailed below in Section 3.2.3);
- Provide a detailed description of appropriate mitigation measures that can be adopted to reduce or avoid negative impacts and improve positive impacts for each phase of the project. Indicate the level of significance of impacts pre- and post-mitigation;

³ An 80m wide area was assessed by the specialists.



- Provide a summary of succinct and practical recommendations based on mitigation measures identified to form the basis of environmental authorisation requirements, should the development be authorised;
- Comply with the content requirements for specialist reports listed in Appendix 6 of the 2014 EIA Regulations (GN R982 of 2014). (These have been updated where required to consider the amendments made to the Regulations on 7 April 2017); and
- Comply with procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA, 1998, when applying for environmental authorisation (GN R320, of 20 March 2020).

3.2.2 Assessment Methodology

This section outlines the proposed method for assessing the significance of the potential environmental impacts. For each predicted impact, criteria are ascribed, and these include the intensity (size or degree scale), which also includes the type of impact, being either a positive or negative impact; the duration (temporal scale); and the extent (spatial scale), as well as the probability (likelihood). The methodology is quantitative, whereby professional judgement is used to identify a rating for each criteria based on a seven-point scale (refer to Figure 3-2); and the significance is auto-generated using a spreadsheet through application of the calculations in Table 3-1. Specialists can comment where they disagree with the auto-calculated impact significance rating.

Calculations

For each predicted impact, certain criteria are applied to establish the likely **significance** of the impact, firstly in the case of no mitigation being applied and then with the most effective mitigation measure(s) in place.

These criteria include the **intensity** (size or degree scale), which also includes the **type** of impact, being either a positive or negative impact; the **duration** (temporal scale); and the **extent** (spatial scale). These numerical ratings are used in an equation whereby the **consequence** of the impact can be calculated. Consequence is calculated as follows:

Consequence = type x (intensity + duration + extent)

To calculate the significance of an impact, the **probability** (or likelihood) of that impact occurring is applied to the consequence.

Significance = consequence x probability

Depending on the numerical result, the impact would fall into a significance category as negligible, minor, moderate or major, and the type would be either positive or negative.

Figure 3-2: Calculation of significance

Table 3-1: Assessment criteria for the evaluation of impacts

Criteria	Numerical Rating	Category	Description
Duration	1	Immediate	Impact will self-remedy immediately
	2	Brief	Impact will not last longer than 1 year
	3	Short term	Impact will last between 1 and 5 years
	4	Medium term	Impact will last between 5 and 10 years
	5	Long term	Impact will last between 10 and 15 years
	6	On-going	Impact will last between 15 and 20 years
	7	Permanent	Impact may be permanent, or in excess of 20 years
Extent	1	Very limited	Limited to specific isolated parts of the site
	2	Limited	Limited to the site and its immediate surroundings
	3	Local	Extending across the site and to nearby settlements



Criteria	Numerical Rating	Category	Description
	4	Municipal area	Impacts felt at a municipal level
	5	Regional	Impacts felt at a regional level
	6	National	Impacts felt at a national level
	7	International	Impacts felt at an international level
Intensity	1	Negligible	Natural and/ or social functions and/ or processes are negligibly altered
	2	Very low	Natural and/ or social functions and/ or processes are slightly altered
	3	Low	Natural and/ or social functions and/ or processes are somewhat altered
	4	Moderate	Natural and/ or social functions and/ or processes are moderately altered
	5	High	Natural and/ or social functions and/ or processes are notably altered
	6	Very high	Natural and/ or social functions and/ or processes are majorly altered
	7	Extremely high	Natural and/ or social functions and/ or processes are severely altered
Probability	1	Highly unlikely / None	Expected never to happen
	2	Rare / improbable	Conceivable, but only in extreme circumstances, and/or might occur for this project although this has rarely been known to result elsewhere
	3	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
	4	Probable	Has occurred here or elsewhere and could therefore occur
	5	Likely	The impact may occur
	6	Almost certain / Highly probable	It is most likely that the impact will occur
	7	Certain / Definite	There are sound scientific reasons to expect that the impact will definitely occur

When assessing impacts, broader considerations are also taken into account. These include the level of confidence in the assessment rating; the reversibility of the impact; and the irreplaceability of the resource as set out in Table 3-2, Table 3-3, and Table 3-4, respectively.

Table 3-2: Definition of confidence ratings

Category	Description
Low	Judgement is based on intuition
Medium	Determination is based on common sense and general knowledge
High	Substantive supportive data exists to verify the assessment

Table 3-3: Definition of reversibility ratings

Category	Description
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Low	The affected environment will not be able to recover from the impact - permanently modified
Medium	The affected environment will only recover from the impact with significant intervention
High	The affected environmental will be able to recover from the impact

Table 3-4: Definition of irreplaceability ratings

Category	Description
Low	The resource is not damaged irreparably or is not scarce
Medium	The resource is damaged irreparably but is represented elsewhere
High	The resource is irreparably damaged and is not represented elsewhere

3.2.3 Assessment of Cumulative Effects

Cumulative effects are commonly understood to be impacts from different projects that combine to result in significant change, which could be larger than the sum of all the individual impacts. However, this project involves the upgrading of existing 132 kV lattice structure with monopole structures within the same existing servitude and along the same centreline. The existing 132 kV transmission line has been operational for over 30 years. The project will therefore not contribute to cumulative impacts when considering developments within a 30km radius. Cumulative impacts associated with the transmission line infrastructure have already realised over the past 30 years. The proposed upgrades would therefore not contribute to any additional cumulative impacts as the facility associated with electricity transmission will remain at the same location. Any project related impacts contributing to such cumulative impacts are predicted to occur within the construction phase only and will be discussed during the impact assessment in Chapter 6 of this BAR. A map indicating the line together with environmental sensitivities, existing Eskom high voltage infrastructure and the existing renewable development in the area is included in Section 7.

3.3 Public Participation

Stakeholder engagement has been described by the International Finance Corporation (IFC) of the World Bank Group as a broad, inclusive and continuous process of communication between a Proponent of a project, and those potentially affected by the activities of the proposed development. This can include a wide range of activities that are relevant to the entire life of a project. The aim of stakeholder engagement differs at different stages of the project lifecycle. During the BA process, the aim is to provide an opportunity for stakeholders to be informed of projects occurring in their area and that may affect them directly or indirectly. It also aims to provide an accessible and meaningful opportunity for people to ask questions, raise concerns or grievances and to ensure that these are used to guide the new development, and ongoing operations, in a responsible manner that complements the local socio-economic environment and enhances the benefit of a given project.

South African legislation and guidelines (refer to Chapter 2) have formalised stakeholder engagement in the BA process and refer to it as the Public Participation Process (PPP). PPP therefore forms an integral component of this investigation and enables interested and affected parties (I&APs) to identify their issues, concerns, and suggestions during the BA process. This PPP has been structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/ reports, and to voice any issues of concern at various stages throughout the BA process. These stages are described below.

A Public Participation Report has been included in Annexure C and provides detail on the process that has been followed to date. This document will be updated as the project progresses.



3.3.1 Stages of the Public Participation Process

PPP for this project are illustrated in Figure 3-3 below.

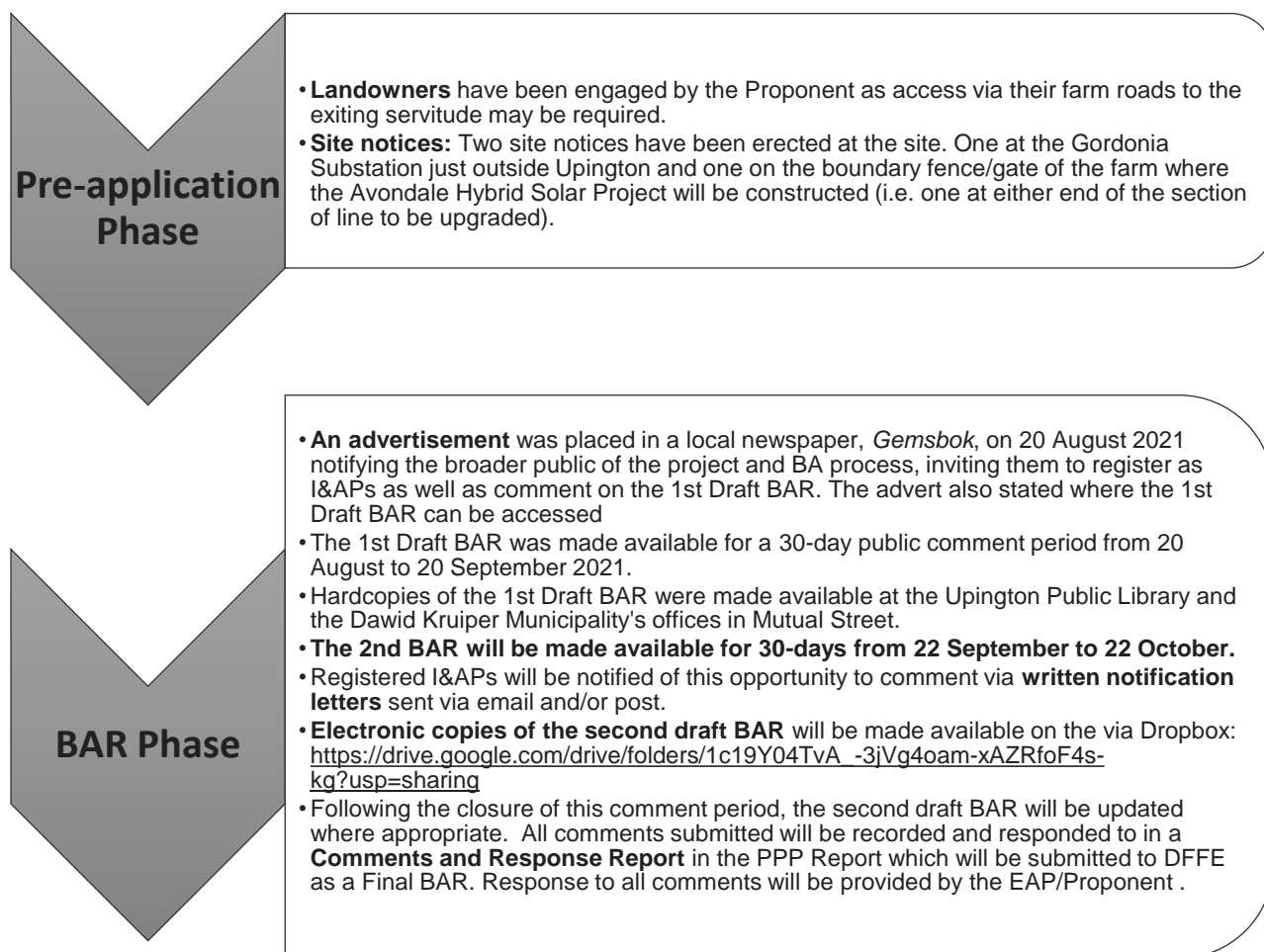


Figure 3-3: Public participation in the BAR process

3.3.2 Identification of Stakeholders

A database of I&APs has been developed based on the landowner contact details obtained by the Applicant and by windeed searches of the affected and neighbouring properties. This database was initiated by including the details of the following affected parties:

- Landowners and adjacent landowners;
- Relevant district and local municipal officials and ward councillor/s;
- Relevant national and provincial government officials;
- Neighbouring renewable energy projects, and
- Organisations in the area.

This database will be augmented via chain referral during the BA process and will be continually updated as new I&APs are identified throughout the project lifecycle. The list of I&APs is included in Annexure C.

3.4 Authority involvement

In terms of Section 24O (2) and (3) of the NEMA, the following state departments and/or parastatal bodies will be sent a copy of the draft BAR for comment.

- Provincial and local authorities, and parastatal organisations:
 - ZF Mgcawu District Municipality (DM);
 - Dawid Kruiper Local Municipality (LM);
 - Northern Cape Provincial Heritage: Boswa ya Kapa Bokone;
 - Eskom;
 - Northern Cape Department of Agriculture, Environmental Affairs, Land Reform & Rural Development;
 - Northern Cape Department of Roads and Public Works; and
 - Northern Cape Department of Economic Development and Tourism.
- National departments and organisations:
 - Department of Human Settlement, Water and Sanitation;
 - Department of Agriculture, Land Reform and Rural Development.
 - Department of Health;
 - Department of Transport;
 - Department of Mineral Resources & Energy;
 - Department of Environmental Affairs: Integrated Environmental Management
 - Department of Environmental Affairs: Biodiversity Conservation
 - South African National Roads Agency Limited;
 - South African Heritage Resources Agency;
 - South African National Defence Force;
 - National Energy Regulator of South Africa;
 - Civil Aviation Authority;
 - BirdLife South Africa;
 - Square Kilometre Array (SKA);
 - South African Astronomical Observation (SAAO)
 - WeatherSA; and
 - Conservation agencies: WESSA, EWT and WWF SA.
- Other national/ provincial departments where deemed necessary

3.5 Summary of Comments and Responses

During the 30-day comment period on the 1st Draft BAR comments were received from the following parties:

- Civil Aviation Authority – requesting that EDF communicate pylon locations to the CAA once finalised. EAP confirmed receipt and forwarded correspondence to client as this will be dealt with post EA.
- Eskom – requesting spatial information of the existing line. EAP provided information to Eskom.
- DFFE – commenting on various aspects of the applications and indicating legislative requirements that need to be complied with. EAP responded the comment.

All comments received to date have been responded to and included in the Comments and Response Report (Annexure C). All comments received during the 30-day comment period on the 2nd Draft BAR will be responded to, included in the Final BAR to be submitted for decision-making and incorporated into the Comments and Responses Report.



4 DESCRIPTION OF PROPOSED PROJECT

The proposed upgrading of part of the existing 132 kV Gordonia-Garona transmission line is a critical component for the new Avondale Hybrid Solar project to connect to the national Eskom electricity grid. The following subsections provide more information on the project context, location, components, activities and alternatives.

4.1 Project Overview

Umoyilanga (Pty) Ltd (the Applicant) has been awarded preferred bidder status as part of the DMRE Risk Mitigation Independent Power Producer Procurement Programme (RMIPPPP) to construct the new Avondale Hybrid Solar project.

The existing 132 kV Gordonia-Garona transmission line is required for the transmission of electricity from the Avondale Hybrid Solar project to the Eskom power grid. This transmission line is approximately 30 years old and runs from Upington, Northern Cape in an easterly direction and then later south towards Groblershoop for an approximate distance of 92 kilometres. Eskom requires that Umoyilanga (Pty) Ltd upgrade an existing portion of the 132 kV Gordonia-Garona transmission line as part of the works required for connecting the new Avondale Hybrid Solar project to the grid.

The project proposes to upgrade the physical components (e.g. conductor, pylons, etc.) of the existing transmission line to prevent potential future capacity issues and failure of the infrastructure. The capacity of the line will remain 132 kV, meaning there will be no increase in line capacity. Only the physical components are proposed to be upgraded. The line is located inside a registered servitude and comprises of ninety-two (92) lattice pylon structures over an approximate distance of 32 kilometres. The line is accessed via existing access/farm roads and a service track running underneath the line.

The proposed infrastructure will be permanent and will remain in place for the duration of the lifespan of the associated Avondale Hybrid Solar project (20 years or more). If/when the Avondale Hybrid Solar project is decommissioned at some point in the future, it is unlikely that the line associated with this project will be decommissioned and removed as it would still form an integral part of Eskom's electricity network. .

4.2 Project details and extent

Removing the existing lattice structures (shown in Figure 4-1) and upgrading them with monopole structures (illustrated in Figure 4-2) along the existing centreline is proposed as the preferred alternative. The existing pylons would have to be rebuilt, (subject to final design approvals) and pylon locations would avoid all sensitive areas identified by the specialist team.

The proposed new monopole structures will be constructed along the existing centreline and thus inside the registered servitude, however the location of the structures will be different to the existing structures. Placing the new monopole structures at new locations (avoiding sensitive areas) will allow the contractor to finish construction within the timeframe that Eskom is able to make the line available for upgrade. It means that the contractor can construct the new foundations, transport parts to site and start assembly of new pylons at each location, prior to the Eskom line being handed over/shutdown. When the line is handed over to the contractor, the old line and existing lattice structures can be taken down and the new monopole structures can be fully assembled and erected and the line can be strung. The old lattice structure and its foundations will be removed from site, appropriately disposed of and rehabilitated as per EMPR requirements.

Many of the existing lattice structures are located inside aquatic features as delineated by the aquatic specialist and the proposed upgrade of the line will ensure that the structures are removed from these sensitive areas.



The existing lattice structure foundation footprint is 6m x 2.4m per structure. The new monopole foundation footprint will be approximately 4m x 4m per structure. The new monopole foundations will therefore be slightly larger than the existing lattice structure footprints, totalling a maximum area of approximately 1,472m².

The technical specification of the preferred alternative (Alternative 1) for the proposed Gordonia-Avondale 132 kV line is summarised in Table 4-1 below.

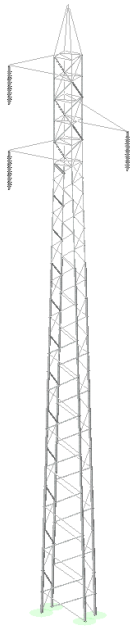


Figure 4-1: Drawing of the existing 255A structure series lattice structures that are proposed to be removed and rebuild with monopole structures



Figure 4-2: Drawing indicating the proposed monopole structure



Table 4-1: Technical details for Gordonia-Avondale 132 kV transmission line (preferred alternative)

Component	Description
Overhead Powerline	132kV single-circuit Extending from the Gordonia sub-station to the new Avondale hybrid solar PV power site. The transmission line will be located within the existing servitude. Length ±32km The line is accessed via existing access/farm roads and the Eskom service track running underneath the line.
New monopole structures	New monopole structures will be up to 28m tall. Monopoles (Self-supporting) is proposed to be used (stayed pylons may potentially be used for long spans, but unlikely). Disturbance footprint per pylon of approximately 16m ² (4m x 4m).
New Conductor type	Upgrade to Tern conductor
Project footprint	1 472m ² total footprint (permanent)
Existing lattice structures	Existing lattice structures are approximately 30 years old. 92 lattice structures within the relevant section of the line. Lattice structure pylons are to be upgraded with new monopole structures. Existing lattice structures are up to approximately 26m tall.

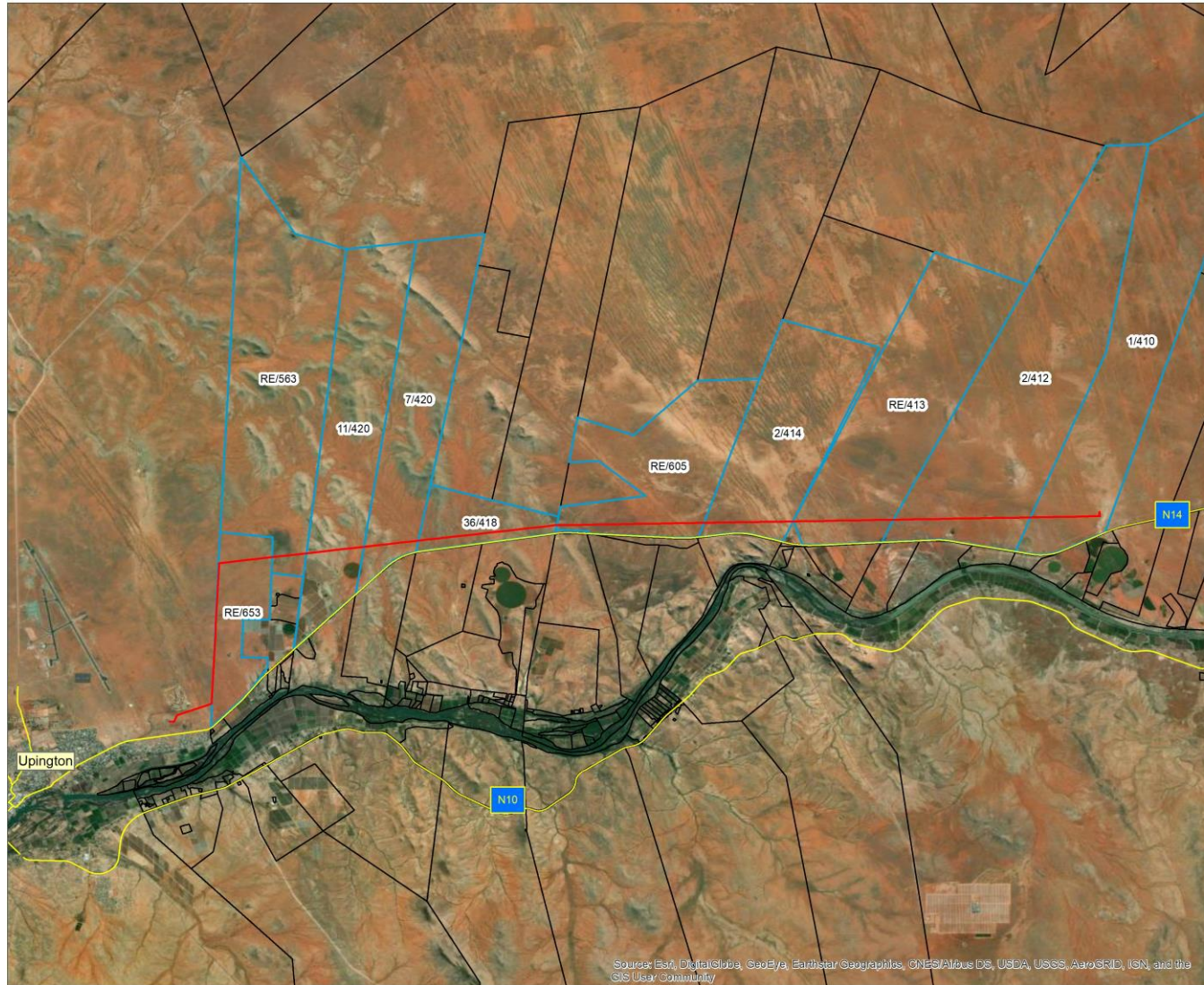
Table 4-2 describes the farm portions through which the existing servitude traverses and where the transmission line will be upgraded. Figure 4-3 shows the farm portions in relation to the transmission line.

Table 4-2: Farm details

Farm name	Erf number	21-digit SG code
Upington 4350	0	C02800070000435000000
Koras 412	2	C02800000000041200002
Uizip 413	RE	C02800000000041300000
Uitkomst 420	7	C02800000000042000007
Uitkomst 420	11	C02800000000042000011
Rouxville 605	RE	C02800000000060500000
Sandflats 653	RE	C02800000000065300000
Melkstroom 563	RE	C02800000000056300000
Kameelpoort 414	2	C02800000000041400002
Avondale 410	1	C02800000000041000001
UAP 418	18	C02800000000041800018







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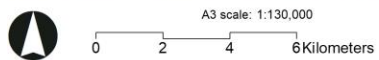


Legend

- Existing Avondale-Gordonia Transmission Line (±32km)
- Affected_Properties

Notes:
Aerial Imagery: ESRI

Date: 2021/08/16 Version: 0



Job No: 1001408 Map by: WL
Projection: GCS_WGS_1984

Avondale-Gordonia Transmission Line - Basic Assessment Properties

Figure 4-3: Map indicating the farm portions in relation to the transmission line

4.3 Description of the proposed infrastructure

This section provides additional technical detail pertaining to the transmission line, pylon/structures and associated infrastructure.

4.3.1 Transmission line and pylon structures

The preferred alternative for the proposed project involves the upgrading of existing lattice structures (92 maximum) and the existing conductors. These structures will be rebuilt with new monopole structures along the existing transmission centreline. The new 132 kV single-circuit overhead transmission line and associated infrastructure will be held up by these new monopole structures in accordance with Eskom Standards⁴.

Refer to Figure 4-4 for the existing lattice structure placements. The new structures will be constructed along this centreline, but not necessarily at the same location as the existing. The final pylon positions will be determined during the detailed design phase and a coordinate list of the final positions will be submitted to the Department.

Self-supporting monopole structures and/or stayed/ suspension monopoles (see Figure 4-5) are proposed along the straight sections of the transmission line, while guyed intermediate structures or guyed suspension structures, angle strain structures (see Figure 4-6) may be used at strain points in the transmission line alignment. These monopoles will be constructed of steel and vary in height, but may be up to 28 m tall (taller structures are required for bend points). The temporary disturbance created during construction will be rehabilitated. The average span between two pylons is 150m, but can vary between 150m and 375m depending on the ground profile (topography) and the terrain to be spanned. The final tower sizes and positions will only be determined once the project has received Environmental Authorisation, and detailed geotechnical assessments have been completed.

Monopole structure type will be selected and installed in accordance with the latest industry standards and Eskom's technical requirements at the time of construction, and within the parameters of this assessment. Environmental sensitivities, such as the delineate aquatic features provided by the aquatic specialist will be avoided into the final pylon placements.

In addition, to reduce the potential negative impacts on avifauna in the area, bird flight diverters will be required to be installed on the power line, as recommended by the avifauna specialist (refer to Annexure D for avifauna report). It should be noted that, currently, there are no bird flight diverters on the transmission line.

The transmission line may be installed as either a single or double circuit on a single set of pylons. This BAR is based on the assumption that the worst-case scenario (being a double circuit configuration) would be utilised. It is important for the lines, regardless of the technology chosen, to adhere to the Occupational Health and Safety Act No. 85 of 1993 which provides statutory clearances to ensure minimum safety standards. These standards include input from various organisations and institutions such as Eskom, the Roads Department, Transnet and Telkom, etc.

⁴ The final choice of a single or double circuit line will be determined by Eskom's requirements. This Basic Assessment has considered both single and double circuit, with the impact assessment based on the worst case scenario of a double circuit.



Figure 4-4: Map illustrating the centre line and existing positions of the Gordonia-Avondale 132 kV transmission line pylons. The new monopole structures will be constructed along the existing centreline.



Figure 4-5: Example of a Self-supporting Monopole (foreground) and Lattice Structure (background)



Figure 4-6: Example of a Guyed-suspension

4.3.2 Pylon foundations

The monopoles will be anchored to the soil through a suitable foundation system. A soil investigation through a geo-technical assessment will be performed prior to construction, at which point the prevailing soil or rock type classification will be confirmed, and a suitable foundation system designed for the various types of proposed structures. A memorandum detailing the preliminary desktop geotechnical study was compiled for this BAR process and is included in Annexure D10 (note this is preliminary).

Foundations are designed according to the following geotechnical classification:

- Type 1 – Hard engineering strong granular soil;
- Type 2 – Less competent soil, stiff clay or dense sand;
- Type 3 – Very incompetent soil i.e. loose sand or soft clay;
- Type 4 – Saturated or submerged soft ground below the seasonal water table;
- Hard rock – Solid continuous moderately fractured; and
- Soft rock – Very fractured, weathered or decomposed rock.

Load safety factors are incorporated into the foundation designs allowing for variations in geotechnical conditions, construction inconsistencies and long-term performance. The soil type nomination to be done by the construction contractor will form the base for subsequent foundation selection, to be finalised on site during construction. Once the soil type nomination has been conducted, suitable foundations will be designed.

Foundations can either be planted foundations, pad and plinth, or pile type foundations.

The Site Sensitivity Verification Report conducted by the Geotechnical specialist concluded that there are no fatal flaws that cannot be overcome through appropriate engineering at a later stage when the detailed geotechnical investigation will be undertaken. Refer to Annexure D for the full report.

4.3.3 Access and service roads

There is sufficient access to the existing servitude via farm roads and the service road which runs underneath the existing transmission line. Any access methods would be negotiated with all respective landowners to ensure that existing servitude agreements are adhered to, and security measures (such as access gates) are agreed upon.

4.3.4 Temporary laydown areas and site camps

During construction, temporary laydown and site camp areas will be required. These areas will be utilised for the temporary storage of materials, equipment and waste and will also serve as a logistical centre for construction activities. Eating and ablution areas may be provided for labourers. These temporary construction areas will be restricted to the minimum size practically required to facilitate construction and will be located in the most disturbed locations possible. Selection of the laydown areas will be done in consultation with the Environmental Control Officer (ECO), as per the requirements of the Environmental Management Programme (EMPr). The temporary construction camp and lay down areas will be rehabilitated once construction is complete.

The laydown and construction camp will be located at the Avondale hybrid solar project site.

4.3.5 Specifications for Bird Flight Diverters installation on a power line

The avifaunal specialist identified seven (7) species of conservation concern (SCC) likely to occur on the site and these were therefore considered as the primary focus of the assessment. An active Verreaux's Eagle nest and an active Martial Eagle nest were located within the existing transmission line lattice structures. The Site Ecological Importance (SEI) for these two species was determined to be Very High and High in parts of the assessment corridor associated with the nests for Verreaux's Eagle and Martial Eagle respectively. Impacts associated with transmission line are already present on the site and the proposed development provides an opportunity to enhance the mitigation measures in effect along the assessment corridor, as the existing line currently does not have any mitigation measures such as Bird Flight Diverters (BFDs) attached.

Appropriate BFDs are to be attached to the transmission line for a distance of at least 5.2 km each side of the Verreaux's Eagle nest and 5 km each side of the Martial Eagle nest (i.e. areas identified as being of Very High and High Site Ecological Importance).

It has been found in South Africa and internationally that most collisions happen with the transmission line itself along the inter-pylon spans. It is likely that this is because the transmission lines are thin and less visible than the conductors. Typically, birds with large wingspans have less manoeuvrability and therefore have limited time to react to the approaching line. BFDs are therefore installed to make the transmission line more visible, allowing birds to take evasive action earlier and thereby reducing the risk of collision.

Further information on the efficacy of BFDs is detailed in the avifaunal specialist report in Annexure D. The EMPr provides more detail on the preferred BFDs that have been approved by Eskom.

4.3.6 Provision of services required during construction

4.3.6.1 Labour required

The construction phase would endure for approximately 14 months, however this would vary depending on the seasonal and environmental conditions at the time of construction. Temporary employees will be required during the construction phase and will be made up of both highly skilled, skilled and unskilled employment opportunities. The unskilled labourers are generally trained by the contractors and sourced from local communities.

4.3.6.2 Water supply

Water will be required during the construction phase for concrete mixing for the pylon foundations, sundry construction purposes, and drinking water for the construction workers. Water will be trucked to site for this purpose, or alternately the construction contractor may obtain water from the site (ground water abstractions), subject to the necessary agreements with the landowners concerned, water quality assessments and receipt of the necessary authorisation from the Department of Water and Sanitation (DWS). The re-use and recycling of water is unlikely to be financially viable based on the small quantity of water required.

4.3.6.3 Waste

According to the Dawid Kruiper Municipality's 2021/2022 Reviewed Integrated Development Plan (IDP), the municipality has nine landfill sites namely, Leerkrans, De Duine, Askham, Welkom, Groot Mier, Loubos, Rietfontein, Philandersbron, Noenieput. Swartkop Dam is currently not a licensed landfill site.

The municipality also has five sewage treatment plants (1 conventional treatment works and 4 oxydation ponds). Portable toilets will be used across the site and waste will be collected at regular intervals and transported to an equipped disposal facility. Solid waste and effluent associated with the construction phase is anticipated to be of minimal volume and would be disposed of via the municipal waste streams. Please note however that the Proponent cannot commit to a specific waste disposal or treatment facility at this stage for solid waste or wastewater. This can only be confirmed closer to the time of construction, and once the Contractor has been appointed.

During the construction phase, the construction contractor will be responsible for collecting and disposing of waste at an appropriate disposal site. Where possible, waste will be diverted for recycling or reuse rather than disposal.

4.4 Project Phases

From a practical perspective the project lifecycle will likely be phased as follows:

- Pre-Construction
- Construction
- Operation
- Decommissioning

4.4.1 Pre-Construction

Pre-construction activities involve tasks that establish the site, both in terms of the construction activities, as well as the social and environmental management systems. During this time, all effort should be made to ensure that the planning of the project is completed effectively to ensure that there are no delays to the project and that no unnecessary environmental degradation occurs.

The footprint boundaries will be demarcated, and no-go areas will be identified and demarcated according to the specialist recommendations. The site camp will also be established and be at the Avondale Hybrid Solar Facility.

It is also important to ensure that social risk is addressed during the pre-construction period by ensuring that an appropriate grievance mechanism is put in place. Furthermore, all the Contractors' staff must undergo training to ensure they understand the environmental sensitivities of the site.

4.4.2 Construction Phase Activities

The contractor is to construct the new foundations, transport parts and start assembly of new pylons at each location, prior to Eskom line handover. When the line is handed over to the contractor, they will take down the old line and pylons, construct the new pylons and string the new line

Potential waste streams during construction will include general site waste and spoil (some of which can be reused). Bins will be placed at suitable locations. Waste mitigation measures are detailed in the EMP.

Most of the low and semi-skilled employment opportunities will be available to residents in the area, specifically residents from Upington and other nearby settlements. Most of the beneficiaries are likely to be historically disadvantaged (HD) members of the community. This would represent a significant positive social benefit in an area. To maximise the potential benefits, the developer should commit to employing local community members to fill the low and medium skilled jobs, as far as possible.

4.4.3 Operational Phase Activities

Transmission lines are designed to run on low maintenance requirements.

During the operational phase, the site will remain available to the farmers as rangeland or retained as wilderness area. During the operational phase Eskom will undertake routine maintenance and inspection of the line.

4.4.4 Decommissioning Phase Activities

It is unlikely that the transmission line that has been operational for over 30 years will be decommissioned in the future following the proposed upgrades. Any decommissioning that may take place in the future will have to adhere to the relevant legislation applicable to such activities at that time.

4.5 Project Need and Desirability

The proposed upgrading of the Gordonia-Avondale 132 kV transmission line is required to connect the new Avondale Hybrid Solar project to the National Grid. Without the authorisation of this proposed upgrade, the Avondale Hybrid Solar project will be unable to supply electricity to the user. Therefore, the need for the proposed project is linked to the need for the Avondale Hybrid Solar project. The questions for need and desirability of the proposed grid connection are therefore answered in the context of being a component of a renewable energy facility.

The need for renewable energy is well documented. In order to evacuate energy from generation plants reliable and efficient grid infrastructure is required. Solar energy is desirable as it:

- Creates a more sustainable economy by promoting South Africa's energy policy towards energy diversification;
- Reduces the demand on scarce resources such as water by promoting energy generating facilities which are less resource intensive;
- Assists in meeting nationally appropriate carbon emission targets in line with global climate change commitments by reducing reliance on coal as an energy source;
- Reduces and, where possible, eliminates pollution by using cleaner energy generating mechanisms and reducing the demand on carbon-based fuels;
- Promotes local economic development by creating jobs and promoting skills development; and
- Enhances energy security by diversifying generation to reduce reliance on coal, which is non-renewable, as a primary energy source and promoting renewable energy generation.

Table 4-3 below provides project specific answers to questions included in the Needs and Desirability Guideline⁵.

Table 4-3: The need and desirability of the proposed grid connection infrastructure is motivated in the following table.

Need and Desirability	
Need (Timing)	
Question	Response
1. Is the activity permitted in terms of the property's existing land use rights?	Yes. The preferred alternative proposes the upgrading of a transmission line within an existing servitude. The current transmission line is approximately 30 years old. There will be no increase in line capacity, only the physical components are to be upgraded.
2. Will the activity be in line with the following? (a) Provincial Spatial Development Framework (PSDF)	The Provincial Spatial Development Framework (PSDF) promotes the provision of electricity to all and supports economic development through sustainable green initiatives on a national scale. The PSDF also identifies the need to promote renewable energy, awareness on biodiversity and improvement through Public Participation. This is to be realised through a diverse range of clean energy options and to accelerate the construction of new electricity generation capacity, in accordance with the IRP2019, to meet the needs of the economy and address historical imbalances. The proposed upgrade of the 132 kV transmission lines and associated infrastructure will allow electricity, generated through renewable technology, to be evacuated from the Avondale Hybrid Solar project to the national grid.
(b) Urban edge / Edge of Built environment for the area	N/A - The proposed project falls outside of the urban edge.
(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	This is an existing 132 kV transmission line which has been in operation for 30 years. The proposed upgrading of the existing line would not impact on the IDP or SDF in any way.
(d) Approved Structure Plan of the Municipality	The proposed project entails transmission line infrastructure, which is compatible with the Local Economic Development (LED) which promotes job creation, skills development, green energy and enhancing the energy security by diversifying energy generation.

⁵ DEA&DP. 2011. Needs and Desirability Guideline.

<p>(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)</p>	<p>No, the approval of this application will not compromise the integrity of the existing environmental management priorities for the area as the upgrading of the transmission line will occur within the existing servitude. The proposed grid infrastructure can also be justified in terms of sustainability considerations, i.e. the generation of renewable energy which in context of the proposed Avondale Hybrid Solar project and associated infrastructure can be viewed as sustainable over a 20 year period.</p>
<p>(f) Any other Plans (e.g. Guide Plan)</p>	<p>N/A - No other plans are applicable to this application.</p>
<p>3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?</p>	<p>The Dawid Kruiper IDP lists renewable energy as one of the economic sectors identified to be a driver of economic development. Upington falls within the Northern Cape Solar Corridor and one of South Africa's Renewable Energy Development Zones (REDZs) – refer to Annexure I4 for REDZ map). The town experiences an ideal level of solar irradiation (power per unit area received from the sun in the form of electromagnetic radiation) for solar energy production.</p> <p>The SDF does not provide a timeframe associated with the activity being applied for, but the local 2020/2021 IDP does identify the promotion of renewable energy as a priority for the period. Renewable Energy projects have been prioritised in strategies at various municipal scales in the area. The Northern Cape Province aims to provide a “home” for Renewable Energy⁶.</p>
<p>4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)</p>	<p>Yes. The construction of the transmission line would facilitate the connection of the proposed Avondale Hybrid Solar project to the national grid. Without the proposed grid connection infrastructure, energy could not be evacuated from the Solar project and the development thereof would not be able to proceed.</p> <p>The need for renewable energy in South Africa is well documented and reasons for the desirability of solar energy include (but are not limited to), the following:</p> <ul style="list-style-type: none"> • utilisation of resources available to South Africa, • meeting nationally and appropriate emission targets in line with global climate change commitments; • enhancing energy security by diversifying generation; and • using renewable energy as a driver for local economic growth. <p>However, not only is the use of renewable energy suitable for South Africa at a strategic level. The local area in which the proposed Avondale Hybrid Solar project (and transmission line) are proposed will benefit the local community as well, through the creation of local employment and investment in local socio-economic development and enterprise development initiatives. The biophysical environment is typical of the arid environment that stretches across the Northern Cape. Through the many specialist assessments (Annexure D) very few environmental aspects were deemed to be considered sensitive. Furthermore, these sensitive areas will be avoided (as far as possible) during the detailed layout undertaken by the design engineers.</p>
<p>5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater</p>	<p>Yes. No municipal services (water, sewerage, electricity) will be required at the site, as the project contractor or appointed sub-contractor/s will be responsible for providing the necessary services to the site during the construction and decommissioning phases. The owner of the infrastructure during operational phases will be responsible for supplying</p>

⁶ Northern Cape Department of Economic Development and Tourism. 2012. Northern Cape Province Economic Potential and Investment Profile.

<p>for the development?</p>	<p>the necessary services during the operational/maintenance period and may sub-contract these services to appropriate private service providers as needed.</p> <p>Waste produced at the site will be collected and taken to an appropriate facility with sufficient capacity to accept the waste, for recycling, re-use, treatment or disposal (as appropriate). No municipal waste collection will be required at the site. Approximately 50m³ of waste will be produced per month during the construction phase. Negligible volumes of waste are expected during the operational phase.</p> <p>Should any need for other services arise the relevant authority will be communicated with, and the necessary approvals/ agreements obtained before proceeding.</p>
<p>6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?</p>	<p>This project proposes the upgrading of an existing 132 kV transmission line within the existing servitude. No additional services are required once the transmission line is operational – there will thus be no impact on infrastructure planning.</p> <p>Water, sanitation and electrical services required for the construction of the proposed grid connection infrastructure will be provided by the appointed contractor, and additional municipal services are not expected to be required for the proposed development (e.g. potable water will be trucked to site, waste water will be collected in conservancy tanks and transported to an appropriate wastewater treatment site, on-site generators will be utilised etc.).</p>
<p>7. Is this project part of a national programme to address an issue of national concern or importance?</p>	<p>Yes. The establishment of the proposed transmission line would strengthen the existing electricity grid for the area. Moreover, given that the development is an essential component of the Avondale Hybrid Solar project, the project would contribute towards meeting the national energy targets as set by the DoE in the 2019 IRP, of a share of all new power generation being derived from IPPs.</p> <p>The Industrial Policy Action Plan (IPAP, 2018/19 – 2020/21) recommends a sector focussed approach identifying key sectors with potential to be developed. The sectors identified in the IPAP document include green energy saving industries especially renewables. The proposed transmission line thus further facilitates the realisation of this development objective.</p> <p>The 2019 Integrated Resource Plan (IRP) developed by the DoE aims to achieve a balance between an affordable electricity price to support a globally competitive economy, a more sustainable and efficient economy, the creation of local jobs, the demand on scarce resources such as water and the need to meet nationally appropriate emission targets in line with global commitments”. The final IRP (2019) provides for an additional 14 400MW wind energy in the electricity mix in South Africa by 2030.</p> <p>In addition, please refer to point 4 above.</p>
<p>8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)</p>	<p>Yes. The proposed upgrading of the transmission line will be within the existing servitude which has carried a 132kV transmission line for 30 years. Furthermore, the proposed grid connection infrastructure provides the critical link from the proposed Avondale Hybrid Solar project to the national grid.</p>
<p>9. Is the development the best practicable environmental option for this land/site?</p>	<p>Yes. The proposed work will be done within an existing servitude which has been in operation for 30 years.</p>

	Therefore, the current proposal would not be out of place in the existing landscape.
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	Yes. The negative impacts for the proposed development are of very low to medium magnitude, local extent and long term and negligible to moderate (-) significance with mitigation. Therefore, the proposed developments impacts with mitigation measures are reduced and are considered to be acceptable. The proposed development would also enable positive impacts to be realised, largely through the support of the Avondale Hybrid Solar project through job creation, clean energy production, and reduction in reliance on fossil fuels. These positive impacts would be of low-medium (+) significance, without mitigation measures and low-high (+) significance with mitigation measures.
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	<p>The Dawid Kruiper Municipal area has a strong resource base that supports a variety of economic sectors, including the renewable energy industry. The area is generally suitable for these projects as the environmental sensitivity of the area, as well as the existing socio-economic benefits are considered low. This therefore reduces the opportunity cost. The IDP states that Uppington in particular is positioning itself to provide businesses and investors with prime locations for renewable energy plants. Economic clusters of solar photovoltaic manufacturing is at the forefront of this activity.</p> <p>While the above is relevant to renewable energy projects, it must be considered that this proposed project is simply for the upgrading of an existing aged transmission line within the same servitude. It is also noted that the project itself is unlikely to attract future similar development to the area – rather it is the excellent solar and wind resources of the area that may attract further similar renewable energy developments.</p>
12. Will any person's rights be negatively affected by the proposed activity/ies?	No. No juristic or person's right will be adversely affected as land use agreements have been negotiated with the relevant landowners.
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	No. The proposed development occurs outside the urban edge and within an existing servitude, therefore the urban edge will not be compromised.
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	<p>Yes, the project forms part of SIP 20: Energy.</p> <p>The project will also contribute indirectly, as the grid connection infrastructure will support the realisation of the Avondale Hybrid Solar project and because it relates to the transmission of electricity to the National Grid. The proposed projects will align with the following SIPS due to its relation to the renewable energy project:</p> <p>SIP 8: Green Energy in support of the South African economy</p> <p>SIP 9: Electricity generation to support socio-economic development</p> <ul style="list-style-type: none"> The proposed transmission line will extend the benefits felt by the proposed Avondale Hybrid Solar project by distributing the power to the national grid. <p>SIP 10: Electricity transmission and distribution for all</p> <ul style="list-style-type: none"> The proposed transmission line will contribute to expanding the transmission network.
15. What will the benefits be to society in general and to the local communities?	The need to improve the quality of life for all, and especially for the poor, is critical in the Dawid Kruiper LM area. It is expected that the proposed project together with the proposed Avondale Hybrid Solar project will

	<p>contribute directly to the upliftment of individuals through direct and indirect employment opportunities and the societies in which they live.</p> <p>The construction of the grid connection infrastructure will result in the creation of temporary employment opportunities, with the majority of unskilled and semi-skilled opportunities being available to members from the local community. Of greater significance, the development of the Avondale Hybrid Solar project will be associated with significant socio-economic benefits including direct and indirect job opportunities and skills development. The Avondale Hybrid Solar project and this associated transmission line upgrade will also create a demand for upstream and downstream goods and services (transport, worker accommodation, construction materials etc.) which will indirectly contribute to economic development. This proposed upgrading of transmission line infrastructure is required to connect the Avondale Hybrid Solar project to the national electricity grid. Without the proposed grid connection, it would not be possible to export the electricity generated by the solar project, and these developments would not be able to proceed – resulting in the substantial socioeconomic developments associated with the solar project being foregone. The proposed development is an essential component of the Avondale Hybrid Solar project and is essential to ensure that all socio-economic benefits associated with the solar project are realised (including direct and indirect job creation, skills development, local socio-economic development and the provision of renewable energy).</p>
<p>16. Any other need and desirability considerations related to the proposed activity?</p>	<p>If the proposed Avondale Hybrid Solar project, and this associated grid connection related project, is not constructed, the need for additional electricity supply will not decrease and a more sensitive part of the country's land and people could be negatively impacted.</p>
<p>17. How does the project fit into the National Development Plan for 2030?</p>	<p>The National Development Plan for 2030 aims to create jobs, develop and expand infrastructure, transition to a low carbon economy and unify South Africa. This project, along with the construction of the proposed Avondale Hybrid Solar project, will fit into the National Development Plan as follows:</p> <p><u>Create jobs:</u></p> <ul style="list-style-type: none"> • Both the proposed solar project and this proposed upgrading of transmission connection infrastructure will result in jobs for the construction phase and the operational phase. • Indirect opportunities for small businesses would be generated such as accommodation, food and service industries through the increased number of people travelling to the proposed area. • Many indirect jobs, such as the hospitality industry, transportation industry and manufacturing industry would also be created. <p><u>Infrastructure development and expansion:</u></p> <ul style="list-style-type: none"> • The Avondale Hybrid Solar project and grid connection infrastructure will assist in increasing the supply of electricity and thereby facilitate further expansion of the electrical network through additional capacity to help meet South Africa's current and future electricity demands. <p><u>Transition to a low-carbon economy:</u></p> <ul style="list-style-type: none"> • This project, together with the new solar project, is a renewable energy project and will result in the expansion of South Africa's renewable generation capacity.

	<ul style="list-style-type: none"> • These projects will help diversity South Africa’s energy portfolio. • Solar energy is a proven source of renewable energy and does not rely on carbon fuels. <p><u>Transformation and unity:</u></p> <ul style="list-style-type: none"> • Employment equity will be met through the Operation and Maintenance Project Company and the contractors responsible for the construction of the transmission lines, as set out in the requirements of the RMIPPPP Tender Process. • Economic development is one of the most important requirements of the RMIPPPP. The programme incorporates stringent requirements for investment in local economic development in various ways. Emphasising its importance, the economic development criteria is allocated a weighting of 30% in the bid evaluation scoring system, against 70% for the price. The seven criteria of the economic scorecard are job creation and local content, followed by local ownership and socioeconomic development, management control and enterprise development.
<p>18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.</p>	<p>The purpose of section 23 of NEMA is to promote the application of appropriate management tools in order to ensure the integrated environmental management of activities. Table 4-4 below lists the general objectives of integrated management and provides a motivation as to how the proposed development has taken the objectives into account.</p>

Table 4-4: Consideration of NEMA objectives

Section 23(2) of NEMA: The general objective of integrated environmental management is to:	Description as to how the proposed development has taken these general objectives into account.
(a) promote the integration of the principles of environmental management set out in section 2 of NEMA into the making of all decisions which may have a significant effect on the environment;	The underlying principle of this Basic Assessment process is to ensure that the development is socially, environmentally, and economically sustainable. This has guided the assessment of impacts of the project by Specialists to ensure that the project will be undertaken in an environmentally responsible manner. In recognition that social responsibility is something which needs to be actively developed, a public participation process (PPP) will be undertaken. This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information.
(b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;	This BAR includes the list of potential impacts associated with this project. Each aspect was evaluated to determine the significance of the impact and mitigation measures have been proposed to reduce negative impacts and to enhance positive impacts. The generic Environmental Management Programme (EMPr) has been updated to include the recommendations from the respective specialists to guide the construction and operational phases in an environmentally and socially sound manner (Refer to Annexure G).
(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.	Specialist studies were commissioned to ensure that specific impacts are adequately assessed and appropriate mitigation measures are proposed.
(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment.	The PPP that is undertaken for the proposed grid infrastructure is described in detail in Section 4 The PPP will be done in accordance with Regulation 41 of the 2014 EIA Regulations (GN R982 as amended) and the applicable best practise guidelines.
(e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment.	The locations for the 132kV transmission line upgrades were proposed once the specialists had been to site and had analysed their findings. The areas of environmental sensitivity (illustrated in the maps in Chapter 7) will be avoided in the layout determination. Detailed design of pylon placements will also take these sensitivities and buffer zones into account.
(f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.	Recommendations and mitigation/ enhancement measures for each of the impacts identified in Section 6 have been included in the Generic EMPr in Annexure G. The purpose of these recommendations is to minimise the disturbance to the environment, and enhance possible opportunities associated with locating the proposed development at this particular site. Where negative impacts are unavoidable, strict management and rehabilitation is recommended to minimise the potential negative impacts.

19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.

Section 2 of NEMA lists a number of principles that underpin the role of Sustainable Development and the consideration of environmental impact within the Act. These principles are critical to achieve Sustainable Development as it is important to find the balance between the competing demands for resources from the Economic system, the Social system, and the Ecological system. These principles are applicable to the “actions of all organs of state that may significantly affect the environment” and it is therefore crucial to apply them to the proposed development, for decision-makers to be confident that their decision to allow a development, promotes Sustainable Development.

The underlying principle of this BA process is to ensure that the development is socially, environmentally, and economically sustainable. This has guided the assessment of impacts of the project to ensure that the project will be undertaken in an environmentally responsible manner. Recognising that social responsibility is something that needs to be actively developed, PPP will be undertaken (as detailed above in Section 3.3). This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information. Furthermore, knowledge from I&APs will be included in all forms, including traditional or ordinary knowledge. The PPP and consultation with the directly affected landowners will also aim to improve environmental awareness in the area (Section 2(4)(h) of NEMA).

Key organs of state that may have interest in the project have been proactively identified, and an effort has been made to promote intergovernmental coordination as far as possible to reduce the potential for conflicts of interest, caused by lack of information or inappropriate communication channels. Proof of this correspondence is detailed in Section 3.3 and Annexure C.

Environmental management has been considered to place people and their needs at the forefront of its concern, aiming to serve their physical, psychological, developmental, cultural and social interests equitably (Section 2(2) of NEMA).

However, it is crucial that ecological considerations are also considered through this process and avoidance, minimising or rehabilitating measures are detailed for the disturbance of ecosystems and loss of biodiversity, pollution and degradation of the environment, disturbance of landscapes, and sites that constitute the nation’s cultural heritage, waste, and the use and exploration of non-renewable natural resources (Section 2(4)(a)(i-v) of NEMA). Where a negative impact is unavoidable, measures have been considered to remedy the disturbance and address the effects (Section 2(4)(p) of NEMA).

However, fortunately, this proposed development will occur within an existing transmission line servitude which is expected to lead to far fewer negative impacts (Section 2(4)(r)).

The nature of this BA process has been to undertake a risk-averse and cautious approach, and where relevant the worst case scenario has been assessed. Each specialist has detailed their methodology as well as their assumptions and limitations about their assessments, and these reports have been included in full in Annexure D. The specialists undertook their site visits July 2021. The findings of their investigations have been considered in determining the proposed layout of the grid connection infrastructure for this application. The findings of these assessments have been amalgamated into this BAR which have assessed the impact of this proposed development.

	<p>Should this BAR be granted a positive environmental authorisation, stringent environmental health and safety standards will be required. It will also acknowledge the right of workers to refuse work that is harmful to human health, or the environment, and be informed of any potential dangers (Section 2(4)(e & j)).</p> <p>In addition, this process has been undertaken in a manner that meets the principles and objectives of the South African legislation, and also meets global and international responsibilities relating to the environment by contributing to the renewable energy targets, and reducing the reliance on carbon heavy energy sources using fossil fuels (Section 2(4)(n)).</p>
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5 CONSIDERATION OF ALTERNATIVES

The NEMA requires that alternatives are considered during the BA process. An alternative can be defined as a possible course of action, in place of another, that would meet the same purpose and need (DEAT, 2004).

The DEA&DP Guideline on Alternatives (2013)⁷ states that: “every EIA process must identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives were found, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not proceeding, is required during the assessment phase. What would, however, have to be provided to the Department in this instance is proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the preferred option and the no-go option exist.”

The 2014 EIA Regulations (GN R982) (as amended) provide the following definition: “*Alternatives*”, in relation to a proposed activity, means different ways of meeting the general purpose and requirements of the activity, which may include alternatives to the -

- a) property on which or location where the activity is proposed to be undertaken;
- b) type of activity to be undertaken;
- c) design or layout of the activity;
- d) technology to be used in the activity;
- e) operational aspects of the activity; and
- f) includes the option of not implementing the activity (“No-Go” alternative).

The proposed project involves the application for environmental authorisation to upgrade an existing portion of the 132 kV Gardonia-Garona transmission line as part of the works required for connecting the new Avondale Hybrid Solar project to the grid.

It should be noted that the nature and extent of the proposed project does not lean itself toward the consideration of location alternatives, as this would subsequently lead to larger social and environmental impacts. Likewise, it is not feasible to consider alternative types of activities as the objective of the project is to construct a 132 kV transmission line which is required to connect the new Avondale Hybrid Solar project to the National Grid.

The following alternatives **were initially** considered for the project in the 1st Draft BAR, **but have subsequently been found to be unfeasible and are no longer part of the project**, with the exception of the no-go option:

- 1) **Alternative 1 (preferred):** Replace the existing lattice structures with monopole structures at the same locations i.e. pylon placements remain the same. Only 88 pylons would have to be rebuilt.
 - a. Removing the existing lattice structures and replacing them with monopole structures at the same locations is not feasible within the available construction period Eskom is able to hand the line over to the contractor. By first dismantling the existing lattice structures before constructing the new monopole structures, the downtime of the power line (i.e no electricity supply) will exceed what Eskom can accommodate. While this particular power line is not currently used to permanently to supply power to the surrounding areas, it is used

⁷ This guideline has been used as a best practice tool since it is the most recent guideline on alternatives.

intermittently when required. For the above reasons this alternative is no longer being considered.

- 2) **Alternative 2:** Construct a new 132 kV monopole transmission line to the south of, and parallel to, the existing line. A 31 m wide corridor has been identified for the potential construction of a new line should this alternative have to be implemented pending technical feedback from Eskom; and
 - a. Constructing a new 132kV monopole line parallel to and directly south of the existing line is not feasible due to costs and time constraints associated with acquiring new land use rights. Considering that the project forms part of the governments RMIPPPP the time constraints associated with this alternative is un acceptable and therefore deems it unfeasible
- 3) **No-Go option**

The following alternatives are therefore being considered as part of the project in this 2nd Draft BAR and are discussed in more detail further in the Chapter:

- 1) **Alternative 1 (preferred):** Upgrade the transmission line by constructing new monopole structures along the existing centreline (lattice structures to be removed); and
- 2) **No-Go option:** No change to existing line

The start and end points of the transmission lines will be the same for both alternatives, namely the Gordonia substation and the new Avondale Hybrid Solar project.

5.1 Alternative 1 (preferred)

Removing the existing lattice structures (shown in Figure 4-1) and upgrading them with monopole structures (illustrated in Figure 4-2) along the existing centreline is proposed as the preferred alternative. New pylons would avoid all sensitive areas identified by the specialist team.

The proposed new monopole structures will be constructed along the existing centreline and thus inside the registered servitude, however the location of the structures will be different to the existing structures. Placing the new monopole structures at new locations (avoiding sensitive areas) will allow the contractor to finish construction within the available timeframe. It means that the contractor can construct the new foundations, transport parts to site and start assembly of new pylons at each location, prior to Eskom line handover/shutdown. When the line is handed over to the contractor, the old line and existing lattice structures can be taken down and the new monopole structures can be fully assembled and erected, and the line can be strung. The old lattice structure and its foundations will be completely removed from site, appropriately disposed of and rehabilitated as per EMPr requirements.

Many of the existing lattice structures are located inside aquatic features as delineated by the aquatic specialist and the proposed upgrade of the line will ensure that the structures are removed from these sensitive areas.

5.2 Routing Alternative for transmission lines

The start and end points of the transmission lines will be the same for both alternatives, namely the Gardonia substation and the new Avondale Hybrid Solar project.

Alternative 1 (preferred alternative) will see the upgrading of the existing 30-year-old 132 kV transmission line within the existing servitude along the same centreline. This alternative will not require any new access or construction roads as the existing roads have been deemed sufficient for construction purposes.

Figures Figure 7-1 to Figure 7-5 in Chapter 7 illustrate the layout of Alternative 1 and provide a closer view of the existing transmission line.

The no-go alternative does not have any routing alternatives as the line will remain as is.

5.3 No-Go Alternative

The assessment of alternatives must always include the “no-go” option as a baseline against which all other alternatives must be measured. The no-go option represents the status quo which normally presents the option of not implementing the activity. The assessment of the No-Go is a requirement of NEMA but also considered a global best practice. This assessment can provide a baseline scenario against which the project (or its alternatives) can be compared. However, the no-go in this instance would be to use the existing aged transmission line as is, possibly subject to a full condition assessment, to retain the Wolf Conductor and to install ADSS between Gardonia and Avondale. This has been deemed a high risk by Eskom and the developer as this 30 year old line is unreliable and in dire need of an upgrade to the latest technology. The No-Go Alternative (i.e. using the existing 30 year old transmission line) would result in an unreliable transfer of electricity from the new Avondale Hybrid Solar project to the National Grid.

6 BASELINE ENVIRONMENT AND ENVIRONMENTAL IMPACT ASSESSMENT

The description of the affected environment provided below draws on existing knowledge from published data, previous studies, site visits to the site and surround area, specialist studies and discussions with various role players.

The high-level identification of potential impacts which may occur as a result of the proposed activities described in Chapter 4 above is broad and covers the four phases of the project (i.e. pre-construction, construction, operation and decommissioning). Cumulative impacts have been assessed per environmental aspect in the BAR and by specialists.

Impacts of negligible significance have been screened out, to ensure that the BA is focused on the potentially significant impacts only. The following environmental aspects are further discussed in this chapter below:

- Climate
- Agricultural production, potential and soils
- Terrestrial and Aquatic ecology
- Avifauna
- Heritage and archaeology
- Palaeontology
- Socio-economic aspects
- Visual landscape
- Electromagnetic Interference (EMI)
- Civil Aviation Authority and Obstruction Limitation Surface Assessment

The specialist assessments conducted as part of the BA process have been included as Annexure D to this report. Annexure D also includes the required biodiversity compliance statements as compiled by the relevant specialists.

IMPORTANT NOTE: Note that the botanical, aquatic, avifaunal and visual specialists have all submitted statements to supplement their studies as their assessments considered the alternatives in the 1st Draft BAR. The statements relate to the change in the project description and updated project alternatives.

6.1 Regional context

The 132 kV transmission corridor runs from the outskirts of Upington, the main urban area in the region, in an easterly direction near to the N14 national highway (approximately 200 m at the closest point). The area surrounding Upington represents a transition zone between the Nama Karoo and Savanna biomes with the route traversing two main vegetation types, namely Kalahari Karroid Shrubland (NKb5) and Gordonia Duneveld (SVkd). Refer to Figure 6-1. Kalahari Karroid Shrubland, generally associated with the Nama Karoo extends towards the south, while Gordonia Duneveld is mostly associated with dunes in an arid Savanna biome and extends northwards to the Kgalagadi Transfrontier Park. The region is relatively flat, interspersed with dunes, gravel patches and rocky hills and is characterised by low levels of annual rainfall and aridity. The Gariiep (Orange) River flows past Upington and provides an important source of water and supports agricultural practices along its banks, such as the growing of vineyards and viticulture.

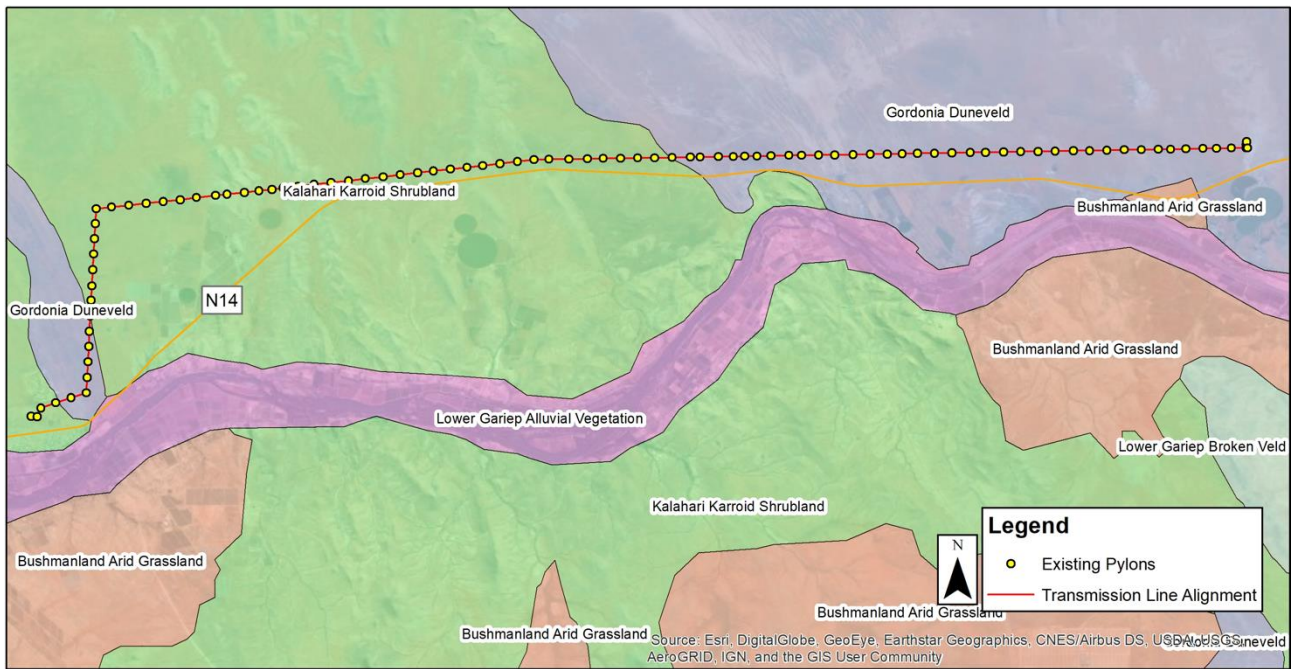


Figure 6-1: Vegetation units related to the project area

6.2 Local context

The majority of the transmission corridor comprises red sandy plains typical of the Kalahari and Bushmanland Bioregions with dominated by a mix of extensive grasses, shrubs and scattered thorn trees. Some parts of the transmission corridor contain sandy dunes while smaller sections of gravel occur in patches among the grasses and scrub, particularly near rocky outcrops and hills. Very few drainage lines occur along the power line route.

6.3 Climate

The Northern Cape and specifically the DKLM area, is known for its harsh climate, typically of a semi-desert area such as found in the central and northern sections of the province. The Kalahari semi-desert area forms a large part of the Municipal area (Savannah Biome), with only the southern sections in the transition zone to the Nama-Karoo Biome.

The average rainfall is between 150 to 250mm per annum for most of the municipal area, with the northern and north-eastern sections receiving between 200 to 300mm per annum. Upington serves as an example of the climatic conditions of the area and the table below indicates the average figures taken from 1961 to 1990⁹. Although Upington is located more to the south of the municipal area, but it serves as a good example for most of the DKLM.

Rainfall within the DKLM area is highly seasonal, with most rain occurring during the summer period (October to April). The peak rainfall months are February and March. Rainfall generally occurs as convective thunderstorms and is sometimes accompanied by strong wind and hail.

The mean annual rainfall over the Molopo and Kuruman catchments decreases fairly uniformly, from more than 500 mm in the east (upper Molopo catchment) to approximately 150 mm in the vicinity of the Orange River confluence. In the Nossob and Auob catchments, mean annual rainfall decreases in a southerly direction and varies from about 400 mm in the upper Nossob catchment to less than 200 mm at the confluence with the Molopo River.

Table 6-1: Upington average climatic information from 1961 to 1990 (Dawid Kruiper LM SDF, 2018)

Month	Temperature (° C)				Precipitation		
	Highest Recorded	Average Daily Maximum	Average Daily Minimum	Lowest Recorded	Average Monthly (mm)	Average Number of days with >= 1mm	Highest 24 Hour Rainfall (mm)
January	42	36	20	10	24	4	33
February	42	34	20	9	35	6	59
March	41	32	18	5	37	6	46
April	38	28	13	2	26	5	52
May	34	24	8	-2	10	2	26
June	29	21	5	-5	4	2	13
July	29	21	4	-6	2	1	7
August	33	23	6	-7	4	1	40
September	39	27	9	-2	4	2	19
October	40	30	13	2	9	3	22
November	41	33	16	5	17	3	51
December	43	35	19	6	17	4	42
Year	43	29	13	-7	189	37	59

6.4 Geology and soils

Most of the area of DKLM is relatively flat with shallow valleys and dry drainage lines, especially in the southern sections. The central and northern sections are characterised by the Kalahari sand dunes which is so unique to this specific area. Dunes are associated with the arid environment of the Kalahari and occurs in the most of DKLM, it also has an interesting and ancient geological heritage, rich in minerals and palaeontological artefacts. The DKLM area is located on the great African plateau, which formed part of the ancient continent of Gondwanaland that formally included eastern Brazil, southern India, Western Australia and Antarctica. The general surface geology of the area is either:

- a) Exposed metamorphic rocks originating mostly from intrusive rock;
- b) Thick sand and alluvium;
- c) Sedimentary rocks and/or sand (Karoo Sediment) and
- d) Folded sedimentary and volcanic rocks.

The geology can be summarised as characterised by metamorphosed sediments and volcanic activity, intruded by granites and is known as the Namaqualand Metamorphic Province. The soils are mostly reddish, moderately shallow, sandy, and often overlay layers of calcrete of varying depths and thickness. Furthermore, a large proportion of the Municipality falls in the Ghaap Plateau physical geographical region.

The Ghaap Plateau is a higher lying, pre-Karoo surface with its main physiographic element being the surface of dolomite that gives the form to the plateau. The plateau is separated from the Postmasburg plain by the Langeberg-Koranna ranges which are made up out of Matsap quartzites that form the boundary of the Kalahari to the west. The Ghaap Plateau is a roughly triangular limestone area. There are strong limestone springs on the western side of the plateau.

6.5 Botanical Environment

Zutari appointed Dr Dave McDonald from Bergwind Botanical Surveys and Tours to conduct a botanical assessment of the proposed project route, with specific emphasis being on the power line pylons and their impact on the flora and vegetation found along the route. The purpose of the botanical assessment is to inform the environmental assessment process on (a) the level of disturbance within the existing transmission line servitude and (b) to determine any constraints and mitigation measures that should be implemented to conserve the vegetation and flora (sensitivity analysis) that would then inform the overall basic assessment process.

Note: The specialist assessment originally considered the alternatives included in the 1st Draft BAR and has therefore subsequently provided a statement that the change in the project description does not impact or change the outcome of the assessment. The statement is included with the specialist report annexed.

6.5.1 Baseline

The terrain varies along the length of the power line route with mostly 'flat' to shallowly undulating topography. In a few places there are dunes of red Kalahari Group sand. The 'red dunes' are found in the east but are not prominent at any point along the route. Where they occur, they are low but have relatively stable sand and support plant species typical of Kalahari dunes (Figure 6-2 - Figure 6-4). The red sand is coloured by each grain having a coating (pellicule) of ferric (iron) oxide. In circumstances of reduction of the oxide and / or by attrition when the sand is 'reblown', this coating is lost and the sand grains appear yellow.



Figure 6-2: A typical red sand dune with Gordonia Duneveld. The tree is *Vachellia haematoxylon* (grey camelthorn) that is commonly found on these dunes. The grasses are also species typical of these dunes



Figure 6-4: The grasses seen on the red dune here are mainly *Stipagrostis amabilis* and *Eragrostis trichophora* that are diagnostic of dune crests



Figure 6-3: The flats are either areas that may be described as 'gravel plains' or sandy flats (red sand) with shallow soil over bedrock

In addition, seasonal shallow 'washes' are present in some places. These washes are non-perennial and only run with water for brief periods after rain.

Disturbance regime:

The 'study area' along the power line route has been grazed by livestock (cattle and sheep) over a long time. A few sheep and cattle were present at the time of the survey. Disturbance caused by these animals

was recorded as relatively minor with trampling occasionally occurring at the base of pylons or at camp gates. No overgrazing was noted.

A two-spoor track created and used by Eskom is found along the power line route. In some places it has become overgrown whereas in other places, as at Portion 36 of UAP 418, the vegetation has been cleared completely to make 'roads'. Some of the servitude tracks are also used as farm roads.

It is the policy of Eskom to clear tall shrubs and trees in the servitude under the power lines (see Appendices 3 & 4 of the Botanical Assessment in Annexure D). This is done to ensure that if there are wildfires under the power lines, no flash-over would occur from ionized air resulting from fires under the power lines.

Vegetation:

Gordonia is a magisterial district and division in the Northern Cape Province is the largest magisterial district in South Africa. Formerly known as Koranaland, it was renamed after Sir Gordon Sprigg, who was Prime Minister of the Cape Colony four times between 1878 and 1902. Gordonia lies in the far north of the Northern Cape Province and a large part of this area comprises dunes composed of sand of variable colour, either yellowish, greyish or red.

Upington and its outlying districts lie in the southern part of Gordonia and the two vegetation types that occur in the study area of the power line route east of Upington are, Gordonia Duneveld and Kalahari Karroid Shrubland. Gordonia Duneveld is a member of the *Kalahari Duneveld Bioregion* of the Nama Karoo Biome and Kalahari Karroid Shrubland is a member of the *Bushmanland and West Griqualand Bioregion*, within the Savanna Biome (Rutherford *et al.* 2006; Mucina *et al.* 2006; in Mucina & Rutherford eds. 2006). These two vegetation types interleave and often share the same plant species. Refer to (Figure 6-).

Site specific details of the vegetation found at the respective waypoints on the farms are given in Tables 1—9 in the Botanical Assessment. Please refer to Annexure D for more detail.

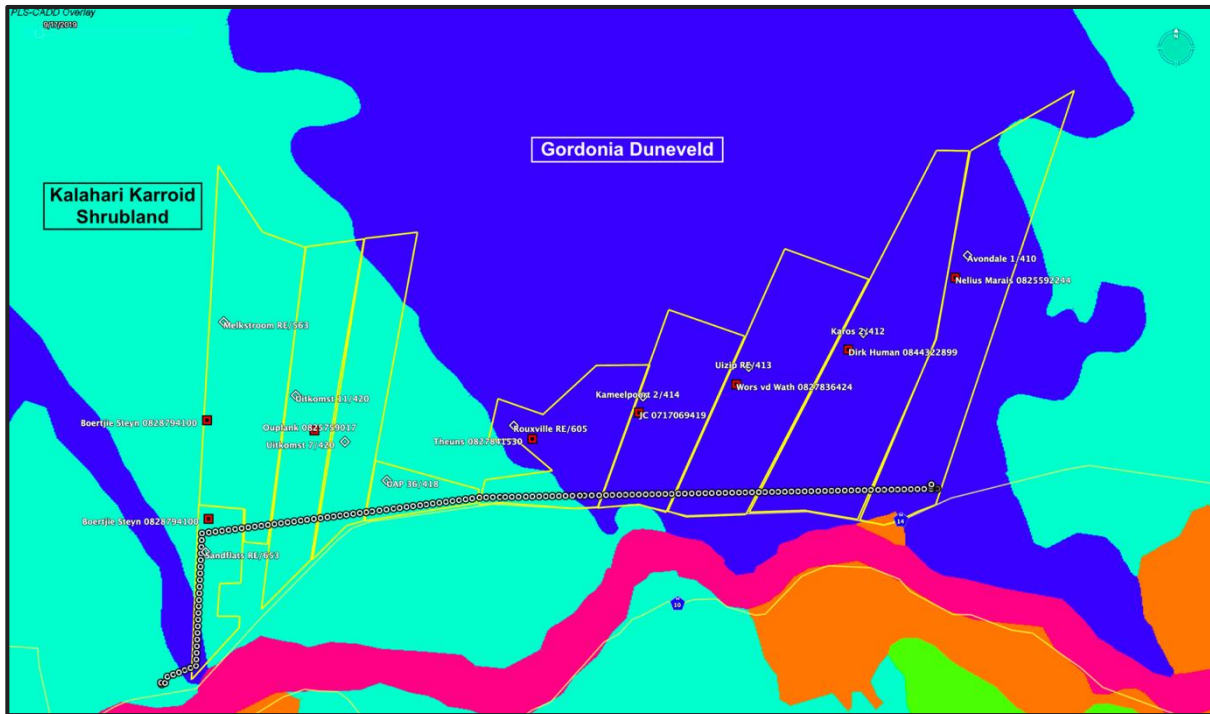


Figure 6-5: Portion of the Vegetation Map of South Africa, Lesotho & Swaziland (Eswatini) (SANBI, 2018). Indicating that the existing power line route (dotted line) traverses two vegetation types: Gordonia Duneveld and Kalahari Karroid Shrubland

Gordonia Duneveld:

Gordonia Duneveld is almost at its southern limit in the study area and is mostly found in the eastern part on the farms Avondale, Koras, Uizip, Kameelpoort and part of Rouxville. Red dunes are not well developed except on Uizip. In most of the other areas to the west, the terrain is flat to undulating but it is the moderately deep dune sand that determines the expression of the vegetation. At Rouxville there is a gradual transition to Kalahari Karroid Shrubland. Gordonia Duneveld is encountered again at the southern end of the north-south part of the power-line route where it crosses a tongue of red Kalahari dune sand, supporting Gordonia Duneveld.

Kalahari Karroid Shrubland

Kalahari Karroid Shrubland is found on shallow, rocky soils found mostly in the western part of the study area on the farms Rouxville, UAP (Aquila), Uitkomst, Melkstroom and Sandflats, except for the southern part of the powerline route.

6.5.2 Site sensitivity

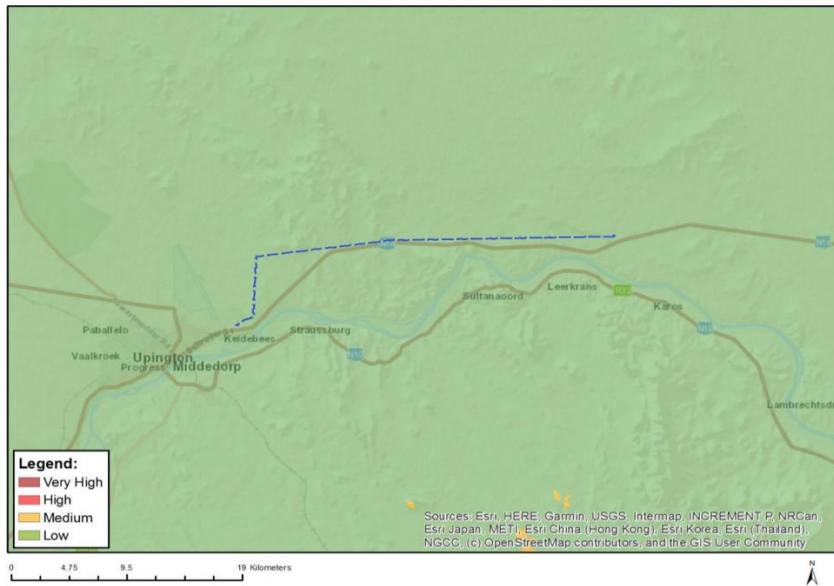
The National Web-based Screening Tool was applied and indicates that for the Relative Plant Species Theme Sensitivity, the sensitivity is LOW (Figure 6-6). The data collected in this study support this level of sensitivity. The Relative Terrestrial Biodiversity Theme Sensitivity, is partly HIGH, coinciding with the Gordonia Duneveld and partly LOW, coinciding with Kalahari Karroid Shrubland (Figure 6-7). Field observations do not support the high level of biodiversity as mapped in Figure 6-7.

Only one Red List species (i.e. species of conservation concern or SCC) was encountered on the power line route, namely *Hoodia officinalis* subsp. *officinalis* (Figure 6-5) (Bruyns, 2005) and the status is **Near Threatened** (Raimondo *et al.* 2009).



Figure 6-5: Flowering branches of the low-growing succulent shrub, *Hoodia officinalis* subsp. *officinalis* (Family: Apocynaceae)

MAP OF RELATIVE PLANT SPECIES THEME SENSITIVITY



Where only a sensitive plant unique number or sensitive animal unique number is provided in the screening report and an assessment is required, the environmental assessment practitioner (EAP) or specialist is required to email SANBI at eiadatarequests@sanbi.org.za listing all sensitive species with their unique identifiers for which information is required. The name has been withheld as the species may be prone to illegal harvesting and must be protected. SANBI will release the actual species name after the details of the EAP or specialist have been documented.

Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
			X

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity

Figure 6-6: Extracted map from the National Web-based Screening Tool report for the power line route (dotted blue line) to the Relative Plant Species Theme Sensitivity. The sensitivity is rated as LOW

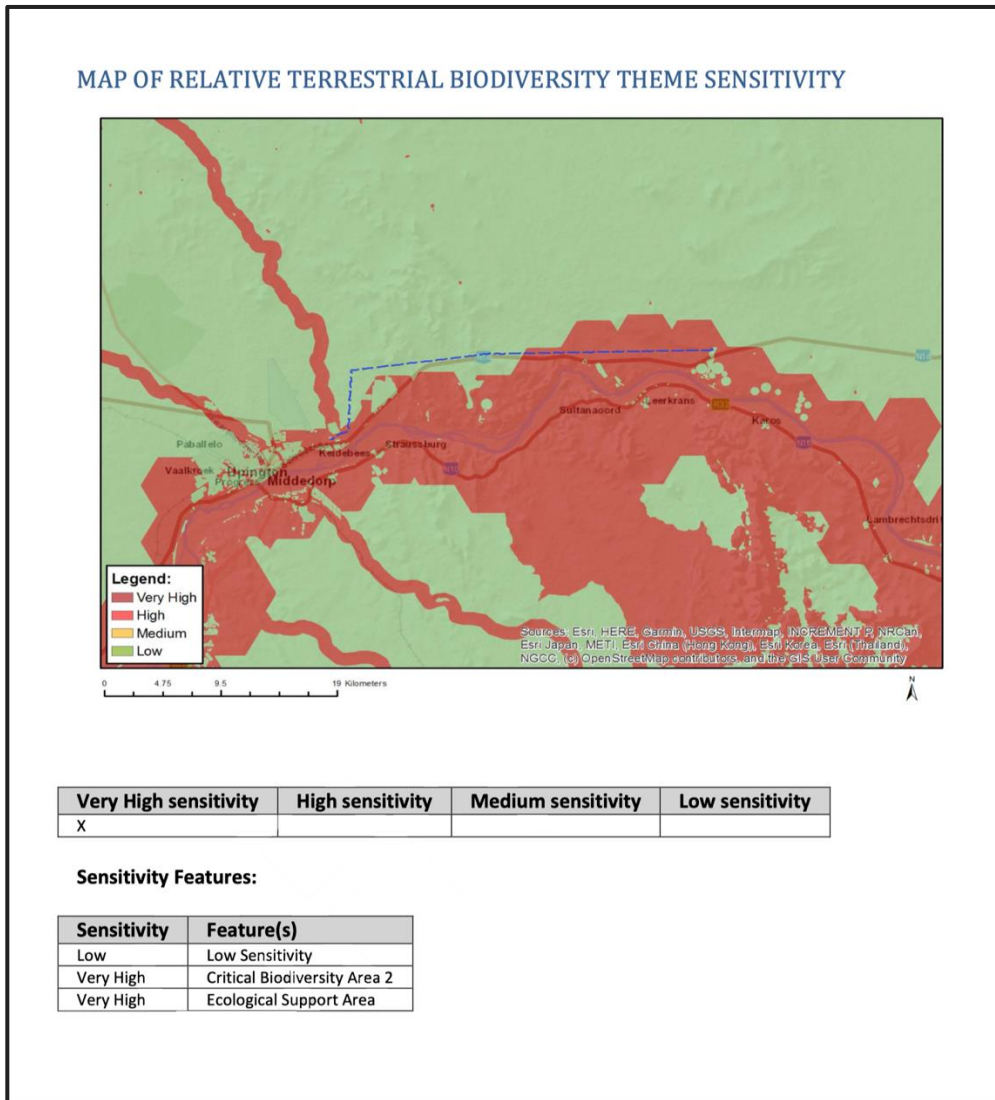


Figure 6-7: Extracted map from the National Web-based Screening Tool report for the power line route (dotted blue line) for the Relative Terrestrial Biodiversity Theme Sensitivity. The sensitivity is rated as in the area that coincides with Gordonia Duneveld (red)

An overlay on Google Earth™ imagery of the critical biodiversity map for the Northern Cape Province (E. Oosthuizen pers. comm.) (Figure 6-8) shows that the eastern part of the power line route traverses an area classified and mapped as Critical Biodiversity Area 2 (CBA2) and a smaller section crosses an Ecological Support Area (ESA). The impact of the proposed new pylons and power line is unlikely to result in any further negative impact in these areas even where, according to the map in Figure 6-8, the biodiversity is considered to be high.

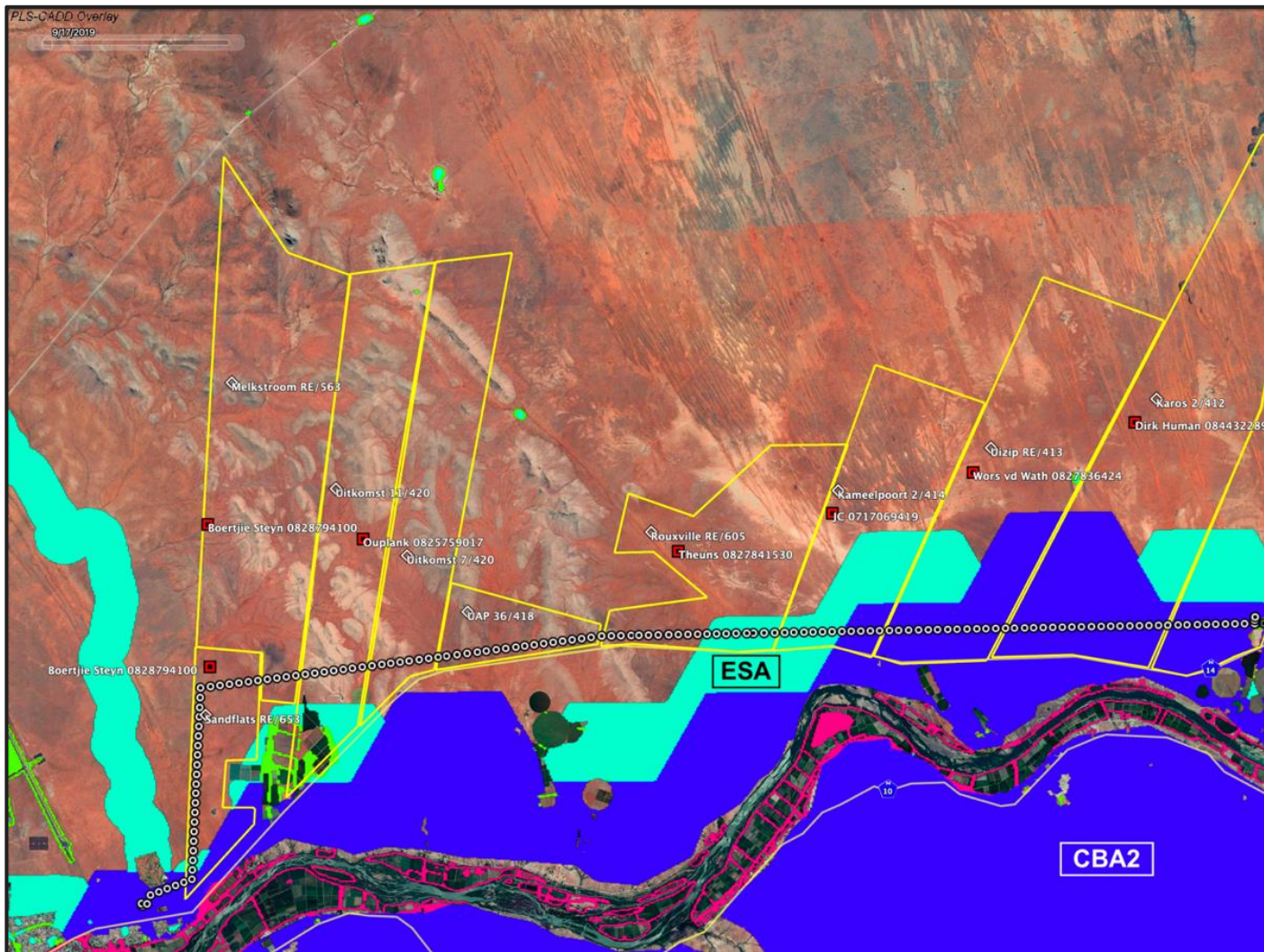


Figure 6-8: Overlay of the Critical Biodiversity Map for the Northern Cape Province (on Google Earth™) on the farms traversed by the power line

6.5.3 Impact assessment

Direct impacts would be the minimal loss Gordonia Duneveld and Kalahari Karroid Shrubland. The proposed development is a linear development so would not have a high aerial footprint. In addition, the Eskom servitude is in place and has been managed for many years, that has already resulted in a moderate level of negative impact. Further negative impacts would thus be of low significance.

These impacts are discussed in the below impact description tables.

Project phase	Construction	
Impact	Loss of vegetation type: Gordonia Duneveld	
Description of impact	Loss of natural Gordonia Duneveld vegetation and habitat due to development of the 'new' power line infrastructure, both in the construction and operational phases	
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	<ul style="list-style-type: none"> The active mitigation is to avoid disturbance of the red sand dune on the farm Uizip. Apart from this being unstable sand and moderately sensitive habitat, the landowner is also particularly concerned about disturbance if this habitat. 	

	<ul style="list-style-type: none"> The passive mitigation would be to clean each pylon construction site and then leave it to let nature take its course. The grass seed in the soil will germinate and the 'white grasses' as described will colonize the disturbed sites. That will create conditions for shrubs to grow as well. No seed of foreign grass species or other foreign 'rehabilitation species' should be introduced at any of the construction sites. In addition, if any plant of mesquite (<i>Prosopis glandulosa</i> subsp. <i>torreyana</i>) are found post-construction, they should be removed. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	<p>Gordonia Duneveld is not a species rich vegetation type, and the pattern of the vegetation is repetitive and uniform over extensive areas. Within the power line route study area, there are not many true dunes but rather areas of deep red dune sand. The high level of uniformity must be stressed since if one analyses the plant species composition at the respective pylon sites as provided in the descriptive tables, the same species occur repeatedly. In addition, none of the species are species of conservation concern (SCC) or Red List species. Based on this, it is concluded that there would be minor negative impacts on Gordonia Duneveld vegetation</p>			

Project phase	Construction	
Impact	Loss of vegetation type: Kalahari Karroid Shrubland	
Description of impact	Loss of natural Kalahari Karroid Shrubland due to development of the 'new' power line infrastructure, both in the construction and operational phases	
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	<ul style="list-style-type: none"> The active mitigation is to avoid disturbance of the red sand dune on the farm Uizip. Apart from this being unstable sand and moderately sensitive habitat, the landowner is also particularly concerned about disturbance if this habitat. The passive mitigation would be to clean each pylon construction site and then leave it to let nature take its course. The grass seed in the soil will germinate and the 'white grasses' as described will colonize the disturbed sites. That will create conditions for shrubs to grow as well. No seed of foreign grass species or other foreign 'rehabilitation species' should be introduced at any of the construction sites. 	

	<ul style="list-style-type: none"> In addition, if any plant of mesquite (<i>Prosopis glandulosa</i> subsp. <i>torreyana</i>) are found post-construction, they should be removed. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	<p>The Kalahari Karroid Shrubland occurs mainly in the western part of the power line route study area and is on shallow soils over rocky subsoils. Approximately 90 % of the plant species encountered in Gordonia Duneveld along the power line route are found in the areas mapped as Kalahari Karroid Shrubland. In essence, this indicates that the Gordonia Duneveld within the study area is mostly transitional to Kalahari Karroid Shrubland, and the driving ecological factor is the depth of sandy soil. As for Gordonia Duneveld, the Kalahari Karroid Shrubland is not rich in plant species and consequently has a low index of biodiversity sensitivity as indicated in the map generated by the National Web-based Screening Tool. The impact of the proposed construction and operation of the 'new' power line as it would affect Kalahari Karroid Shrubland, would be minor negative.</p>			

6.5.4 Conclusion and recommendations

The overall conclusion is that the receiving environment is not sensitive from both a strictly vegetation type / species richness viewpoint as well as from a terrestrial biodiversity perspective. Since there has been a moderate to high level of disturbance along the entire route over a long period, due to Eskom maintenance activities, the vegetation is not 'pristine'. At the same time, the disturbance has not been at an intensity that it has caused ecological disruption and consequent loss of plant species. The areas are also grazed and the most heavily impacted area from grazing by cattle is in the area west of Sandflats as the power line route approaches the Gordonia Substation. But even in this area, the vegetation would easily restore if it is rested from grazing.

Only one plant of *Hoodia officinalis* subsp. *officinalis* was found during the survey. The coordinates of the plant were recorded. Should there be the need to disturb this plant, it should be removed and transplanted in similar habitat nearby that would not be affected by the power line project. One plant of *Euphorbia braunsii* was found (it is Least Threatened) and this plant should also be moved and transplanted to a suitable site.

It should be noted that permits would be from the Department of Environment and Nature Conservation for vegetation clearing and moving of any protected plants. Fortunately, no specimens of the protected trees species, *Boscia albitrunca* (witgat; shepherds' tree) were found at sites where construction is anticipated. If, by chance, any tree of this species must be disturbed in any way, a permit in terms of the National Forest Act of 1998 (Act No. 84 of 1998) would have to be obtained from the Department of Forestry, Fisheries and the Environment.

Given the low sensitivity of the receiving environment and the anticipated low to very low negative impacts from the proposed project, it is completely supported from a botanical perspective.

6.6 Aquatic Environment

EnviroSci (Pty) Ltd was appointed by Zutari to conduct an aquatic impact assessment for the upgrading of the Avondale-Gardonia 132 kV transmission line project. This was based on a site visit conducted in June 2021..

Note: The specialist assessment originally considered the alternatives included in the 1st Draft BAR and has therefore subsequently provided a statement that the change in the project description does not impact or change the outcome of the assessment. The statement is included with the specialist report annexed.

6.6.1 Assessment results

The assessment included the delineation of any natural waterbodies within the affected properties as well as assessing the potential consequences of the proposed corridor on the surrounding watercourses and wetlands.

The proposed development occurs within the D73E catchment associated with alluvial systems of the Nama Karoo ecoregion. These mainstem watercourses are short tributaries of the Orange River (ca. 1 to 7 km from any given point within the study area), which are ephemeral in nature and only contained one wetland element within the proposed alignment corridor, namely a small depression (pan) 0.5 ha in size. The small depression can be avoided/spanned by the development activities as the towers could easily be placed outside of this system. Refer to Figure 6-9.

Overall, these drainage systems and the pan, are largely in a natural state, when compared the Orange River, which has modified floodplains and flows. Current and existing impacts occur in localised areas within the corridor and includes existing tracks and evidence of grazing (small livestock).

The National Wetland Inventory v5.2 spatial data (NWI), confirmed the presence of the pan, while other wetlands contained in that spatial database were confirmed to be more than 1km from the corridor assessed. The potential presence of the pan observed, resulted in the portion of the corridor in which the pan is located to receive a Very High Aquatic sensitivity rating in the DFFE Screening Tool, thus requiring the submission of an Aquatic Biodiversity Specialist Assessment and not an Aquatic Biodiversity Compliance Statement. The remainder of the corridor was rated as Moderate sensitivity with regard the aquatic environment.

In terms of the National Freshwater Ecosystems Priority Areas (NFEPA) assessment, all the systems within the corridors have been assigned a condition score of AB (Nel et al. 2011), indicating that they are largely intact and perform an ecological function. However, the corridor systems are ephemeral and only carried water for a short periods as previously mentioned, thus the observed systems do not support wide riparian zones and the vegetation associated with these watercourses were between 0.65 m and 18 m wide and contain mostly terrestrial species.

Twenty two woody plant species were found associated with the riparian and pan system within the corridor. Although none of these were obligate or facultative river/wetland species, they do show a preference for areas exposed to runoff. Species outside of the corridor were dominated by *Vachellia erioloba* (Camel Thorn, Kameeldoring), *Vachellia haematoxylon* (Grey Camel Thorn), *Boscia albitrunca* (Shepard's Tree) and *Euclea pseudebenus* (Ebony Tree), all protected under the National Forest Act and NEMA Biodiversity Act.

The few grass or forbs species were successfully identified were all associated with the regional vegetation type, namely Kalaharia Karroid Shrubland (NKb5) and Gordonia Duneveld (SVkd 1).

The only obligate wetland plants observed were those found along the Orange River itself. Species observed included *Typha capensis*, *Phragmites australis*, *Prosopis glandulosa* and *Cyperus marginatus*. Notably the prevalence of *Prosopis*, an alien invasive tree species had increased between 2010 and this survey within the sites that had been visited previously by this report author. However, none of the project components would affect these species or habitats that they occur in, both from a hydrological and physical disturbance standpoint.

The National Freshwater Ecosystems Priority Areas (NFEPAs) (Nel *et al.*, 2011), also earmarked sub-quaternaries, based either on the presence of important biota (e.g. rare or endemic fish species) or conversely the degree of riverine degradation, i.e. the greater the catchment degradation the lower the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas (FEPAs). The corridor falls within a Fish FSA (Fish Support Area or Fish Sanctuary) and an Upstream FEPA, all associated with the Orange River. Although no permanent fish habitat occurs within the proposed development corridor, The FEPAs and Fish Sanctuaries are sub-quaternary catchments that are required to meet biodiversity targets for threatened and near threatened fish species indigenous to South Africa. Furthermore, Fish sanctuaries in sub-quaternary catchments associated with a river reach in good condition (A or B Ecological Category) were selected as FEPAs; the remaining fish sanctuaries became Fish Support Areas.

Fish Support Areas and Upstream FEPAS include sub-quaternary catchments that are important for migration of threatened and near threatened fish species or include support catchments (hydrological, sediment or nutrient input). Thus, these reaches need to be maintained in a condition that supports the associated populations of threatened fish species, which need not necessarily be an A or B ecological category

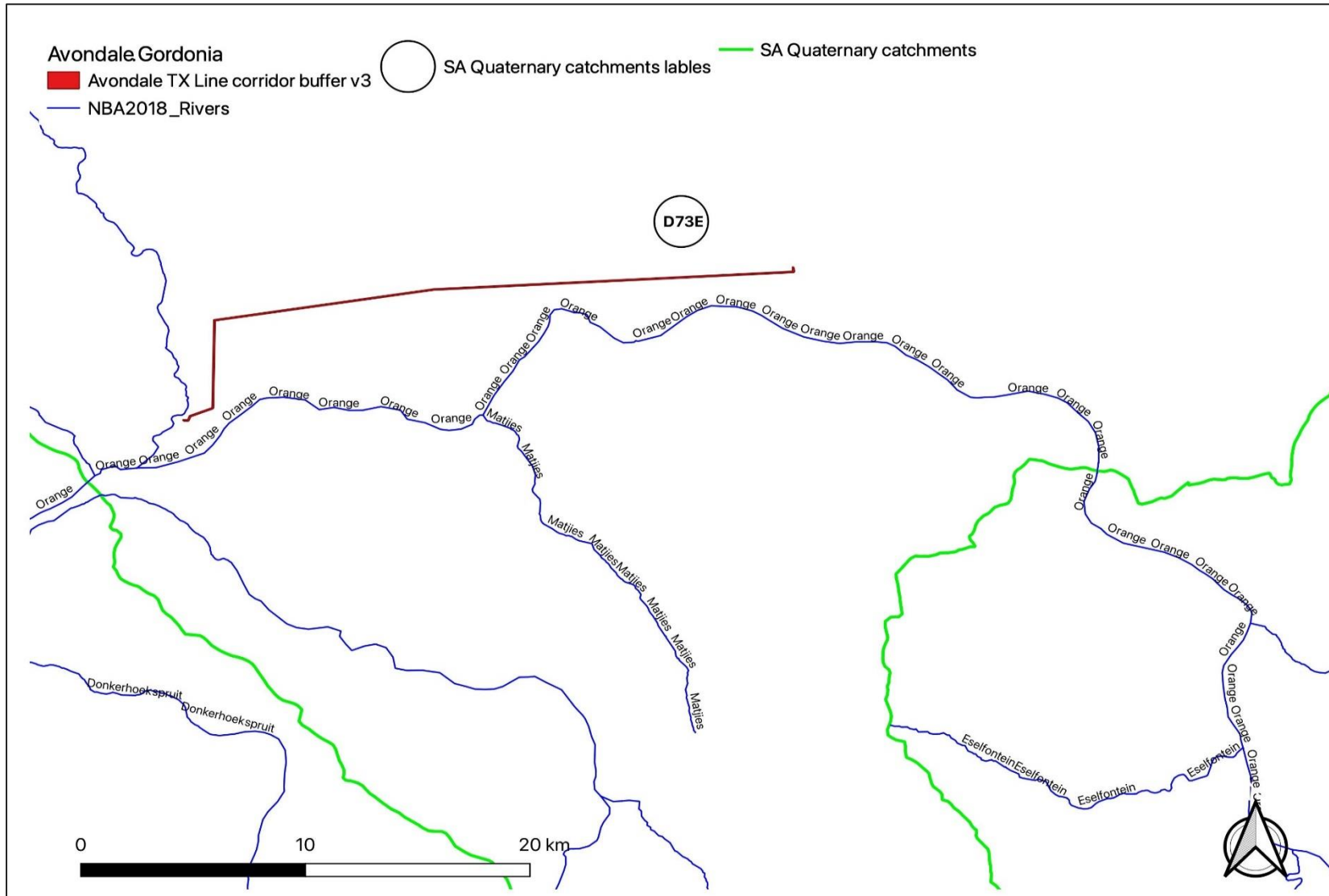


Figure 6-9: Project locality map indicating the various quaternary catchment boundaries (green line) in relation to the grid corridor (Source DWS and NGI)

The Present Ecological State scores (PES) for the corridor systems were rated B – largely natural, and High Ecological Importance and Sensitivity (EIS) and for this reason the portions of the proposed corridor were included as a Critical Biodiversity Area Type 2 and Ecological Support Areas as shown in the Northern Cape CBA map.

The pan / depressions (< 0.5 ha) received a PES score of B, and EIS score of Medium. The score (PES = B) was due to the effect of grazing / trampling by animals searching for shade or water.

The PES and EIS scores were then translated in the respective sensitivity ratings of the various aquatic systems (Very High to Moderate), and used to prepare a sensitivity map, that will be used in guiding the preparation of the alignment and tower/pylon positions.

It is therefore recommended that all non-perennial alluvial drainage lines (incl of 12m buffer) and the pan (inclusive of the 48m buffer), which were rated as Moderate & Very High Sensitivity respectively, must be avoided, i.e. no transmission line towers, but could be spanned. The pan thus corresponded to the Very High Sensitivity systems considered in the DFFE Screening Tool spatial data. Refer to Figure 6-10.

In summary the following aquatic systems were thus observed together with their respective sensitivity ratings based on information collected during this assessment:

Table 6-2: Aquatic systems observed with sensitivity ratings

Hydrogeomorphic and setting	Type	Ecosystem functionality	Sensitivity (Refer to Figure 6-10)	Comment
Pan		Near natural and important temporary wetland habitat away from the Orange River or unique habitat that contain wetland characteristics (Pans/Depression)	Very High	No development will occur within these areas and the layout can accommodate this aspect, and any access roads, must also avoid this area inclusive of the 48m buffer
Non-perennial drainage / alluvial systems, with or without a defined channel and riparian vegetation (scattered trees – non obligate)		Important in preventing erosion of landscape during high volume flows	Moderate	12m buffer

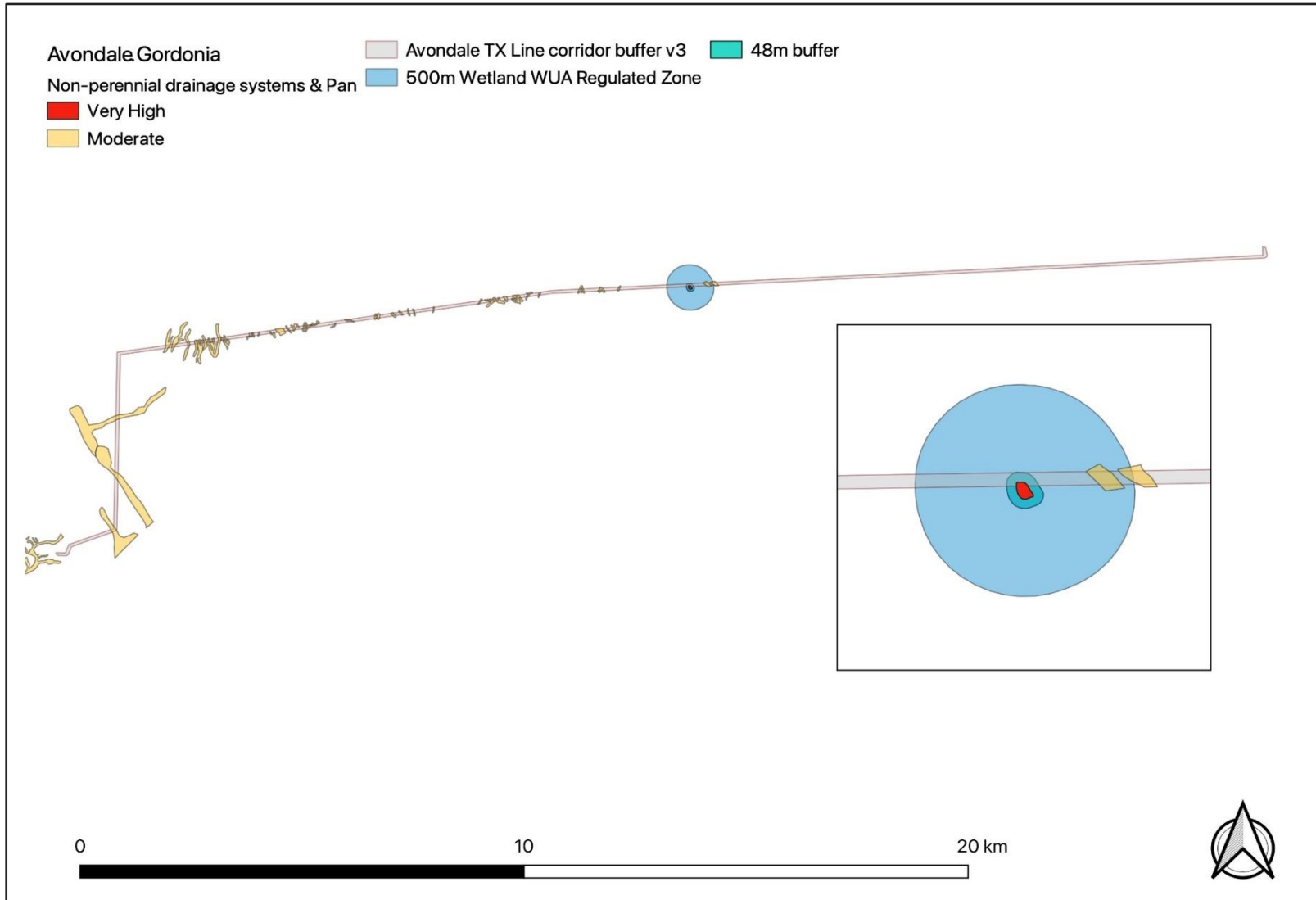


Figure 6-10: Delineated wetlands (pan) and watercourses in relation to the corridor, sensitivity ratings and the 500m regulated WULA zone

6.6.2 Impact assessment

The following impacts have been identified and are discussed in more detail below.

- Impact 1: Loss of Very High and Moderate Sensitivity systems, namely the pan and the non-perennial drainage lines through physical disturbance although the proposed layout could avoid any of these systems.
- Impact 2: Impact on all riparian and wetland systems through the possible increase in surface water runoff on riparian form and function through hydrological changes
- Impact 3: Increase in sedimentation and erosion from any access tracks and earth works
- Impact 4: Risks on the aquatic environment due to water quality impacts
- Impact 5: Cumulative impacts

The nature of a transmission line lends itself to potentially cause the majority of impacts during the construction phase of the project. In this case, removing the existing lattice structures is included as part of the construction phase. All the identified impacts therefore relate to the construction phase. Once rehabilitation is completed, it is not expected that the transmission line will have any further impact on the surrounding aquatic environment.

Project phase	Construction			
Impact	Loss of aquatic sensitivity systems			
Description of impact	Loss of Very High and Moderate Sensitivity systems, namely the pan and the non-perennial drainage lines through physical disturbance although the proposed layout could avoid any of these systems			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> The layout planning must take cognisance of the sensitivity layers as shown in Figure 6-10, to avoid these areas or cross such areas using existing tracks / roads or where the impacts would be low or can easily be mitigated. Where new access roads are required, they should avoid aquatic features. The ECO must be consulted on site if any aquatic features are to be affected by monopole structures and a suitable location that avoids these features be determined in consultation with the project team. Stormwater mitigation measures must be guided by the stormwater measures contained in the generic EMPr and implemented as per guidance from the ECO. All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Prosopis (alien invasive riparian tree) is prevalent, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years
Extent	Regional	Impacts felt at a regional / provincial level	Local	Extending across the site and to nearby settlements
Intensity	Very high	Natural and/ or social functions and/ or processes are majorly altered	Low	Natural and/ or social functions and/ or processes are somewhat altered

Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Major - negative		Minor - negative	
Comment on significance	Mitigation measures will ensure the sensitive aquatic systems are retained with a low intensity of physical disturbance.			
Cumulative impacts	When compared to the surrounding transmission lines (roads and infrastructure - operational), this impact would be negligible as they have shown limited impacts have occurred when compared to other land use activities within the region			

Project phase	Construction			
Impact	Hydrological changes: Increase in surface water runoff			
Description of impact	Increase in hard surface areas, such as the substations and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within the riparian systems, which are currently ephemeral, i.e. riparian and pan systems species composition changes, which then results in habitat change / loss.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> The layout planning must take cognisance of the sensitivity layers as shown in Figure 6-10, to avoid these areas or cross such areas using existing tracks / roads or where the impacts would be low or can easily be mitigated; It is noted that the existing Eskom service track will be used to access the site. Should any vehicle have to drive outside of the existing track it must always avoid aquatic features or consult with the ECO for a suitable crossing where impacts will be the lowest. Site specific mitigations can be implemented as per the EMPr; <ul style="list-style-type: none"> Stormwater mitigation measures must be guided by the stormwater measures contained in the generic EMPr and implemented as per guidance from the ECO; Any stormwater systems or control measures must be inspected on an annual basis to ensure these are functional; The ECO must conduct erosion monitoring of areas where the existing access track crosses aquatic features and implement control measures where necessary as per the EMPr; Effective stormwater management must include measures to slow, spread and deplete the energy of concentrated flows thorough effective stabilisation and the re-vegetation of any disturbed areas; and Transmission lines – Any areas disturbed during the operations of the transmission line, including the access tracks must be inspected on an annual basis for signs of erosion or scour. Where these are identified efforts to stabilise the areas (e.g. with reno mattresses, Gabions, Vegetation other suitable intervention) should be immediately implemented and monitored. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years

Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	The significance rating is lowered to minor negative with the implementation of mitigation measures, mainly due to the change in probability rating.			
Cumulative impacts	When compared to the surrounding transmission lines (roads and infrastructure - operational), this impact would be negligible as they have shown limited impacts have occurred when compared to other land use activities within the region			

Project phase	Construction			
Impact	Increase in sedimentation and erosion			
Description of impact	An increase in hard surface areas, and or roads that require stormwater management increases runoff from a site through the concentration of surface water flows. These higher volume flows, with increased velocity can result in downstream erosion and sedimentation if not managed.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> The stormwater management measures must be guided by the stormwater measures contained in the generic EMPr and implemented as per guidance from the ECO. The measures and actions must prevent the increase of surface water flows directly into any natural systems; Stormwater systems must be inspected on an annual basis to ensure these are functional; Effective stormwater management must include measures to slow, spread and deplete the energy of concentrated flows thorough effective stabilisation and the re-vegetation of any disturbed areas; and Transmission lines – Any areas disturbed during the operations of the transmission line, including the access tracks must be inspected on an annual basis for signs of erosion or scour. Where these are identified efforts to stabilise the areas (e.g. with reno mattresses, Gabions, Vegetation other suitable intervention) should be immediately implemented and monitored. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements

Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	Implementing the proposed mitigation measures is expected to lower the potential impact of sedimentation and erosion to minor negative mainly due to a lower intensity and probability rating.			
Cumulative impacts	Downstream erosion and sedimentation of the downstream systems and farming operations. During flood events, the unstable banks (eroded areas) and sediment bars (sedimentation downstream) already deposited downstream will be washed into the Orange River, although currently no direct connections with the Orange River, extreme high flows do enter the river from the development area.			

Project phase	Construction	
Impact	Impact on localised surface water quality	
Description of impact	During both preconstruction, construction and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities, as well as maintenance activities, could be washed downslope via the ephemeral systems.	
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts
Potential mitigation	<ul style="list-style-type: none"> All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be more 50 m from a watercourse and wetland. Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early; Occurrences of erosion and sedimentation must be monitoring during construction and addressed as soon as possible to avoid losing this material into the drainage lines; Littering and contamination of water sources during construction must be prevented by effective construction camp management; Emergency plans must be in place in case of spillages onto road surfaces and water courses; No stockpiling should take place within a water course; 	

	<ul style="list-style-type: none"> All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds; Stockpiles must be located away from river channels; and The construction camp and necessary ablution facilities meant for construction workers must be beyond the 48 m buffer described previously. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	Mitigation measures are predicted to ensure a very low intensity which leads to the significance rating of minor-negative.			
Cumulative impacts	None as no direct connection between the development area and Orange River remains			

6.6.3 Conclusions and recommendation

By ensuring proper placement of pylons outside of sensitive areas, the proposed project is not expected to have any direct impact on any areas of very high sensitivity as identified by the DFFE screening tool.

Therefore, based on the results of this report, the significance of the remaining impacts assessed for the aquatic systems after mitigation would be minor. Furthermore, based on the findings of this study no objection to the authorisation of any of the proposed activities is made at this point based on the current layout as provided by the developer, i.e. the preferred alternative.

6.7 Avifaunal Environment

Arcus Consultancy Services South Africa (Pty) Ltd was appointed by Zutari to conduct an Avifaunal Assessment of the proposed project area. The assessment was conducted in two phases, namely a desktop study and a site assessment.

Note: The specialist assessment originally considered the alternatives included in the 1st Draft BAR and has therefore subsequently provided a statement that the change in the project description does not impact or change the outcome of the assessment. The statement is included with the specialist report annexed.

6.7.1 Assessment results

The initial site sensitivity verification was carried out following the prescriptions of Government Gazette, No. 43855 (Published in Government Notice No. 1150) of 30 October, 2020: "Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Animal Species". The results of the site sensitivity verification report confirmed that areas of very high avifaunal sensitivity exist along the route of the proposed transmission line.

As the proposed project relates to the upgrade of existing transmission infrastructure, a portion of overhead power line that is approximately 30 years old and no increase in line capacity the majority of the impacts associated with overhead power lines (OHPLs) (and this line in particular) are likely to have been present in the area over an extended period of time. The project area of influence (PAOI) is therefore not considered to extend beyond the development footprint and immediate surrounds. A corridor of approximately 80 m was provided for assessment that included the existing transmission line, this was considered sufficient by the avifaunal specialist given the existing impacts present.

The species predicted to occur along the transmission corridor was determined through a desktop study including a database search and mapping. No CWAC sites, CAR routes or IBAs occur within 50 km of the proposed project site. The 32 km transmission line falls within five pentads surveyed by SABAP2; pentad 2820_2115 (66 species, 5 cards), pentad 2820_2120 (72 species, 4 cards), pentad 2820_2125 (127 species, 6 cards), pentad 2820_2130 (111 species, 4 cards), pentad 2825_2115 (135 species, 39 cards).

A total of 169 bird species have been recorded by SABAP2 in those pentads (Appendix B), including four Red-data species, namely the critically endangered White-backed Vulture (*Gyps africanus*), the vulnerable Verreaux's Eagle and Lanner Falcon and near-threatened Karoo Korhaan. Records of Martial Eagle, Ludwig's Bustard and near-threatened Kori Bustard were notably absent from the SABAP2 data examined but records of these species do exist in the greater Upington area. Similarly the habitat suitability map for Ludwig's Bustard indicate that this species may occur on the project site as indicated by the output of the screening tool.

The iNaturalist database search revealed a photographic record of a pair of Verreaux's Eagle perched on a lattice pylon (No. 225) from March 202015. The position of the record was near a rocky hill along the power line route (as determined from aerial/satellite imagery). It was predicted that nests of several species will occur within the lattice pylon structures, including those of Sociable Weaver (*Philetairus socius*), Pygmy Falcon (*Polihierax semitorquatus*), Pied Crow (*Corvus albus*), Greater Kestrel (*Falco rupicoloides*) and potentially Lanner Falcon, Verreaux's Eagle and Martial Eagle.

Subsequent to the desktop assessment, a site visit was conducted over three days between 12 July 2021 and 14 July 2021. Approximately 25 km of the 32 km (78%) portion of OHPL under consideration was surveyed by traversing the existing servitude underneath the power line in a 4x4 vehicle.

The timing and execution of the site visit coincided with the breeding period of SCCs known to utilise lattice pylon structures for nesting, facilitating the positive determination of nest status and identification of nest occupants.

Several SCCs were observed along the transmission corridor as predicted during the desktop study. Karoo Korhaan were observed in association with the gravel patches as expected as these areas were most similar to those found throughout the karoo. In contrast, Kori Bustard were observed in the sandy plains. Verreaux's Eagle were recorded nesting on a pylon near a rocky hill while Martial Eagle were recorded nesting on a pylon in the flat plains. The Verreaux's Eagle pair observed nesting were in the same vicinity as the location of the photographic record on iNaturalist. Nests of various other species were observed on lattice pylon structures along the transmission corridor, including those of Sociable

Weaver, Pied Crow and Greater Kestrel. Greater Kestrel utilise nests constructed by Pied Crow and were observed perched next to nest structures.

The resultant receptors of potential impacts across the project site derived from the desktop study and the site visit are listed in Table 6-3 below. Figure 6-11 illustrates the location of these SCC receptors.

Table 6-3: List of SCCs considered to be the receptors of potential impacts associated with the proposed development

Common name	Habitat preference	Observed on site	Detection probability
White-backed Vulture	Present	No	Low
Ludwig's Bustard	Present	No	Low
Marial Eagle	Present	Yes	Medium
Verreaux's Eagle	Present	Yes	High
Lanner Falcon	Present	Yes	Medium
Karoo Korhaan	Present	Yes	High
Kori Bustard	Present	Yes	Medium

As the proposed project relates to the upgrading of an existing aging OHPL, many of the potential impacts associated with linear transmission infrastructure already exist, and have existed on the project site for approximately 30 years. Current impacts that are likely to exist across the site include the risk of avifaunal fatalities due to collisions and electrocution, habitat destruction due to the clearing of servitudes and disturbance due to routine line and servitude maintenance activities. The existing transmission line is not marked with any bird flight diverters (BFDs) along its entire length and the aging design may not provide the same level of protection against potential electrocution as contemporary designs where sufficient clearances between electrical components render electrocutions unlikely on modern 132 kV (and higher) capacity lines. The lattice pylon structures attract a number of species as they provide platforms for the construction of nests. Some nests may be used periodically during the breeding season by a single species (e.g. eagles), periodically by multiple species (e.g. crows and kestrels) during alternating periods or continually throughout the year (e.g. weavers).

Suitable nesting platforms are a limiting resource for many species in the area under natural conditions and therefore lattice pylons may be considered to have a positive impact to species such as Verreaux's Eagle and Martial Eagle. Providing artificial nesting platforms for these species is beneficial given their conservation status, however such platforms may not be desirable for all species as they could result in unintended and poorly understood ecological knock-on effects, for example the expansion of the range of Pied Crow and what effects that may have on nest predation or breeding success of SCCs such as eagles, falcons, korhaans and bustards.

While the resident adult Verreaux's Eagle and Martial Eagle are likely familiar enough with the presence of the OHPL to avoid fatal collisions, their offspring are at risk of collision particularly when learning to fly and especially as no parts of the line are currently marked with visual devices such as BFDs. The upgrading of the existing line will result in the marking of power line with BFDs which can be seen as a positive contribution to the existing impact.

6.7.2 Site ecological importance (SEI)

SEI is considered to be a function of the biodiversity importance (BI) of the receiving environment and its resilience to impacts (i.e. receptor resilience (RR)). The BI of the receiving environment is in turn a

function of the conservation importance (CO) and the functional integrity (FI) of the receiving environment.

Conservation importance is defined as: ‘*The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of IUCN threatened and Near Threatened species (CR, EN, VU and NT), rare species, range-restricted species, globally significant populations of congregatory species, and areas of threatened ecosystem types, through predominantly natural processes.*’

The conservation importance of the project site for each SCC has been determined separately and listed in Table 6-4 below.

Table 6-4: Conservation importance of the project site for Species of Conservation

Common name	Conservation importance	Motivation
White-backed Vulture	Medium	Confirmed or highly likely occurrence of EN species listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.
Ludwig’s Bustard	Medium	As above
Martial Eagle	High	Confirmed or highly likely occurrence of EN species that have a global EOO of > 10 km ² . IUCN threatened species (EN) listed under any criterion other than A (Regionally C1). Regional population estimates are c. 800 pairs with population trend calculated to be in significant decline. Breeding confirmed on site.
Verreaux’s Eagle	High	Confirmed or highly likely occurrence of VU species that have a global EOO of > 10 km ² . Regionally threatened species (VU) listed under any criterion other than A (Regionally C1). Regional population estimated to be c. 1750 pairs. Breeding confirmed on site.
Lanner Falcon	High	Confirmed or highly likely occurrence of VU species that have a global EOO of > 10 km ² . Regionally threatened species (VU) listed under any criterion

Common name	Conservation importance	Motivation
		other than A (Regionally C1). Regional population estimated to be c. < 2500 pairs.
Karoo Korhaan	Medium	Confirmed or highly likely occurrence of populations of NT species listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals.
Kori Bustard	Medium	As above.

Functional integrity of the receiving environment/habitats is defined as its current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions, i.e. a measure of the ecological condition of the receiving environment as determined by its remaining intact and functional area, its connectivity to other natural areas and the degree of current persistent ecological impacts.

The site experiences mostly minor current negative ecological impacts with some major impacts. The ecosystem is semi-intact and runs near a busy road network to the south and near the urban area of Upington in the west. The presence of various agricultural activities in and around the project site (including stock farming and vineyards) as well as the existing OHPL and servitude results in a medium functional integrity of the receiving environment.

As biodiversity importance is a function of conservation importance and the functional integrity, the biodiversity importance can be determined. With a medium functional integrity both high and medium conservation importance scores result in a medium biodiversity importance score.

Receptor resilience is the intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention. Resilience of avifaunal receptors will often be linked to a particular disturbance or impact and time of year. For example large birds of prey have different levels of resilience to noise disturbance depending on whether they are breeding or not; these species would have low resilience to noise disturbance such as construction of a road adjacent to a nest site during the breeding season than outside of the breeding season.

White-backed Vulture have a low SABAP2 reporting rate along the transmission corridor and are most likely to utilise the transmission corridor as a temporary roost occasionally if a food source is located nearby. This species has a very high likelihood of rapidly returning to a site once the disturbance or impact has been removed. Similarly Ludwig's Bustard, Karoo Korhaan and Kori Bustard also have a very high likelihood of rapidly returning to a site once the disturbance or impact has been removed as they are ground nesting birds that do not rely on structures such as trees or pylons on which to breed. Lanner Falcon also has a very high likelihood of rapidly returning once the disturbance or impact has been removed as there are nesting opportunities for species of that size in the rocky hills and they are likely to mostly be utilising the pylon structures as hunting perches.

Martial Eagle frequently nest on transmission pylons and while they also nest in large trees, there may not be adequate large trees in the area for this species to establish a nest and therefore there is a low likelihood that this species will return to the site once the disturbance or impact has been removed if the existing lattice pylon structure supporting their nest is also removed. There is, however, a very high likelihood of this species rapidly returning to the project site once the disturbance is removed if the pylon

is left standing. There is a chance that they may return if a suitable alternative nest platform is constructed nearby, but the probability of success is unknown, therefore the receptor resilience is considered to be low. Mitigation options are nevertheless available.

Verreaux's Eagle prefer to nest on inaccessible cliff faces, which are not present on or near the project site which is likely the reason for the pair nesting on the existing lattice pylon structure. It is therefore unlikely that this species will return to the site once the disturbance or impact has been removed if the existing lattice pylon structure supporting their nest is also removed. There is a very high likelihood of this species rapidly returning to the project site once the disturbance is removed if the pylon is left standing. There is a chance that they may return if a suitable alternative nest platform is constructed nearby, but the probability of success is unknown, therefore the receptor resilience is considered to be very low. Mitigation options are nevertheless available.

The Site Ecological Importance has been determined for each SCC and listed in Table 6-5 below and mapped in Figure 6-12.

Table 6-5: Site ecological importance per species of conservation concern

Common name	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
White-backed Vulture	Medium	Very high	Very low
Ludwig's Bustard	Medium	Very high	Very low
Martial Eagle	Medium	Low	High
Verreaux's Eagle	Medium	Very low	Very high
Lanner Falcon	Medium	Very high	Very low
Karoo Korhaan	Medium	Very high	Very low
Kori Bustard	Medium	Very high	Very low

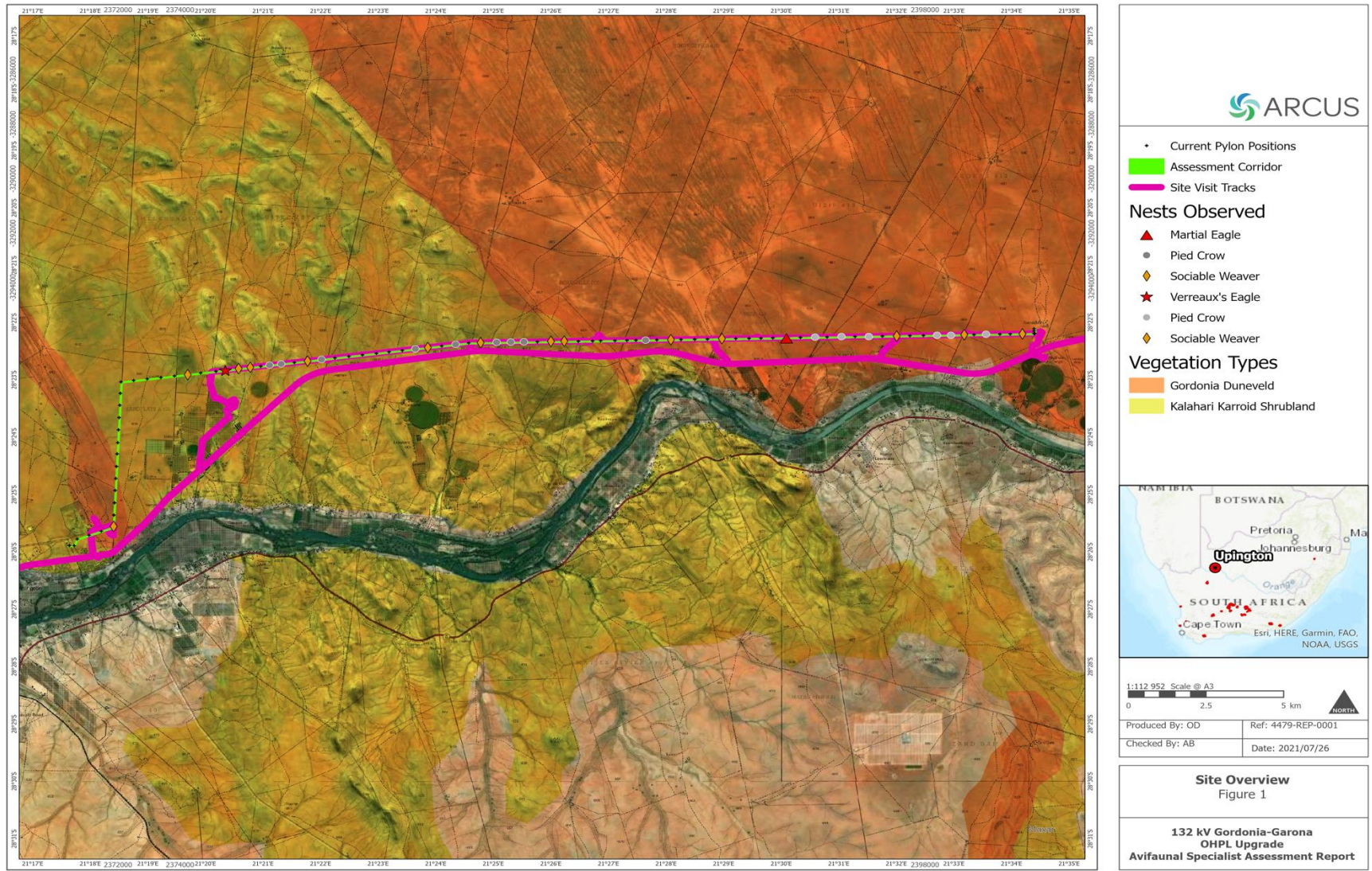


Figure 6-11: Avifaunal overview



Figure 6-12: Map indicating avifaunal site ecological importance



Figure 6-13: Avifaunal no-go areas

The interpretation guideline of the SEI for the Very High category as detailed in the Species Assessment Guideline states that avoidance mitigation is applicable where no destructive development activities should be considered (i.e. the existing lattice pylon structures housing nests of SCCs must remain). This interpretation would preclude alternative 1 as proposed if it results in the removal of the lattice pylon structure associated with the Verreaux's Eagle nest and that alternative 2 is the preferred option if combined with the existing lattice pylon structure concerned remaining in place. If alternative 2 is not feasible the only remaining options would be to reroute the OHPL around this location (in line with the interpretation guideline) or construct an alternative nesting platform with the desire that it is accepted by the resident breeding pair (i.e. offset mitigation not in-line with the interpretation guideline for this category), with unknown probability of success.

The interpretation guideline for the High category states that avoidance mitigation is applicable wherever possible and offset mitigation may be required for high impact activities. This interpretation would allow for the construction of an alternative nesting platform (and therefore the pursuit of alternative 1), however it is the specialists opinion that alternative 2 is preferred when combined with the retention of the existing lattice pylon structure associated with the Martial Eagle nest. However, construction of alternative nesting platforms are a suitable mitigation and have been successfully implemented. As the proposed project will require the upgrading of the existing lattice structures along the existing centerline, alternative nesting platforms are considered the recommended mitigation measure.

6.7.3 Impact assessment

The potential avifaunal impacts of the proposed upgrade of the 132 kV transmission line have been categorized into four phases, namely:

1. Pre-construction phase (removal of the existing 88 lattice structures, applicable to Alternative 1);
2. Construction phase of the new 132 kV transmission line (applicable to both Alternative 1 and 2);
3. Operational phase; and
4. Decommission phase

All four phases of the project are expected to result in impacts of similar nature. The identified impacts for each phase are:

- Habitat destruction;
- Disturbance and displacement; and
- Direct impact.

These impacts are assessed per phase below. However, due to the similar nature of the removal of the existing structures (pre-construction phase) and the construction of the new 132 kV transmission line (construction phase), these phases have been collectively assessed according to construction related impacts.

Pre-construction and construction phase

Potential impacts associated with the replacement of the old latticed towers and associated infrastructure are primarily related to the habitat destruction. Despite being artificial, they provide important breeding habitat for two SCCs (Verreaux's Eagle and Martial Eagle). Disturbance and displacement of birds due to increased noise and activity associated with the replacement of the old lattice structures will unlikely have a significant impact on ground-dwelling SCCs such as bustards and korhaans, displacement distances should not incur a great energetic cost as suitable habitat surrounds the site, this should also allow for rapid return to the site once the disturbance concludes. Disturbance and displacement of the

SCCs nesting on the lattice pylon structures could however be significant if the rebuilding activity occurs in the vicinity of the nests (including site access) during the breeding season. This impact can be mitigated against through access planning and avoidance of activity in 'No-Go' buffers applicable during the relevant breeding seasons.

Potential impacts associated with the construction of the new monopole structured 132 kV transmission line are similar in nature to the pre-construction phase as are discussed below.

Project phase	Construction			
Impact	Avifauna habitat destruction associated with the removal of existing lattice structures			
Description of impact	The existing lattice pylon structures themselves represent the most important aspect to consider when determining the potential impact of habitat destruction despite being artificial, as they provide important breeding habitat for two SCCs (Verreaux's Eagle and Martial Eagle). Destruction of the semi-natural habitat present along the transmission corridor during removal of the existing lattice structures will unlikely be of significance to SCCs as the area affected will be relatively small in the context of the surrounding habitat available and will be temporary in nature.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> For the Verreaux's Eagle and Martial Eagle nests, alternative nesting platforms of appropriate design are to be designed and constructed in consultation with BirdLife South Africa (BLSA) and the Endangered Wildlife Trust (EWT) in the immediate vicinity of the existing nests. ; Existing roads and servitudes to be used wherever possible; All vehicles must adhere to clearly defined and demarcated roads, no off-road driving should be allowed; Ensure that sufficient erosion control measures are constructed on all servitudes and access roads in the project area; 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; and No open fires should be permitted outside of designated areas. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Short term	impact will last between 1 and 5 years
Extent	Municipal area	Impacts felt at a municipal level	Local	Extending across the site and to nearby settlements
Intensity	Extremely high	Natural and/ or social functions and/ or processes are severely altered	Very high	Natural and/ or social functions and/ or processes are majorly altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Low	The resource is not damaged irreparably or is not scarce

Significance	Major - negative	Moderate - negative
Comment on significance	Retaining the existing lattice structures where nests of SCCs were observed and implementing the suggested buffer zone will reduce the impact significance from major negative to moderate negative.	
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.	

Project phase	Construction			
Impact	Disturbance and displacement of avifauna associated with the replacement of existing lattice structures			
Description of impact	Disturbance and displacement of birds due to increased noise and activity associated with replacement of the old lattice structures will unlikely have a significant impact on ground-dwelling SCCs such as bustards and korhaans, displacement distances should not incur a great energetic cost as suitable habitat surrounds the site, this should also allow for rapid return to the site once the disturbance concludes. Disturbance and displacement of the SCCs nesting on the lattice pylon structures could however be significant if the pylon replacement activity occurs in the vicinity of the nests (including site access) during the breeding season. This impact can be mitigated against through access planning and avoidance of activity in 'No-Go' buffers applicable during the relevant breeding seasons.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • Pylon replacement activities (including site access) must not occur within 1 000m of the identified Verreaux's Eagle or Martial Eagle new nesting platforms during the breeding period (May, June, July, August, September); • An area 1 000m from the new nesting platforms must be clearly demarcated during these periods and considered to be temporary 'No-Go' areas; • Maximize the use of existing access road and servitudes; • No off-road driving should be permitted; • Speed limits (30 km/h) should be strictly enforced for heavy vehicles on the project site to reduce unnecessary noise; • Personnel camps should be lit with as little light as practically possible, with the lights directed downwards where appropriate to reduce disturbance of nocturnal birds; • The movement of personnel should be restricted to the demarcated areas on the project site; • No dogs or cats other than those of the landowners should be allowed on site; • An appointed Environmental Control Officer (ECO) must be trained by an avifaunal specialist to identify ground nesting species such as bustards and korhaans as well as the signs that indicate possible breeding by these species; • The ECO must make a concerted effort to look out for such breeding activities especially of Red List species; and • If any additional Red List species are confirmed to be breeding (e.g. if a nest site is found), pylon replacement activities within 500m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements

Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	Mitigating the disturbance and displacement impact will reduce the moderate high significance to a minor negative rating.			
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.			

Project phase	Construction			
Impact	Direct impact on avifauna associated with the replacment of existing lattice structures and construction of new transmission line.			
Description of impact	<p>Direct impact to birds associated with pylon replacement includes the destruction of nests of Sociable Weaver, as they breed year-round it is likely that the nests will contain juveniles regardless of the timing of their removal. Aside from this species not being of conservation concern, populations have benefited from the utilisation of artificial structures such as electricity and telephonic transmission pylons and poles throughout their range and therefore the removal of nests on the site will not likely result in a significant negative impact on the long-term persistence of the species in the area. Indeed, their numbers are likely artificially inflated in areas without naturally occurring suitable nesting structures with unknown ecological impact.</p> <p>Direct impact to SCCs is less likely during the pylon replacement phase but could include fatalities of ground-dwelling SCCs such as bustards and korhaans due to roadkill or poaching, these impacts can be reduced following the implementation of mitigation measures.</p>			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • All vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; • All vehicles should adhere to a low speed limit (30km/h) on the project site to avoid collisions with susceptible species; • Night driving must be avoided where possible; • Any holes dug should not be left open for extended periods of time to prevent entrapment of ground dwelling birds (especially chicks) and only be dug when required and filled in soon thereafter; • Site access should be controlled, and no unauthorised persons should be allowed onto the site; • Personnel should not be allowed to wander off the construction site; • All personnel should undergo an initial environmental induction with regards to birds and in particular awareness about not harming or collecting species or eggs; 			

	<ul style="list-style-type: none"> The illegal collection, hunting or harvesting of birds at the site should be strictly forbidden; No animals such as dogs or cats to be allowed on site other than those of the landowners; No open fires should be permitted outside of designated areas; and Any birds directly threatened by the pylon replacement activities should be removed to a safe location by the ECO or other suitably qualified person. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Brief	Impact will not last longer than 1 year	Immediate	Impact will self-remedy immediately
Extent	Local	Extending across the site and to nearby settlements	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Negligible - negative	
Comment on significance	Mitigation measures to prevent the destruction of nests and fatalities of ground-dwelling SCCs lowers the significance rating from moderate negative to minor negative.			
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.			

Operational phase

These impacts relate to the long-term operation of the transmission line and as a result the risks associated with the potential impacts are present for a much longer period than those of the construction phases. It is noted that the potential impacts associated with the operational phase are already present on the site due to the long-term presence of the current operational transmission line on the landscape. Mitigation measures are nevertheless required to reduce these impacts based on our improved understanding of impact significance and changes that have occurred to the conservation status of receptor species.

Project phase	Operation
Impact	Disturbance and displacement associated with periodic maintenance works
Description of impact	Periodic maintenance is required of the servitude and transmission infrastructure, including the regular clearing of excess vegetation to allow for unrestricted movement along the service and access roads and to minimize the risk of fires. The transmission line may also require aerial inspection or maintenance. The disturbance of SCCs during the

	operational phase, while ongoing, is not continuous and as the transmission line that already exists on the site already imparts these impacts on the site, the individuals of species that persist in this area are likely to already experience levels of disturbance associated with these activities. The probability that the disturbance or displacement of individuals of species during the operation phase, particularly SCCs, will negatively impact the viability and persistence of the species in the area for the long term is therefore low and the implementation of mitigation measures can further reduce these impacts. It is suspected that disturbance and displacement during the operational phase may be increased should alternative 3 (No-Go) be pursued as more maintenance will likely be required on the aging infrastructural components that currently exist.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> All vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; Speed limits (30 km/h) should be strictly enforced to reduce unnecessary noise; The movement of personnel should be restricted to the servitudes and access roads on the project site; and No dogs or cats other than those of the landowners should be allowed on site to reduce disturbance of birds. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	Implementation of the proposed mitigation measures reduces the significance of the impact to a minor negative, mainly due to the lower probability of the impact occurring.			
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.			

Project phase	Operation
Impact	Direct impact to avifauna associated with periodic maintenance works during operational phase
Description of impact	The potential direct impacts during the operational phase relate to the collision of SCCs with the transmission line or the electrocution of SCCs. These impacts are currently present on the site largely unmitigated. The proposed upgrade to the transmission line

	presents an opportunity to deploy mitigation measures and reduce the overall risk that currently exists to certain SCCs and birds in general. Bird Flight Diverters improve the visibility of the line and reduce the risk of collisions for certain species (though not bustards) and modern 132 kV monopole structures reduce the risk of electrocution. Both alternatives 1 and 2 have a low impact significance following the implementation of mitigation measures.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> All vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; Pylons must conform to Eskom standards using bird friendly monopole structures fitted with appropriate bird perches on every pole to reduce the probability of electrocutions; Flappers and bird flight diverters (BFDs) are to be attached to the new OHPL in the areas identified as high or very high SEI (5.2 km each side of the Verreaux's Eagle nest and 5 km each side of the Martial Eagle nest) to reduce the risk of collision particularly for sub-adult and recently fledged birds; The most appropriate and up-to-date marking devices (such as flappers and BFDs) must be selected in consultation with the Endangered Wildlife Trust (EWT); Attach appropriate marking devices along the new OHPL in accordance with installation guidelines to increase visibility; Should alternative 3 be pursued BFDs are to be retrofitted to the existing OHPL in the same places as required above; Flappers and BFDs must be maintained and replaced where necessary, for the life span of the project; An operational monitoring programme must be implemented and include regular monitoring (e.g. during maintenance activities) of the entire length of the OHPL for collision and electrocution incidents for the lifespan of the project; and Any collision incidents must be recorded and reported to the EWT. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	On-going	Impact will last between 15 and 20 years	On-going	Impact will last between 15 and 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	High	Natural and/ or social functions and/ or processes are notably altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	Medium	Determination is based on common sense and general knowledge
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Moderate - negative		Moderate - negative	

Comment on significance	Flappers and other BFDs are not 100% effective at preventing collisions and relatively ineffective at preventing bustard collisions. The mitigation measures therefore do not lower the significance rating of the impact.
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.

Decommission phase

This phase relates to the eventual decommissioning and removal of the proposed transmission infrastructure. These impacts are largely similar to those considered for pylon replacement and the construction phase however fewer nests are likely to be constructed on the monopole pylon structures compared to the existing lattice pylon structures. These impacts are temporary in nature and habitats are likely to return to their semi-natural state relatively quickly after the decommissioning activities conclude.

Project phase	Decommissioning			
Impact	Habitat destruction			
Description of impact	Habitat destruction during decommission phase is unlikely to result in a significant negative impact to populations of SCC regardless of the alternative pursued.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Alternative nesting platforms of appropriate design are to be designed and constructed in consultation with BirdLife South Africa (BLSA) and the Endangered Wildlife Trust (EWT) in the immediate vicinity of existing nests if still in use; Existing roads and servitudes to be used wherever possible; All vehicles must adhere to clearly defined and demarcated roads, no off-road driving should be allowed; Ensure that sufficient erosion control measures are constructed on all servitudes and access roads in the project area; 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; and No open fires should be permitted outside of designated areas. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Medium	The affected environment will only recover from the impact with significant intervention	Medium	The affected environment will only recover from the impact with significant intervention

Resource irreplaceability	Medium	The resource is damaged irreparably but is represented elsewhere	Medium	The resource is damaged irreparably but is represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	While mitigation measures have been recommended, the probability of SCCs adopting alternative nesting platforms is unknown, resulting in a similar significance rating as without mitigation implementation.			
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.			

Project phase	Decommissioning			
Impact	Disturbance and displacement of avifaunal species			
Description of impact	Disturbance and displacement during decommission phase could potentially impact SCCs breeding in the vicinity of the transmission route should they still be utilising the site. Appropriate mitigation measures based on the most recent research available at the time of decommission phase must be implemented based on the receptors present.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> Decommission activities (including site access) must not occur within 1 000m of the identified Verreaux's Eagle or Martial Eagle new nesting platforms during the breeding period (May, June, July, August, September); An area 1 000m from these nesting platforms must be clearly demarcated during these periods and considered to be temporary 'No-Go' areas; Maximize the use of existing access road and servitudes; No off-road driving should be permitted; Speed limits (30 km/h) should be strictly enforced for heavy vehicles on the project site to reduce unnecessary noise; Personnel camps should be lit with as little light as practically possible, with the lights directed downwards where appropriate to reduce disturbance of nocturnal birds; The movement of personnel should be restricted to the demarcated areas on the project site; No dogs or cats other than those of the landowners should be allowed on site; An appointed Environmental Control Officer (ECO) must be trained by an avifaunal specialist to identify ground nesting species such as bustards and korhaans as well as the signs that indicate possible breeding by these species; The ECO must make a concerted effort to look out for such breeding activities especially of Red List species; and If any additional Red List species are confirmed to be breeding (e.g. if a nest site is found), decommission activities within 500m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	impact will last between 1 and 5 years	Short term	impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	High	Natural and/ or social functions and/ or processes are notably altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Certain / definite	There are sound scientific reasons to expect that the impact will definitely occur	Probable	The impact has occurred here or elsewhere and could therefore occur

Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Minor - negative	
Comment on significance	Implementing mitigation measures such as no-go areas result in a minor negative significance rating.			
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.			

Project phase	Decommissioning			
Impact	Direct impact to avifaunal SCCs			
Description of impact	Direct impact during decommissioning phase will likely be less significant than during the pylon replacement work in the construction phase as fewer nesting opportunities exist on monopole structures when compared to lattice structures.			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> All vehicles should adhere to clearly defined and demarcated roads, no off-road driving should be allowed; All vehicles should adhere to a low speed limit (30km/h) on the project site to avoid collisions with susceptible species; Night driving must be avoided where possible; Any holes dug should not be left open for extended periods of time to prevent entrapment of ground dwelling birds (especially chicks) and only be dug when required and filled in soon thereafter; Site access should be controlled and no unauthorised persons should be allowed onto the site; Personnel should not be allowed to wander off the construction site; All personnel should undergo an initial environmental induction with regards to birds and in particular awareness about not harming or collecting species or eggs; The illegal collection, hunting or harvesting of birds at the site should be strictly forbidden; No animals such as dogs or cats to be allowed on site other than those of the landowners; No open fires should be permitted outside of designated areas; and Any birds directly threatened by the decommission activities should be removed to a safe location by the ECO or other suitably qualified person. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Long term	Impact will last between 10 and 15 years	Long term	Impact will last between 10 and 15 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Very low	Natural and/ or social functions and/ or processes are slightly altered

Probability	Probable	The impact has occurred here or elsewhere and could therefore occur	Probable	The impact has occurred here or elsewhere and could therefore occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	The intensity level of the potential impact is expected to lower with mitigation, however the significance score remains minor-negative.			
Cumulative impacts	As the proposed project relates to an existing transmission line, the cumulative impact is unlikely to increase the risks to populations of SCC in the area beyond those currently present and may reduce the risks to individuals by improving the mitigation measures in effect along the transmission corridor after implementation.			

6.7.4 Conclusion and recommendations

Upgrading the existing OHPL provides an opportunity to reduce the overall risks of impact to the receiving avifaunal community compared to the current risks present along the transmission corridor, following the implementation of mitigation measures.

It is the specialist opinion therefore that the proposed development can be approved from an avifaunal perspective.

6.8 Socio-economic context

This section provides a summary of the social environment affected by the proposed project⁸. Thus, the proposed development should be seen in light of the greater socio-economic context. The socio-economic impact is not assessed in this section but it is required to provide context of the proposed development.

While the preferred option proposes upgrades to the 132 kV transmission line within the existing registered servitude, it is important to consider the aspects that may affect the surrounding and, in particular, the neighbouring landowners. These considerations are an important part in a BA process as the population and communities affected by this project will contribute to whether this project is a success or failure. It is important to consider the socio-economic environment in which the project is located, in accordance with the legal and planning framework.

Baseline Description

The Mier Local Municipality (LM) and Khara Hais LM were amalgamated to form the Dawid Kruiper LM. The Dawid Kruiper Local Municipality (Figure 6-14) is a Category B municipality that forms part of the ZF Mgcawu District Municipality in the Northern Cape Province, which is the total area forming the north-western quadrant of South Africa. It borders the Kgalagadi Transfrontier Park in the north, Botswana in the north-east, and Namibia in the west.

⁸ Note that according to the outcomes for the DFFE Screening tool no Socio-Economic Impact Assessment is required for the proposed development. As such this information is provided as baseline information to provide context of the proposed development.

It is the largest of five municipalities in the district, making up almost half its geographical area, about 43% of the District. DKLM comprises an area of about 44 231km² 1 and is formally the largest Local Municipality in South Africa. DKLM makes up 12% of the total Northern Cape Province and about 4% of the South Africa, which is something to take note of when reading and studying the detail spatial vision maps that form part of the SDF. To put it in comparison, the Municipality is twice the size of Gauteng, one third the size of the Free State- and Limpopo Provinces and almost half the size of KwaZulu- Natal Province.

Upington is situated 400km west of Kimberley, 380km east of Springbok, 400km north of De Aar, 470km south-east of Keetmanshoop in Namibia and is generally very centrally located in the Northern Cape Province. Natural boundaries provide a certain uniqueness to Upington, as the administrative and economic centre, including the Kalahari Desert and the picturesque Orange River, South Africa's largest river that flows through the centre of the town.

Demographics

In accordance with the IDP, as well as the official statistics available, the total population of the combined areas of //Khara Hais and Mier was at 100 497 in 2011, with an overall population growth of 1.82% between 2001 and 2011. The combined projection between the Mier and //Khara Hais municipal areas for 2016/2017 is at 107 161 and Table 6-6 below summarises the mentioned statistics.

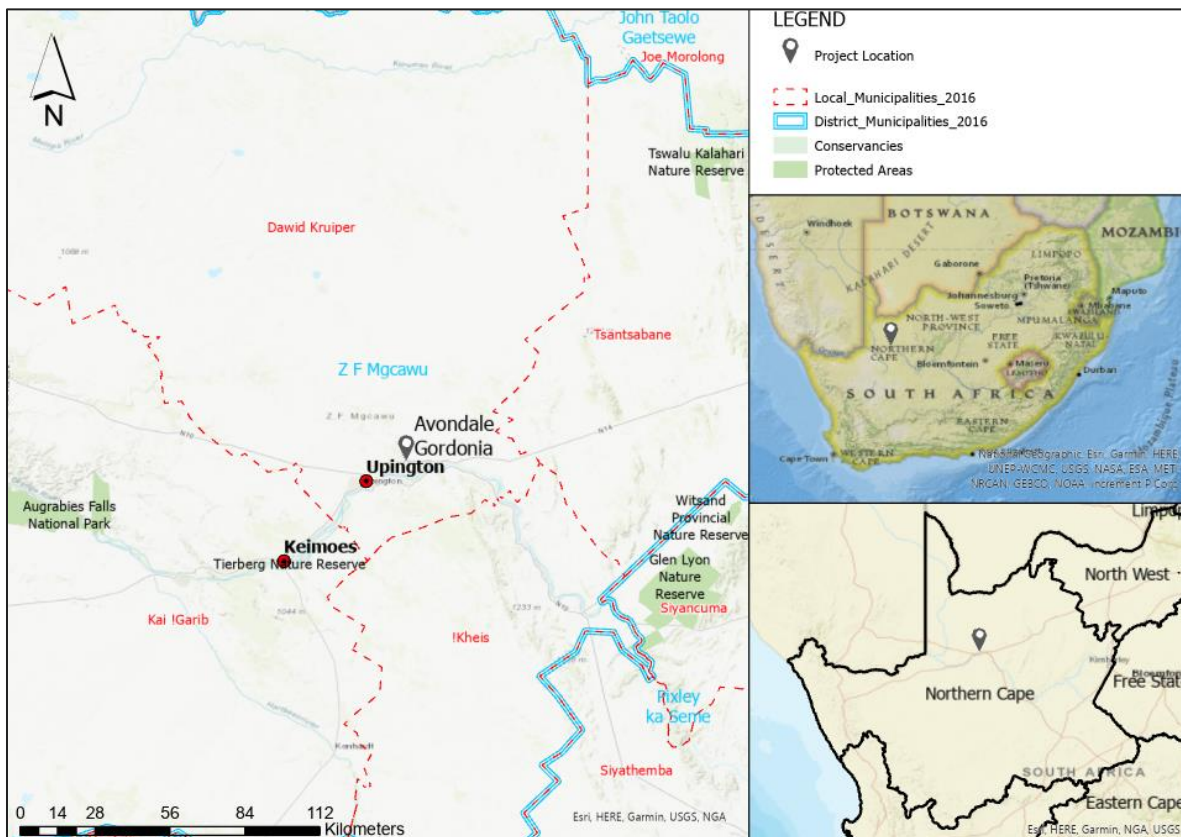


Figure 6-14: Location of the affected municipalities, conservancies and protected areas (source: Barbour, T. 2020)

Table 6-6: Summary of demographic statistics in Dawid Kruiper LM

Municipal area:	1996	2011	2016/7
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Mier	7026	7003	6879
//Khara Hais	80823	93494	100282
Dawid Kruiper combined	87849	100497	107161

According to the Dawid Kruiper LM spatial development framework (SDF) (2018), the Dawid Kruiper LM comprises of various towns and communities within its borders (21 clearly identifiable communities in 16 different Wards that formed part of the SDF and LUMS process) and each of them plays an important role in the total functioning of the economy, community vibrancy and service delivery. These communities include various sizes from the larger Upington area to the smaller communities alongside the Orange River and the Mier communities.

Employment and Sectors

The Municipality's economy is rather centred on the trade and retail sectors, due to its strong tourism and agricultural sectors, leaving the local economy fairly vulnerable for any significant changes in this industry. It is therefore important that the Municipality seeks to further diversify its economy into other sectors to counter this vulnerability in the future. Furthermore, the manufacturing sector of the municipality is one of the lowest performing sectors of the local economy. The provision of land for the development of the manufacturing sector (the provision of areas for industrial development and precinct industrial areas) is included in the Dawid Kruiper LM SDF to allow this sector to grow and diversify the economy to its full extent.

Due to the unique spatial manifestation of the municipality, both the first and second economy is mostly located around the CBD's of the towns and also various farms (intensive and extensive agricultural farming units). Upington as main town has a well-defined business centre with numerous residential areas, with a mixture of densifications already present. Secondary activities in the municipality are mainly light industrial, warehousing, processing facilities and light engineering works.

Agricultural activities take up portions of land abutting the Orange River in the southern sections of the Municipality. The Agricultural sector is very important to the local economy and therefore represents an emerging strength for the Municipality, which creates further opportunities for expansion, as well as the development of linkages with other sectors of the economy, creating further opportunities for job creation. The protection of agriculture land and the link between conservation, sensitive and transition zones in the Dawid Kruiper LM SDF are focussed on in each of the various SPC's.

Diamond mining in the Rietfontein area seems to be a viable option for future development and special policies are included for handling mining land uses in the future. A study done by the DBSA indicated that several minerals can be found in Rietfontein area, with different potential levels for mining. Diamonds were already recovered from the Kimberlite-pipe, almost 1 km east of Rietfontein and the study indicated that the pipe and subsequent mine development holds major economic potential for the area with a lifespan of more than 20 years before rehabilitation need to start. Another potential which has not yet been investigated is the economic spin-offs from current, as well as future salt mining on the salt pans in the Municipal Area. During any application the Decision-making policies must always be implemented and will form a very important component when handling new applications.

As already mentioned, the manufacturing sector of the Dawid Kruiper LM economy is currently not up to the performance that this sector could possibly achieve in the future. However, given the good agricultural base, opportunities for the expansion of the manufacturing industry exists through agro- processing and other activities. The inclusion of the RDP identification of an Agri-Park in the ZF McCawu District

Municipality, will also be an opportunity for emerging farmers to be part of the agri-manufacturing industry. The inclusion of agricultural industries and the handling of these applications in rural area, are included in the Dawid Kruiper LM SDF. The National Centre for Manufacturing Science (NCMS) has identified Upington as one of the pockets of manufacturing capability in the Northern Cape, and suggests that the Dawid Kruiper LM and other stakeholders focus on the development of the local manufacturing sector.

Upington International Airport has been identified as an alternative or supplement for the O.R Tambo International Airport for handling of cargo traffic, as there is less congestion and quicker airport turnaround times, shorter-to-market timeframes which would enhance product freshness by one day, and improved supply-chain performance. These are all positive components for development in the area and therefore offers greater benefits for cargo airlines and both importers and exporters of goods.

The uncommonly long runway and the strategically advantageous location of the Upington International Airport makes it ideal to serve the African continent. An adequate volume of cargo is generated in the Western and Eastern regions of South Africa and Namibia to warrant the establishment of a cargo hub at Upington. Due to this, the establishment of an Industrial Development Zone (IDZ) at the airport has been included in the SDF, to further enhance the strategic importance of the airport for the local, regional and provincial economy. The establishment of an SEZ (Industrial Development Zone) is also included in the SDF and the combination and inclusion of the Green Energy Zone as part of the SEZ forms an important factor in the SDF.

Potential Impacts

A number of impacts are associated with the proposed development are listed below. The EAP is of the opinion that **the proposed grid infrastructure is likely to minorly contribute to the below impacts, both positive and negative due to the scale of the project**, however they remain pertinent and relevant and are therefore elaborated upon.

Construction Phase Impacts

The following potential construction phase impacts have been identified;

- Creation of local employment (positive);
- Impact of construction workers on local communities (negative);
- Influx of job seekers (negative);
- Risk to safety, livestock and farm infrastructure (negative);
- Increased risk to health, specifically the spread of COVID-19 (negative);
- Increased risk of grass fires (negative);
- Impacts associated with movement of heavy vehicles and on-site construction related activities (negative); and
- Impacts associated with loss of grazing resources (negligible negative).

Operational Phase

The following potential construction phase impacts have been identified:

- Implementation of clean, renewable energy infrastructure (positive); and
 - Upgrades made to the transmission line will ensure more reliable transmission of electricity.
-

Conclusion and Recommendations

The above findings indicate that the development of the proposed project will create employment for locals during both the construction and operational phase of the project. The main positive feature from the proposed project would be the establishment of the Avondale Hybrid Solar project which represents an investment in clean, renewable energy infrastructure, which, given the challenges created by climate change, represents a positive social benefit for society as a whole. The potential negative social impacts can be effectively mitigated due to the small scale of the project and low population density.

6.9 Agricultural Compliance

Zutari appointed Johann Lanz as an independent agricultural specialist to conduct a site sensitivity verification and agricultural compliance statement for the upgrading of the Gardonia-Avondale 132 kV transmission line project.

The entire corridor is on land that is classified by the national web-based environmental screening tool as less than high sensitivity for impacts on agricultural resources. The level of agricultural assessment required in terms of the protocol (and hence in terms of NEMA) for sites of less than high sensitivity is an Agricultural Compliance Statement. The protocol also requires that a Site Sensitivity Verification be done.

The objective and focus of an Agricultural Compliance Statement is to assess whether or not the proposed development will have an unacceptable agricultural impact or not, and based on this, to make a recommendation on whether it should be approved or not.

Note the ...

6.9.1 Site sensitivity verification

Agricultural sensitivity, in terms of environmental impact, is a direct function of the capability of the land for agricultural production. This is because a negative impact, or exclusion of agriculture, on land of higher agricultural capability is more detrimental to agriculture than the same impact on land of low agricultural capability. The general assessment of agricultural sensitivity that is employed in the national web-based environmental screening tool, identifies all arable land that can support viable production of cultivated crops, as at least high sensitivity. This is because there is a scarcity of arable production land in South Africa.

The screening tool classifies agricultural sensitivity according to only two independent criteria – the land capability rating and whether the land is cultivated or not. All cultivated land is classified as at least high sensitivity, based on the logic that if it is under cultivation, it is indeed suitable for cultivation, irrespective of its land capability rating.

Uncultivated land is classified by the screening tool in terms of its land capability rating, as per the 2017 DAFF updated and refined land capability mapping for South Africa. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land. The higher land capability values (≥ 8 to 15) are likely to be suitable as arable land for the production of cultivated crops, while lower values are only likely to be suitable as non-arable, grazing land, or at the lowest extreme, not even suitable for grazing.

A map of the proposed corridor overlaid on the screening tool sensitivity is given in the below figure. Because none of the land is classified a cultivated land, agricultural sensitivity is purely a function of land capability. The land capability of the corridor varies from 2 to 6. Values of 2 to 5 give a low agricultural sensitivity and a value of 6 gives a medium agricultural sensitivity. There are only a few pixels of 6 (medium sensitivity) at a few points along the corridor. The small scale differences in land capability (pixels) across the project area are not very significant and are more a function of how the land capability data is generated by modelling, than actual meaningful differences in agricultural potential on the ground.

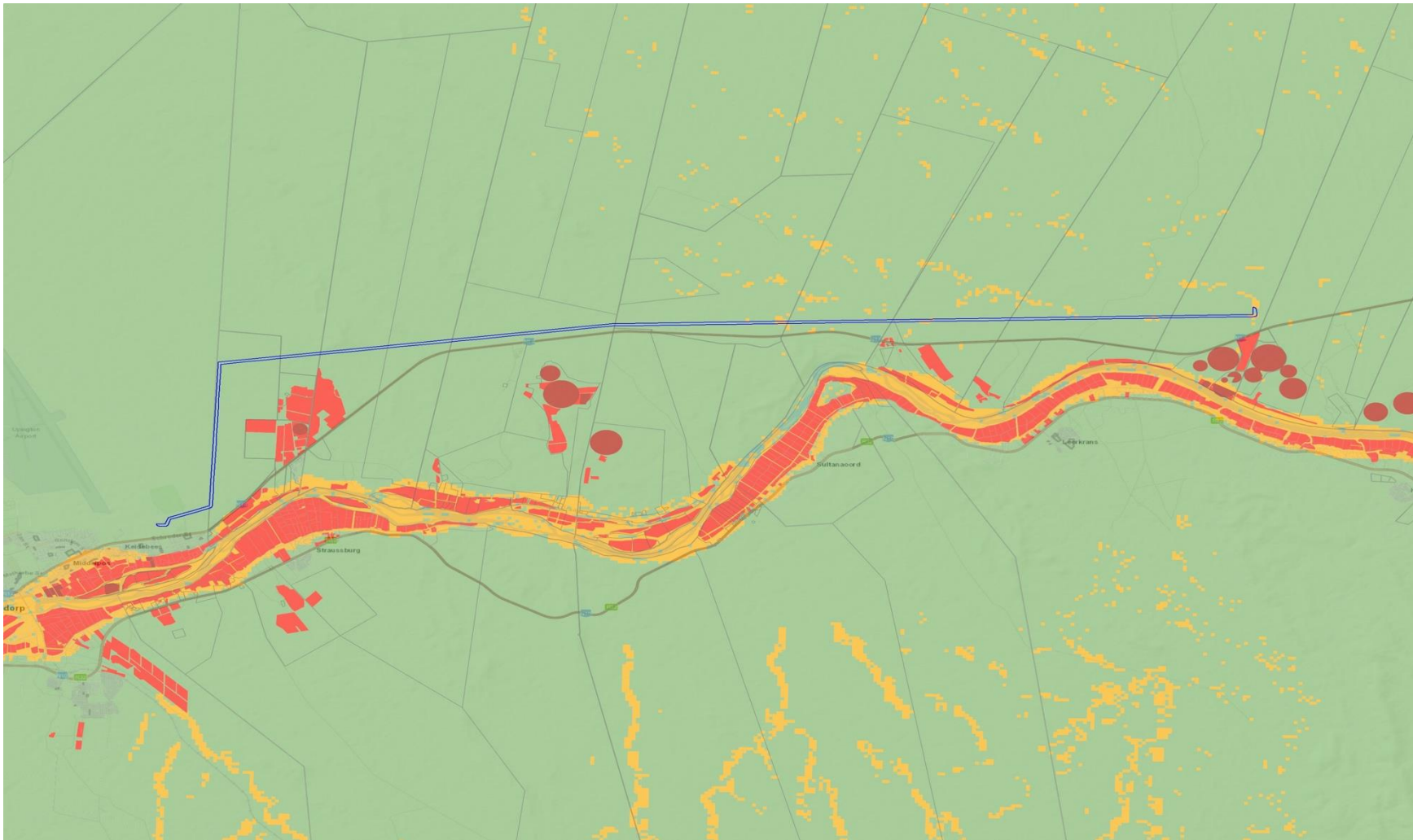


Figure 6-15: The proposed corridor (blue outlines) overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high)

The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of between 160 and 200 mm per annum and high evaporation of over 1,700 mm per annum) proves the area to be arid, and therefore of limited land capability. The land of the study area, therefore, without doubt, corresponds to the definitions of the different screening tool sensitivity categories in terms of its land capability and cultivation status.

In terms of agricultural land use, the transmission line corridor is located entirely on land that has only ever had grazing as an agricultural land use.

6.9.2 Impact assessment

The focus and defining question of an agricultural impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or potential future agricultural production. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or potential future agricultural production. If there will be no impact on production, then there is no agricultural impact.

The proposed electrical grid infrastructure has negligible agricultural impact for three reasons:

1. Overhead transmission lines have no agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath transmission lines.
2. The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture, is entirely insignificant within this agricultural environment.
3. The affected land has very low agricultural potential, anyway.

The cumulative impact of a development is the impact that development will have when its impact is added to the incremental impacts of other past, present or reasonably foreseeable future activities that will affect the same environment. It is important to note that the cumulative impact assessment for a particular project, like what is being done here, is not the same as an assessment of the impact of all surrounding projects. The cumulative assessment for this project is an assessment only of the impacts associated with this project, but seen in the context of all surrounding impacts. It is concerned with this project's contribution to the overall impact, within the context of the overall impact.

Because the development itself has negligible agricultural impact, its cumulative impact must also logically be negligible. Likewise, there can be no material difference between the agricultural impacts of any alternative layouts within the corridor and any technological alternatives. All proposed alternatives are therefore considered acceptable.

6.9.3 Conclusions and recommendation

The conclusion of this assessment is that the proposed development will not have an unacceptable negative impact on the agricultural production capability of the site. The proposed development is therefore acceptable.

Therefore, from an agricultural impact point of view, it is recommended that the development be approved.



6.10 Archaeology and Heritage

Johan A van Schalkwyk, an independent heritage consultant was appointed by Zutari to undertake a heritage impact assessment (HIA) for the proposed project in accordance with Section 38 of the NHRA to determine if the proposed upgrade of the portion of the transmission line would have an impact on any sites, features or objects of cultural heritage significance.

The HIA consisted of a desktop study (archival sources, database survey, maps and aerial imagery) and a physical survey that included the interviewing of relevant people.

6.10.1 Baseline Description

Physical Environment

For the western half of the study region the vegetation is classified as Kalahari Karroid Shrubland, falling in the Nama-Karoo Biome, which is part of the Bushmanland Bioregion. The eastern half is classified as Gordonia Duneveld, a Savanna Biome, falling in the Kalahari Duneveld Bioregion.

The geology of the region is made up of amphibolite, amphibole gneiss, subordinate biotite, quartz-feldspar and pelitic gneisses, calc-silicate rocks and mica schist. The topography is described as lowlands and hills. The Orange River forms the southern boundary of the project area.

The area which the power line transverses is a generally flat, rolling landscape interspersed with irregularly spaced parallel dunes (Figure 6-16). The plains are covered in red Kalahari soils, vegetated with Bushman grass, shrubs and occasional trees. There are no seasonal or permanent water sources in the project area, but this is offset by the Orange River that occurs to the south.



Figure 6-16: The topography of the project region



Cultural Environment

The cultural landscape qualities of the larger region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age) as well as a much later colonial (farmer) component. The second component is an urban landscape dating to the colonial period and is linked to the rural colonial landscape.

Stone Age:

Surveys done for example by Sampson (1985) to the south-east of the study area indicated a rich legacy in Stone Age sites in the Karoo. However, the region of the study area seems to have been a bit more marginal as no major sites or traditions have been identified in the region.

Occupation by early humans would probably date to the Middle Stone Age and would consist of open sites in the vicinity of stream beds or hills and outcrops. Population density might have increased during the Later Stone Age and people would have occupied rock shelters where available as well as open sites. During this later period, they also produced rock engravings. Although none are known from the immediate region, some have been reported to exist north of Upington.

Recently Parsons (2007, 2008) demonstrated that the so-called Swartkop and Dornfontein industries possibly relate to different socio-economies – those of hunter-gatherers and stock keepers. Based on an analysis of material recovered from five sites in the Northern Cape Province, all dating to the last two millennia, she compare variability between assemblages attributed to the Swartkop and Doornfontein industries and identify areas of overlap and difference.

Historic period:

The town of Upington, originally known as Olijvenhoutsdrift, was founded in 1871 as part of a mission station by the German missionary Rev Schröder. The town was renamed in 1884 after Sir Thomas Upington, who was the Prime Minister of the Cape Colony and who visited the town in 1884.

An irrigation canal was started by Rev Schröder in 1883. It was completed in 1885. By 1884 there were already 77 irrigation farms. Nowadays, it is disputed that Schröder was the original builder of the canal, and it is claimed that he only carried on with an idea that was started by a local inhabitant by the name of Abraham September.

6.10.2 Site Sensitivity

During the survey, the following sites, features and objects of cultural significance were identified in the project area (Figure 6-17). Table 6-7: List of archaeological heritage sites recorded in the transmission line corridors. The list is organised such that the records are in order starting from the southeast.



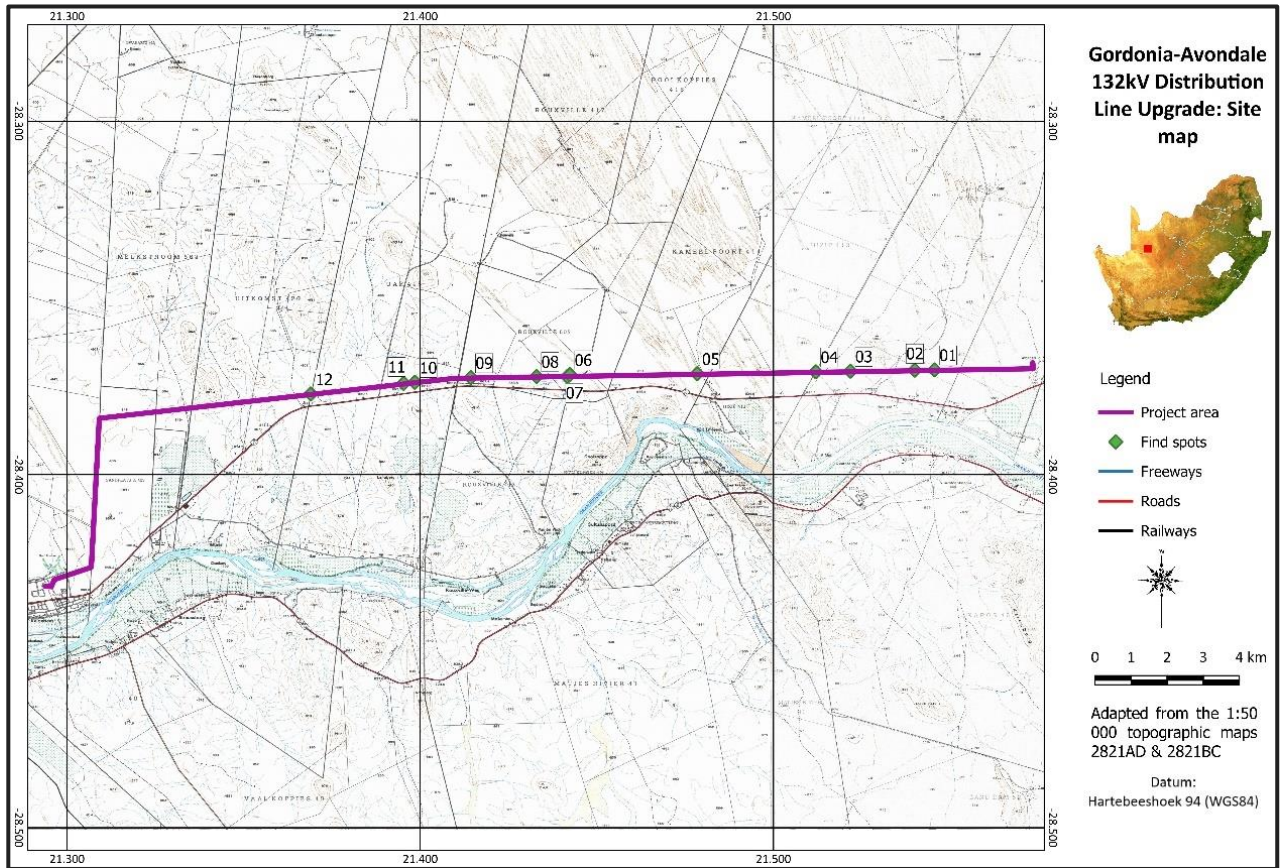


Figure 6-17: Location of heritage sites in the project area

The following factors would have had an influence the finds made during the field survey and should be noted:

- The survey was confined strictly to the limits of the power line servitude;
- In all probability the construction of the existing power line would have had an impact on heritage material, specifically as an access road was made within the servitude.










Apart from a limited number of farming related features, mostly watering points for livestock, the material that was identified is stone tools dating to the Middle and Later Stone Age. This occurs as a very thin scatter sporadically across the landscape.

Most researchers (Dreyer 2013; Gaigher 2012; Kruger 2015; Morris 2017, 2018; Van der Walt 2015a, 2015b; Van Schalkwyk 2012) have noted that the further one move away from the riverine environment, the lower the occurrence of Stone Age material become. Away from the river the terrain becomes inhospitable being arid, rocky ground. Exceptions do occur, e.g., Kaplan (2015) shows that Holocene occupation also occurred long distances from the river. This probably can be attributed to small, isolate environmental factors.




Regarding the material found away from the river in this arid landscape, Morris (2018) is of the view that it is of mainly low significance. It is instructive about the exploitation of this landscape, especially during Later Stone Age times. The fact that tools made from jaspilite (banded iron stone), which do not occur naturally in the interior and probably was sourced from the Orange River, were identified, shows that this part of the landscape was indeed exploited, but in a limited sense.



Table 6-8: Table of the various find-spots and the type of material it contains

No	Coordinates	Description	Image	Grading	Proposed mitigation
01	-28,37038; 21,54565	Single flake in quartzite		4C	None required
02	-28,37049; 21,53986	Single flake in quartzite		4C	None required
03	-28,37074; 21,52181	Thin scatter of flakes in quartzite		4C	None required
04	-28,37096; 21,51203	Thin scatter of flakes in quartzite and jaspilite. Possibly MSA & LSA		4C	None required
05	-28,37147; 21,47844	Possible hammerstone		4C	None required
06	-28,37177; 21,44237	Farming related features – live-stock watering point, just outside of servitude		4C	None required
07	-28,37227, 21,44166	Single flake in indurated shale		4C	None required
08	-28,37226, 21,43294	Thin scatter of LSA flakes in jaspilite		4C	None required
09	-28,37254; 21,41432	Thin scatter of MSA & LSA flakes in jaspilite and quartzite		4C	None required



10	-28,37391; 21,39846	Single flake in jaspilite		4C	None required
11	-28,37421; 21,39533	Single flake in jaspilite		4C	None required
12	-28,37723; 21,36898	Single MSA core in quartzite		4C	None required

6.10.3 Impact assessment

Heritage impacts are categorised as:

- Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries;
- Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment;
- Cumulative impacts that are combinations of the above.

Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development.

Project phase	Construction			
Impact	Impact on identified heritage features			
Description of impact	Heritage impacts considered include: <ul style="list-style-type: none"> • Direct or physical impacts, implying alteration or destruction of heritage features within the project boundaries; • Indirect impacts, e.g. restriction of access or visual intrusion concerning the broader environment; and • Cumulative impacts that are combinations of the above. Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development			
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts		
Potential mitigation	As no sites, features or objects of cultural heritage significance were identified on the project area, there would be no impact as a result of the proposed development. However, the heritage management measures as included in the EMPr will ensure that appropriate measures are implemented should any heritage features be found during construction.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings



Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur	Unlikely	Has not happened yet but could happen once in the lifetime of the project, therefore there is a possibility that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Minor - negative		Minor - negative	
Comment on significance	As the preferred alternative is within an existing servitude that has been operational for 30 years, it is not expected that any features of heritage significance will be found. The site assessment of the adjacent area relative to alternative 2 found no heritage features. The significance of the impact is therefore rated as minor negative.			
Cumulative impacts	As no sites, features or objects of cultural heritage significance were identified on the project area, there would be no cumulative impact as a result of the proposed development.			

6.10.4 Conclusion and Recommendations

Apart from a limited number of farming related features, mostly watering points for livestock, the material that was identified is stone tools dating to the Middle and Later Stone Age. This occurs as a very thin scatter sporadically across the landscape. This material is viewed as mainly low significance.

As no sites, features or objects of cultural significance were identified for the current study area, no mitigation measures are proposed. If heritage features are identified during construction, as stated in the management recommendation, these finds would have to be assessed by a specialist, after which a decision will be made regarding the application for relevant permits.

It is recommended that the proposed development be allowed to continue subject to the implementation of the condition that, should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. The appropriate steps to take are indicated in the HIA report as attached in Annexure D of this BAR and have been included in the EMPr.



6.11 Palaeontology

Zutari appointed Prof. Marion Bamford of the University of the Witwatersrand to conduct a palaeontological impact assessment (PIA) of the proposed upgrade of the Gordonia-Avondale 132 kV transmission line in order to comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act. A desktop PIA was completed and is discussed below.

6.11.1 Baseline Description

The Gordonia-Garona transmission line lies within the Namaqua-Natal Province in the Namaqua section (Figure 6-18, Table 2). The Namaqua-Natal Province is a tectono-stratigraphic province and forms the southern and western boundary of the ancient Kaapvaal Craton, and extends below the Karoo Basin sediments to the south (Cornell et al., 2006). It comprises rocks that were formed during the Namaqua Orogeny (mountain-building) some 1200 – 1000 million years ago. It has been divided by geologists into a number of terranes (similar lithology and bounded by shear zones). There are three main lithologic units used to separate the terranes as well as the shear zones but still there is some debate about the terranes (ibid). Very simply, the lithologic units are older reworked rocks, juvenile rocks formed during tectonic activities and metamorphosed, and intrusive granitoids.

According to Cornell et al. (2006) the five terranes are:

- A - Richtersveld Subprovince (undifferentiated terranes)
- B – Bushmanland Terrane (granites)
- C – Kakamas Terrane (supracrustal metapelite ca 2000 Ma)
- D – Areachap Terrane (supracrustal rocks and granitoids)
- E – Kaaian Terrane (Keisian aged metaquartzites and deformed volcanic rocks).

The route lies in the Kaaian Terrane and it has a more or less northwest-southeast extent, bounded on the eastern side by the Kheis Province and on the western side by the Areachap Terrane.

The Namaqua-Natal Province rocks are volcanic in origin and frequently metamorphosed. Small outcrops of the Kalkpunt, Rouxville and Swartkopsleegte Formations (Koras Group) occur along the eastern part of the route (Cornell et al., 2006).

The eastern section of the route and Avondale occur on younger rocks of the Nama Group, namely the Schwarzrand Formation, that were deposited in the Nama Foreland Basin in a peripheral basin that developed on the margin of the Kaapvaal Craton.

Overlying many of these rocks are loose sands and sand dunes of the Gordonia Formation, Kalahari Group of Neogene Age. The Gordonia Formation is the youngest of six formations and is the most extensive, stretching from the northern Karoo, Botswana, Namibia to the Congo River (Partridge et al., 2006). It is considered to be the biggest palaeo-erg in the world (ibid). The sands have been derived from local sources with some additional material transported into the basin (Partridge et al., 2006). Much of the Gordonia Formation comprises linear dunes that were reworked a number of times before being stabilised by vegetation (ibid).



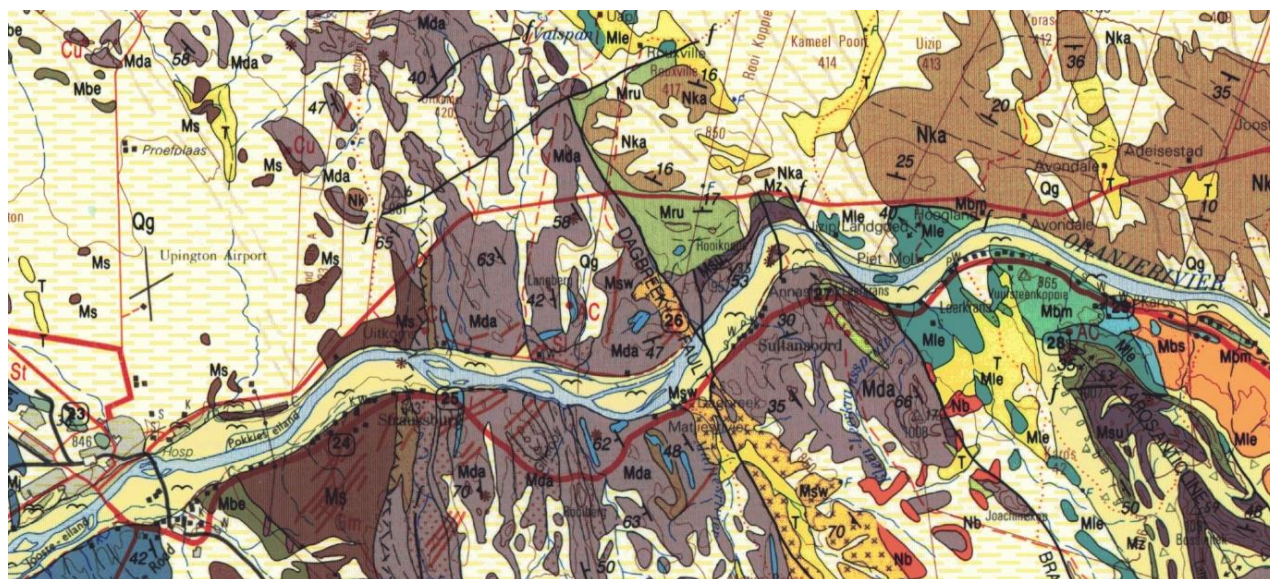


Figure 6-18: Geological map of the area around the existing and possible northern/southern parallel new route for the Gordonia-Avondale transmission line within the yellow rectangles. Abbreviations of the rock types are explained in Table 2. Map enlarged from the Geological Survey 1:250 000 map 2820 Upington, 1988.

Table 6-9: Explanation of symbols for the geological map and approximate ages (Cornell et al., 2006. Partridge et al., 2006). SG = Supergroup; Fm = Formation; Ma = million years; grey shading = formations impacted by the project

Symbol	Group/Formation	Lithology	Approximate Age
Qg	Gordonia Fm, Kalahari Group	Red-brown wind-blown sand and sand dunes	Quaternary, ca 2.5 Ma to present
T	Tertiary	Calcrete	Neogene, last 25 Ma
Nk	Schwarzrand Fm, Nama Group, Pan African Belt	Quartzite, shales, conglomerate	Neoproterozoic to early Cambrian
Mka	Kalkpunt Fm, Koras Group, Kaaien Terrane, Namaqua-Natal Province	Sandstone and conglomerate	1180 - 1123 Ma
Mru	Rouxville Fm, Koras Group, Kaaien Terrane, Namaqua-Natal Province	Andesitic to basaltic lava	1180 - 1123 Ma
Ms	Swartkopsleegte Fm, Koras Group, Kaaien Terrane, Namaqua-Natal Province	Weakly foliated biotite granite	1180 - 1123 Ma

6.11.2 Site Sensitivity

The palaeontological sensitivity of the area under consideration is presented in Figure 6-19. The site for development lies on volcanic and metamorphic rocks of the Kaaien Terrane, Namaqua-Natal Province that are dated broadly between 1200 to 1000 Ma. This predates any body fossils, and because of their volcanic origin, they do not preserve any fossils.

The aeolian (windblown) sands of the Gordonia Formation do not preserve fossils because they have been transported and reworked, but in some regions they may have covered pan or spring deposits and



these can trap fossils, and, more frequently, archaeological artefacts. Usually these geomorphological features can be detected using satellite imagery. No such features are visible.



Figure 6-19: SAHRIS palaeosensitivity map for the site of the Avondale-Gordonia 132 kV transmission line that is to be upgraded, shown within the yellow rectangles. Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero.

There are numerous pans in the Kalahari, generally 3–4 km in diameter (Haddon and McCarthy, 2005). According to Goudie and Wells (1995) there are two conditions required for the formation of pans. Firstly, the fluvial processes must not be integrated, and second, there must be no accumulation of aeolian material that would fill the irregularities or depressions in the land surface. Favoured materials or substrates for the formation of pans in South Africa are Dwyka and Ecca shales and sandstones (ibid).

Most pans in the Kalahari Basin are filled by a layer of clayey sand or calcareous clays and are flanked by lunette dunes formed as a result of deflation of the pan floor during arid periods (Lancaster, 1978a, b; Haddon and McCarthy, 2005). At some localities in the south western Kalahari spring-fed tufas have formed at the margins of pans during periods where groundwater discharge was high (Lancaster, 1986). These tufas may contain evidence of algal mats and stromatolites and may also be associated with calcified reed and root tubes (Lancaster, 1986). Many of the pans are characterised by diatomaceous earth, diatomite or kieselguhr, a white or grey, porous, light-weight, fine-grained sediment composed mainly of the fossilised skeletons of diatoms. Associated with some palaeo-pans and palaeo-springs are fossil bones, root casts, pollen and archaeological artefacts. Well-known sites are Florisbad and Deelpan in the Free State, Wonderkrater in Limpopo and Bosluispan in the Northern Cape. In this region under study is the Kathu Complex.



From the SAHRIS map above (Figure 6-19) the area is indicated as moderately sensitive (green) reflecting the Gordonia Formation sands and sand dunes. The volcanic rocks are indicated as having zero or insignificant palaeosensitivity (grey), or unknown (white). The route is predominantly on the Gordonia Formation sands and minor sections in the eastern part are on the Koras Group non-fossiliferous rocks.

6.11.3 Impact assessment

Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old and of volcanic origin to contain fossils, along this route, i.e. in the Koras or Nama Group rocks. The Tertiary calcretes and Gordonia Formation sands do not preserve fossils but might cover palaeo-pans or palaeo-springs, however, none are visible from imagery.

Project phase	Construction			
Impact	Impact on fossil heritage			
Description of impact	Based on the nature of the project, surface activities may impact upon the fossil heritage if preserved in the development footprint. The geological structures suggest that the rocks are either much too old and of volcanic origin to contain fossils, along this route, i.e. in the Koras or Nama Group rocks. The Tertiary calcretes and Gordonia Formation sands do not preserve fossils but might cover palaeo-pans or palaeo-springs, however, none are visible from imagery.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Since there is an extremely small chance that fossils might be below the sands or calcretes, a Fossil Chance Find Protocol has been added to this report and should be incorporated into the EMPr.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Limited	Limited to the site and its immediate surroundings	Limited	Limited to the site and its immediate surroundings
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Highly unlikely / none	Expected never to happen	Highly unlikely / none	Expected never to happen
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified	Low	The affected environment will not be able to recover from the impact - permanently modified
Resource irreplaceability	High	The resource is irreparably damaged and is not represented elsewhere	High	The resource is irreparably damaged and is not represented elsewhere
Significance	Negligible - negative		Negligible - negative	
Comment on significance	Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.			
Cumulative impacts	None, based on the unlikelihood of the impact occurring.			



6.11.4 Conclusion and Recommendations

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the Aeolian sands of the Quaternary Gordonia Formation. There is a very small chance that fossils may occur beneath the sands, if any have been trapped in palaeo-pans or palaeo-dunes, although no such feature is evident. Nonetheless, a Fossil Chance Find Protocol should be added to the EMP: if fossils are found once excavations have commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.



6.12 Visual Landscape

Visual Resource Management Africa CC (VRMA) was appointed by Zutari to undertake a Visual Impact Assessment (VIA) for the proposed Avondale Gordonia 132kV Transmission Line. A site visit was undertaken on the 13th of July 2021. The assessment comprised of two main sections: firstly, the Baseline Stage to identify the visual resources and key observation locations within the project zone of visual influence; and secondly, the Assessment Stage which determines the visual impacts and significance of the proposed landscape modifications.

The landscape value issues that were flagged in the greater landscape were:

- Viticultural landscape associated with the Orange River.
- Upington built environment.
- The N14 National Road.
- REDZ7 Renewable Energy development.
- Low intensity cattle and game farming.

These are discussed below.

Note: The specialist assessment originally considered the alternatives included in the 1st Draft BAR and has therefore subsequently provided a statement that the change in the project description does not impact or change the outcome of the assessment. The statement is included with the specialist report annexed.

6.12.1 Baseline Description

Orange River:

The main landscape feature in the area is the Orange River. This landscape includes the river and residential and agricultural developments along the valley. Landform is fairly undulating and hilly, with rocky outcrops scattered along the banks where the river has eroded down creating a slight valley. Due to the proximity to water, vegetation is more prolific along the riverbank and is predominantly associated with cultivated vineyards and small-scale agriculture, although there are some larger residential developments that do detract from the overall landscape character. The cultural landscapes of this area are primarily associated with agricultural activities and vineyards on the more fertile lands along the Orange River and they add value to the overall vista. The types of receptors making use of the Orange River visual resources are mostly related to agriculture, tourism and residential. It is likely that maintaining the existing sense of place would be important to these receptors. The area is also strongly associated with the 'vineyard' cultural landscape and hence attractive to landscape-based tourism.





Figure 6-20: Photograph taken from elevated location on the outskirts of Upington depicting the cultivation adjacent to the Orange River that characterises the river valley.

Upington built environment:

The western portions of the existing 132kV Eskom power line, and proposed landscape change, would be visible to the eastern sections of Upington urban residential areas. Also located in this region, bordering the town urban edge, is the Upington Golf Course and associated casino. The entrance to this recreation area would be located in close proximity to the existing power line. Any changes to this existing powerline landscape would be clearly visible to receptors entering and leaving the recreation area.



Figure 6-21: Photograph 9 depicting the Upington residential built environment



N14 National Road:

The N14, is routed to the south of the proposed transmission line, with the nearest location 250m away. The route is important in terms of planning, as tourism activities are often located along national routes in order to cater to tourism interest. Important tourist destinations in the region, that could result in increased tourist usage, are the Kalahari Gemsbok National Park and the Augrabies National Park. As a national road, it is important that the natural landscapes on either side of the road are maintained as much as possible, affording the road a view corridor status.



Figure 6-22: Photograph 5 of the scenic views of the N14

Renewable energy development:

The renewable energy development zone 7 (REDZ7) area is located due south of the routing. Due to the optimal location for renewable energy (RE) technology, the region has become a major RE node. This has resulted in a change to the sense of place, especially around the town of Upington, with the construction of the Khi Solar 1 concentrating solar power (CSP). This creates a large vertical feature in the landscape. It is likely that the area will be further developed as a solar energy hub, as within the surrounding landscape there are other proposed, and approved CSP projects (currently unconstructed) and large-scale PV projects. Associated with the RE developments, there will be an increase in transmission lines vacating the electrical current from the RE projects, to the various Eskom substations.





Figure 6-23: View of Khi Solar One under construction as seen from the N14

Rural agriculture:

As previously indicated, agriculture is the largest economic driver in the region, with viticulture and beef farming the main production.



Figure 6-24: The existing farm roads and Bushmanland Basin Shrublands (general site photo).

Vegetation:

According to the South African National Biodiversity Institute (SANBI) National Vegetation Website, Mucina & Rutherford (2006) identify two main vegetation types, Gordonia Duneveld and Kalahari Karroid



Shrubland. As indicated in the table below, the Gordonia Duneveld vegetation falls within the Savanna Biome and Kalahari Duneveld Bioregion, with the Kalahari Karroid Shrubland falling within the Nama-Karoo Biome and Bushmandland Bioregion. The Gordonia Duneveld is characterised by sparse vegetation associated with arid climate dune fields, with the Kalahari Karroid Shrubland characterised by small bushes and small water hardy trees. The arid climatic conditions and resulting sparse vegetation results in limited capacity for the vegetation to visually absorb/ or obscure views of landscape changes.

It is important to note that the area is arid, with high summer temperature averages, the capacity for screening mitigation by the planting of vegetation has a limited potential.



Figure 6-25: Photograph depicting the Gordonia Duneveld type vegetation which has been incorporated into a game farm located to the south of the N14.

6.12.2 Site Sensitivity

The key topographic feature in the landscape is the Orange River Valley, with the closest portion located 1.1km to the south of proposed routing. While the river has incised a valley into the landscape, the depression is not significant and the valley sides are fairly shallow in gradient, creating a meandering river effect within a wide river channel. The other key landscape features include low hills to the north, and flatter, arid landscapes with some dune features which do not reflect in the elevation model. The low mountains located to the north do extend into the routing area, increasing prominence along the central-western section. The low hills also increase the visual appeal of the landscape, especially for tourist related activities associated with local game farming ventures.

As can be viewed in the visibility map in Figure 6-26 below, the approximate extent of the proposed project is widespread within the 6km buffer area. This is due to the relatively flat nature of the terrain in relation to the height of the proposed landscape modification. While the viewshed generated from the proposed monopoles would extend into the full 6km buffer area, the undulation of the terrain results in a variation in the number of monopoles that would be visible at a single point. As can be seen on the map, the intensity of the landscape change is likely to be less in areas where less monopoles are visible. Due to the length of the routing, the viewshed is likely to be regional, but with the Zone of Visual Influence, contained at the Local level within the 1km High Exposure buffer zone.



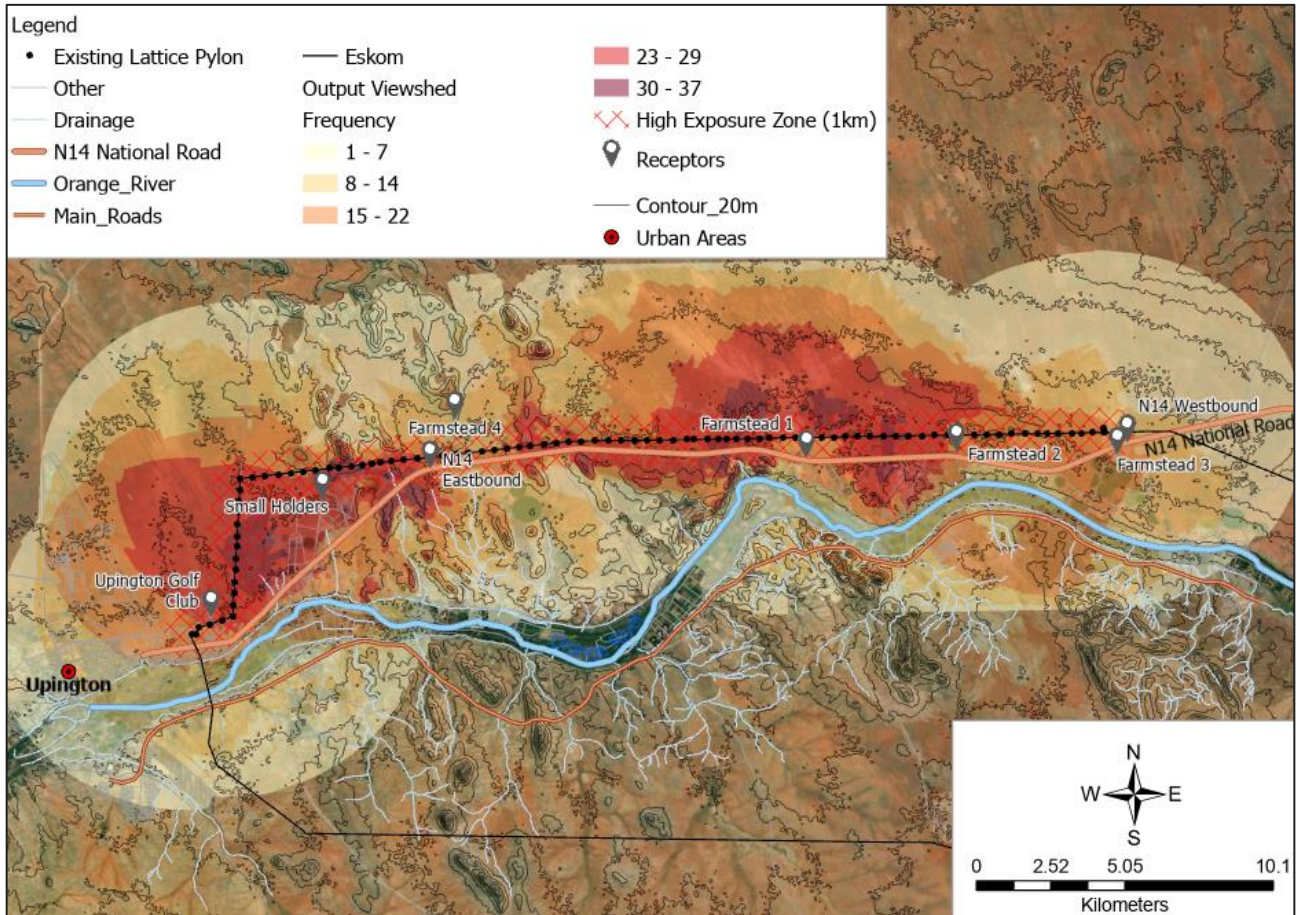


Figure 6-26: Transmission line visibility and receptor map generated from a 32m Offset with thematic display according to number of poles visible

6.12.3 Impact assessment

Construction Phase impacts include the use of large vehicles and a crane to raise the power line monopoles. Small maintenance access routes would be created along the proposed power line route which could result in soil erosion if not adequately managed. Due to the small footprint of the monopole and small track, windblown dust is likely to be limited. Operation Phase impacts will include the occasional maintenance vehicle travelling down the access track to check on possible soil erosion and the power lines. Decommissioning Phase impacts include the movement of large vehicles and cranes for the removal of the monopoles as well as the rehabilitation of the access track.

Potential visual cumulative impacts are caused mainly by multiple power lines being routed adjacent to each other, or converging on a specific area, resulting in a massing effect and subsequent landscape degradation.

The impact considered below is therefore the visual obstruction of the landscape to sensitive receptors (-) and included the change to the landscape sense of place due to the presence of the monopoles. The impact assessment considered the two proposed alternatives.



Option 1 – Replacement of the existing Eskom 132kV lattice structures with monopoles to accommodate the existing and the proposed new cables.

Option 2 – No replacement of the existing Eskom 132kV lattice structures and the addition of further power line routing using monopoles to carry the proposed new cables within a new servitude.

VIA for Alternative 1:

Project phase	Construction			
Impact	Alternative 1. Loss of landscape character due to the replacement of the existing lattice structure with a similar sized monopole.			
Description of impact	Change in sense of place to rural landscape character from the placement of monopoles and associated cabling using large vehicles and cranes.			
Mitigatability	Medium	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Management of dust from moving vehicles. Utilisation of the existing Eskom maintenance road.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor – negative		Minor - negative	
Comment on significance	Due to the Low Magnitude and Local Extent, the Visual Significance is rated Minor - negative.			
Cumulative impacts	The routing is located on private property, where the landuse is zoned agricultural, and as such the proposed change to the existing power line would not result in a significant cumulative risk from landscape degradation.			



Project phase	Operation			
Impact	Alternative 1. Loss of landscape character due to the operation of the transmission line.			
Description of impact	Change in sense of place to rural landscape character from the long-term monopoles and associated cabling in the landscape.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Soil erosion needs to be adequately monitored on a Bi-Annual basis.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Moderate - negative		Moderate - negative	
Comment on significance	The existing 132kV power line already defines the landscape context moderating the intensity of the landscape change. The replacement of the lattice to monopoles will be clearly noticeable in the landscape and is likely to become more dominating to the casual observer. The small extent of the impact area and low gradient are likely to limit the potential of soil erosion. Best practice requires that the maintenance road should be checked for soil erosion on a routine basis.			
Cumulative impacts	The routing is located on private property, where the landuse is zone agricultural, and as such the proposed change to the existing power line would not result in a significant cumulative risk from landscape degradation.			

Project phase	Decommissioning			
Impact	Alternative 1. Loss of landscape character due to the deconstruction of the transmission line (UNLIKLEY TO TAKE PLACE)			
Description of impact	Movement of large vehicles in the landscape to take down the monopoles and restore vegetation on the impacted areas.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		



Potential mitigation	<ul style="list-style-type: none"> • All structures should be removed and where possible, re-used or recycled. • The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused. • All compacted areas should be ripped and then rehabilitated according to a rehabilitation specialist. • Monitoring for soil erosion should be undertaken on a bi-annual basis for a year following the completion of closure phase. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Almost certain / Highly probable	It is most likely that the impact will occur	Almost certain / Highly probable	It is most likely that the impact will occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor – negative		Minor - negative	
Comment on significance	The small footprint of the impacted area and the shorter time period of the phase reduces the visual significance of the landscape change.			
Cumulative impacts	The shorter time period for this phase reduces the intensity of the landscape change, following which the landscape would be restored to an un-modified version of the previous agricultural sense of place.			

VIA for Alternative 2:

Project phase	Construction			
Impact	Alternative 2. Loss of landscape character due to the construction of the new transmission line adjacent to the existing lattice power line.			
Description of impact	Change in sense of place to rural landscape character from the placement of monopoles and associated cabling using large vehicles and cranes.			
Mitigatability	Medium	Mitigation exists and will notably reduce significance of impacts		
Potential mitigation	Management of dust from moving vehicles.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	



Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Moderate	Natural and/ or social functions and/ or processes are moderately altered	Moderate	Natural and/ or social functions and/ or processes are moderately altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	Due to the Low Magnitude and Local Extent, the Visual Significance is rated Minor - negative.			
Cumulative impacts	Due to the remoteness of the locality for most of the routing, and the higher visual absorption capacity of the area where the power lines will be viewed from the road due to the existing Eskom power line, this effect is rated to be Low.			

Project phase	Operation			
Impact	Alternative 2. Loss of landscape character due to the construction of the new transmission line adjacent to the existing lattice power line.			
Description of impact	Change in sense of place to rural landscape character from the long-term monopoles and associated cabling in the landscape.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	Soil erosion needs to be adequately monitored on a Bi-Annual basis.			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Permanent	Impact may be permanent, or in excess of 20 years	Permanent	Impact may be permanent, or in excess of 20 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	High	Substantive supportive data exists to verify the assessment	High	Substantive supportive data exists to verify the assessment



Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact
Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	The existing 132kV power line already defines the landscape context moderating the intensity of the landscape change. The addition of the smaller monopoles will be noticeable in the landscape but will not become a dominating feature to the casual observer. The small extent of the impact area and low gradient are likely to limit the potential of soil erosion. Best practice requires that the maintenance road should be checked for soil erosion on a routine basis.			
Cumulative impacts	The local landscape context is already defined by the existing 132kV power line, thus landscape degradation effects are limited, as the smaller monopoles adjacent to the existing lattice structure, would be visually absorbed into the existing power line corridor sense of place.			

Project phase	Decommissioning			
Impact	Alternative 2. Loss of landscape character due to the deconstruction of the ADDITIONAL transmission line.			
Description of impact	Movement of large vehicles in the landscape to take down the monopoles and restore vegetation on the impacted areas.			
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts		
Potential mitigation	<ul style="list-style-type: none"> • All structures should be removed and where possible, re-used or recycled. • The rubble should be managed according to NEMWA and deposited at a registered landfill if it cannot be recycled or reused. • All compacted areas should be ripped and then rehabilitated according to a rehabilitation specialist. • Monitoring for soil erosion should be undertaken on a bi-annual basis for a year following the completion of closure phase. 			
Assessment	Without mitigation		With mitigation	
Nature	Negative		Negative	
Duration	Short term	Impact will last between 1 and 5 years	Short term	Impact will last between 1 and 5 years
Extent	Local	Extending across the site and to nearby settlements	Local	Extending across the site and to nearby settlements
Intensity	Low	Natural and/ or social functions and/ or processes are somewhat altered	Low	Natural and/ or social functions and/ or processes are somewhat altered
Probability	Likely	The impact may occur	Likely	The impact may occur
Confidence	Medium	Determination is based on common sense and general knowledge	Medium	Determination is based on common sense and general knowledge
Reversibility	High	The affected environmental will be able to recover from the impact	High	The affected environmental will be able to recover from the impact



Resource irreplaceability	Low	The resource is not damaged irreparably or is not scarce	Low	The resource is not damaged irreparably or is not scarce
Significance	Minor - negative		Minor - negative	
Comment on significance	The small footprint of the impacted area and the shorter time period of the phase reduces the visual significance of the landscape change.			
Cumulative impacts	The shorter time period for this phase reduces the intensity of the landscape change, following which the landscape would be restored to the existing power line in rural agricultural sense of place.			

6.12.4 Conclusion and Recommendations

An inventory of the visual resources was undertaken for the site and surrounds. The Scenic Quality was defined as Medium to High due to the low hills and dune-field landscapes adjacent to the Orange River. There is a higher visual absorption capacity from the agricultural viticultural practice, as well as the existing 132kV power line with lattice structures. Receptor Sensitivity was rated Medium to Low due to the remoteness of the locality and the existing precedent for a power line routing in the landscape.

The recommendation of the assessment is that either of the proposed alternatives can be authorised with mitigation, as no significant visual resources will be lost and the power line corridor is already in place.



6.13 Electromagnetic Interference (EMI) & Radio Frequency Interference (RFI)

Zutari appointed Interference Testing and Consulting Services (Pty) Ltd to undertake an electromagnetic interference (EMI) assessment for the Gordonia-Avondale 132 kV transmission line project.

6.13.1 Baseline Description

The Karoo area is host to the Department of Science and Technology's square kilometre array (SKA) radio telescope project. Due to the sensitivity of the telescope receivers, there is a risk that unintentional emissions from electrical and electronic systems will desensitise the SKA receivers resulting in interference to celestial observations and/or data loss. Such interference is typically referred to as EMI.

Schedule D (Regulations restricting interference due to electrical activities within the Karoo central Astronomy advantage area 1) of the Regulations On The Protection Of The Karoo Central Astronomy Advantage Areas In Terms Of The Astronomy Geographic Advantage Act, 2007 published on 15 December 2017 was considered to determine the project's applicability.

However, as this project area is outside of the Karoo Central Astronomy Advantage Areas in terms of the Astronomy Geographic Advantage Act of 2007, no permits are required in terms of the 2017 Regulations on the Protection of the Karoo Central Astronomy Advantage Areas.

6.13.2 Site Sensitivity

To determine the site's sensitivity to EMI, it is important to unpack the technical considerations. These are discussed below.

Potential noise sources:

In a high voltage environment, the radio frequency interference sources are generally sparking and arcing related. Corona from the lines are generally not associated with high frequency (above 30MHz) interference. Gap-type corona interference can extend to beyond 1GHz.

- Corona discharge at the surface of the conductors, insulators and fittings;
- Sparking at the insulators;
- Sparking at mounting hardware and contacts;
- Micro arcing.

Weather conditions have a 10 to 20 dB impact on the noise source with corona being worst during wet weather conditions and sparking/ arcing being worst during dry weather conditions.

Corona discharge:

Corona discharge occurs when the electrical field close to a conductor is higher than the electrical withstand capability of the air, resulting in an electrical break down. The breakdown occurs at a local level, hence no flash over will occur. The discharge energy will be fairly low and the frequency band of concern is also low.

Any equipment, fittings and insulators energised to high voltage may generate corona. Corona is a normal effect and is worst during wet weather conditions.

Sparking:



Sparking occurs when there is sufficient voltage ($>$ withstand capability of air) to cause electrical breakdown of the air between two metallic objects (avalanche ionisation) and the development of an arc. At least one of the metallic components is electrically floating. This is not necessarily a single event as the components can be charged again after the discharge. The discharge energy is much higher than for corona and the frequency range extends into the GHz domain.

Sparking (gap discharge) is mostly associated with bad contacts and inferior installation practises. Sparking is worst during dry weather conditions.

Arcing:

Arcing is when ionised air forms a conductive current path between an earthed component and component at line potential. Arcing is associated with a fault condition, of short duration and the arc will normally be interrupted by the protection circuits.

Switching events:

Switching events such as capacitor bank switching will cause voltage and current transients with frequency components into the GHz band due to steep dV/dt and dI/dt gradients.

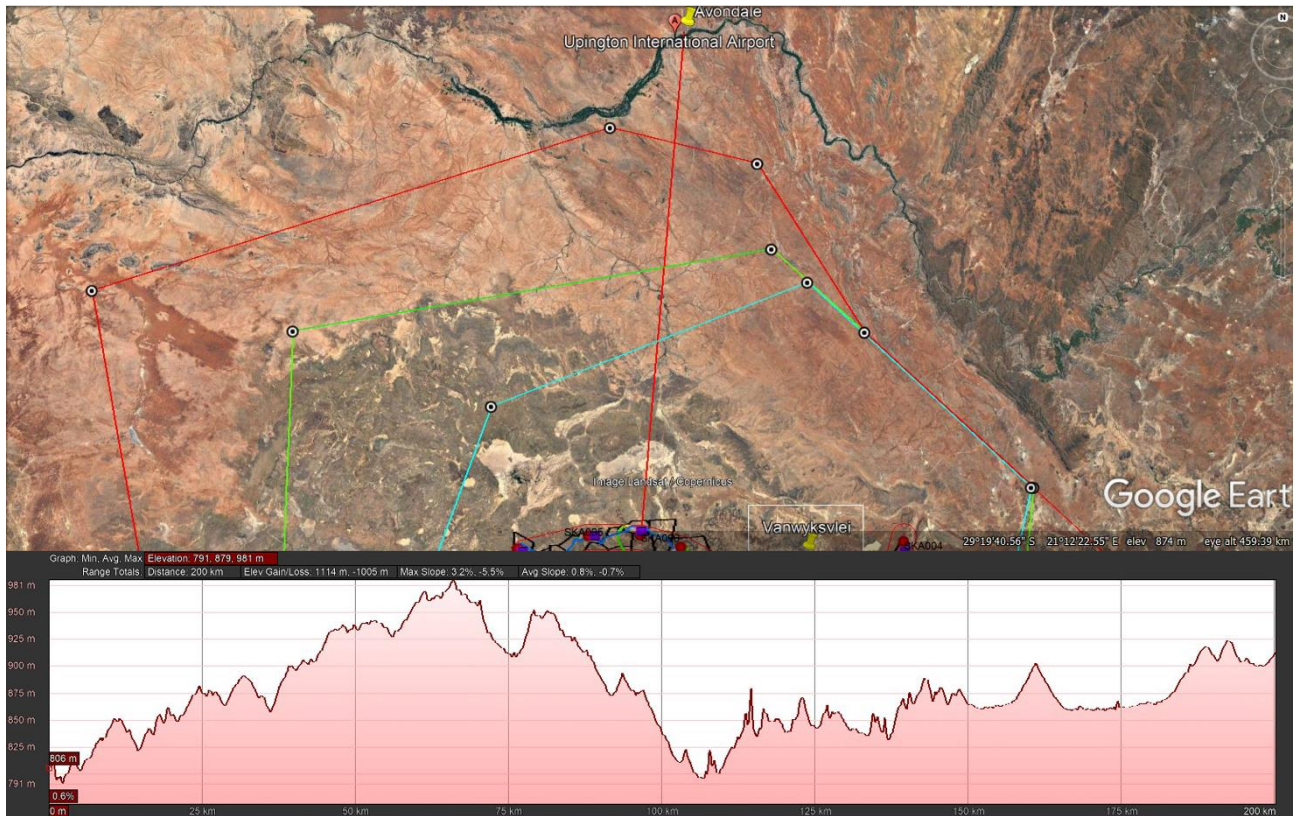


Figure 6-27: Elevation profile between the 132kV transmission line and the SKA buffer zone

6.13.3 Path loss calculation

The total path loss calculation (free space loss of 128dB and terrain loss of 60.2dB) shows a signal reduction of 191.5dB due to the 200km separation distance and terrain profile (Figure 6-28).



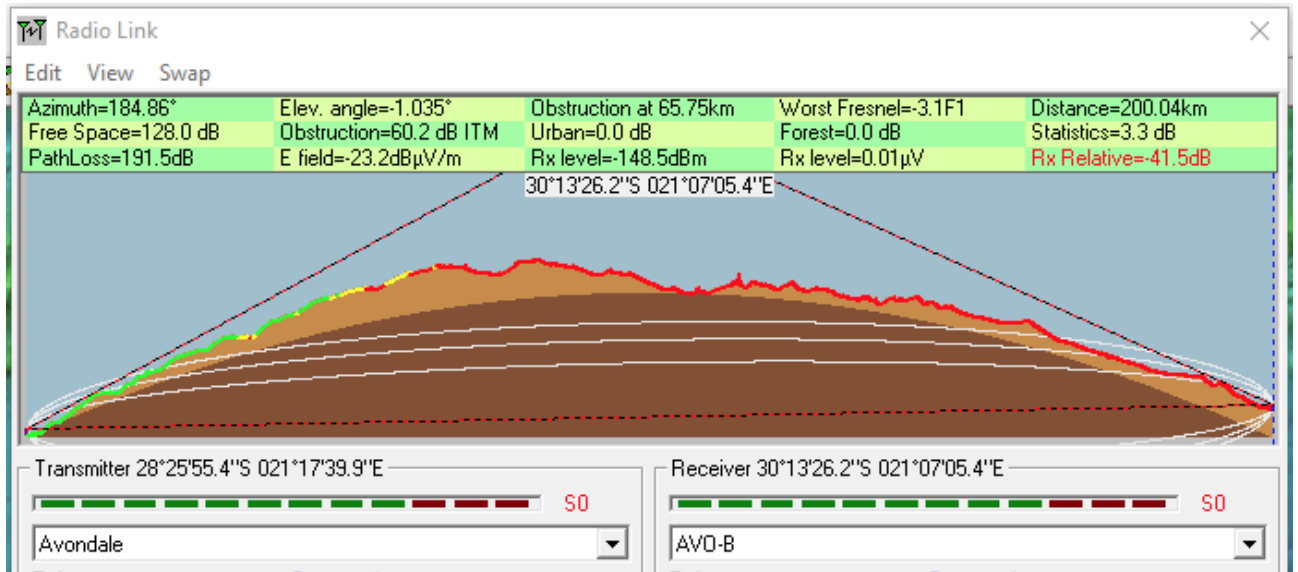


Figure 6-28: Path loss calculation at 300MHz

6.13.4 Impact assessment

Due to the >90km separation distance no impact assessment is required for the proposed project.

Based on the study supported by Eskom under the research programme: EMC and EMI (N.R100017.R.01.009 [2] with inputs from SKA, a 132kV transmission line will achieve SARAS limit compliance (-245 dBW/Hz) for separation distances >8km (wet conditions).

The 8km separation distance is confirmed by the separation distances adopted by the SPDO [1].

As a result of the 199km separation distance between the Gordonia-Avondale 132kV Transmission Line and the SKA infrastructure no mitigation measures would be required.

6.13.5 Conclusion and Recommendations

The study area is located outside of the declared Karoo Central Astronomy Advantage Area, promulgated in terms of the Astronomy Geographic Advantage Act, Act No. 21 of 2007. Due to the 200km separation distance between the Gordonia-Avondale 132kV Transmission Line area and SKA infrastructure, this infrastructure would pose a very low risk to the SKA operations and no special design techniques, or additional mitigation measures would be required.

6.14 Obstacle Limitation Surface Assessment

Zutari conducted an Obstacle Limitation Surface Assessment to verify the airspace interaction of the upgrade of the Gordonia-Avondale 132 kV transmission line with the Upington International Airport.

6.14.1 Baseline Description

The Obstacle Limitation Surfaces (OLS) are series of surfaces that define the limits to which objects may project into airspace around aerodromes which are required to be maintained free from obstacles. The definition and assessment of OLS permit that the intended airplane operations at the aerodromes are



conducted safely and prevent the aerodromes from becoming unusable by the growth of obstacles around the aerodromes.

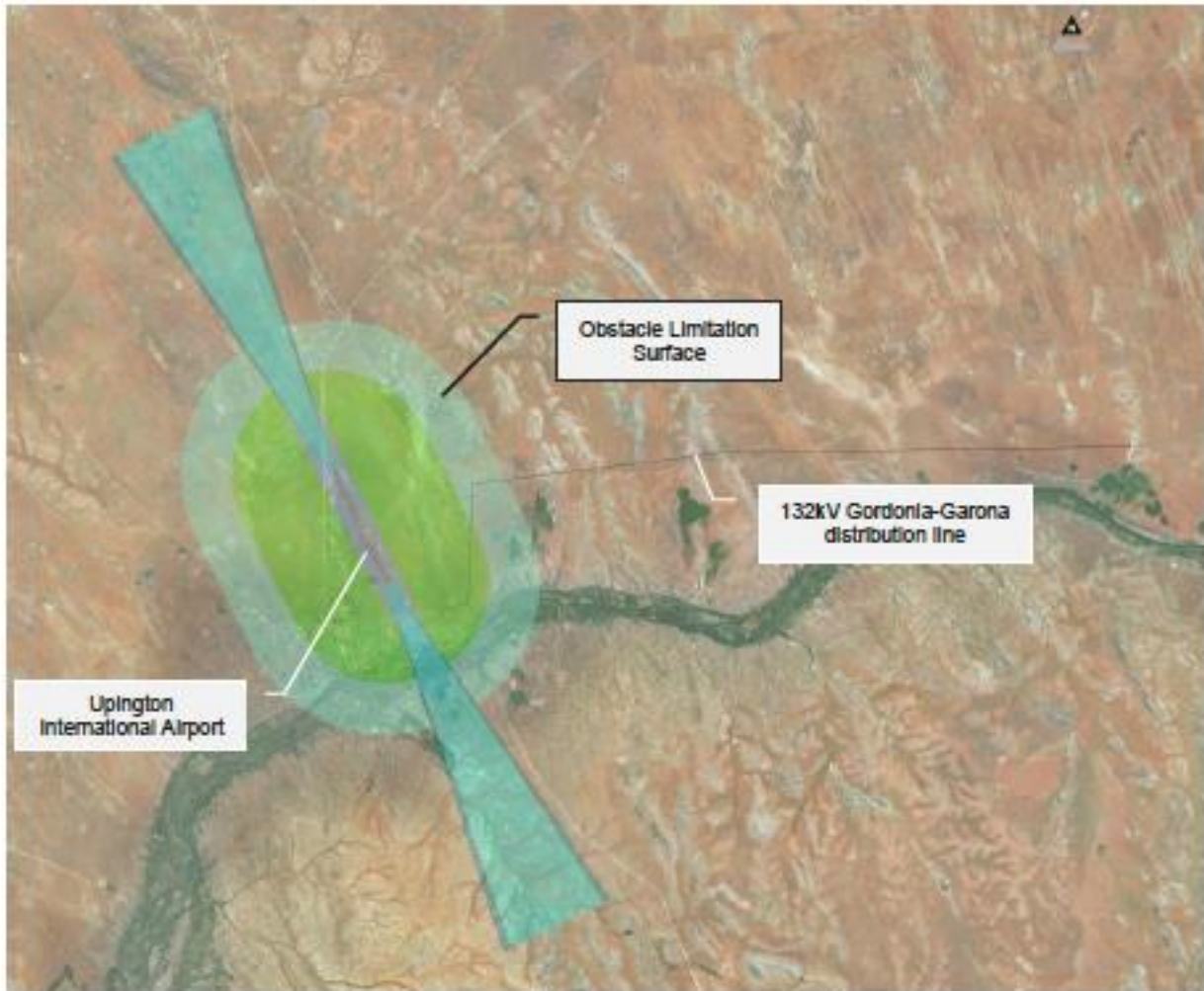


Figure 6-29: Transmission line in relation to the Upington International Airport

According to ICAO Annexure 14, the following surfaces were considered for a non-precision approach runway, as is the case for Upington International Airport:

- Transitional surfaces;
- Approach and take-off surfaces;
- Inner horizontal surface; and
- Conical surface.

A brief description of each surface with assessment findings is presented in the following sections.

Transitional surfaces:

This is a complex surface which interacts with the Approach surface. The lower limit of the Inner Transitional surface is the portion of the runway strip which is parallel to the runway/extended centreline and the upper limit, the Inner Horizontal Surface.



The Transitional surface slope is 14.3% for a code number 4, from the defined lower edge up to the Inner Horizontal Surface.

As illustrated in Figure 6-30, the transmission line is situated outside the Transitional Surfaces. Thus, no protrusions are anticipated in the Transitional Surfaces.

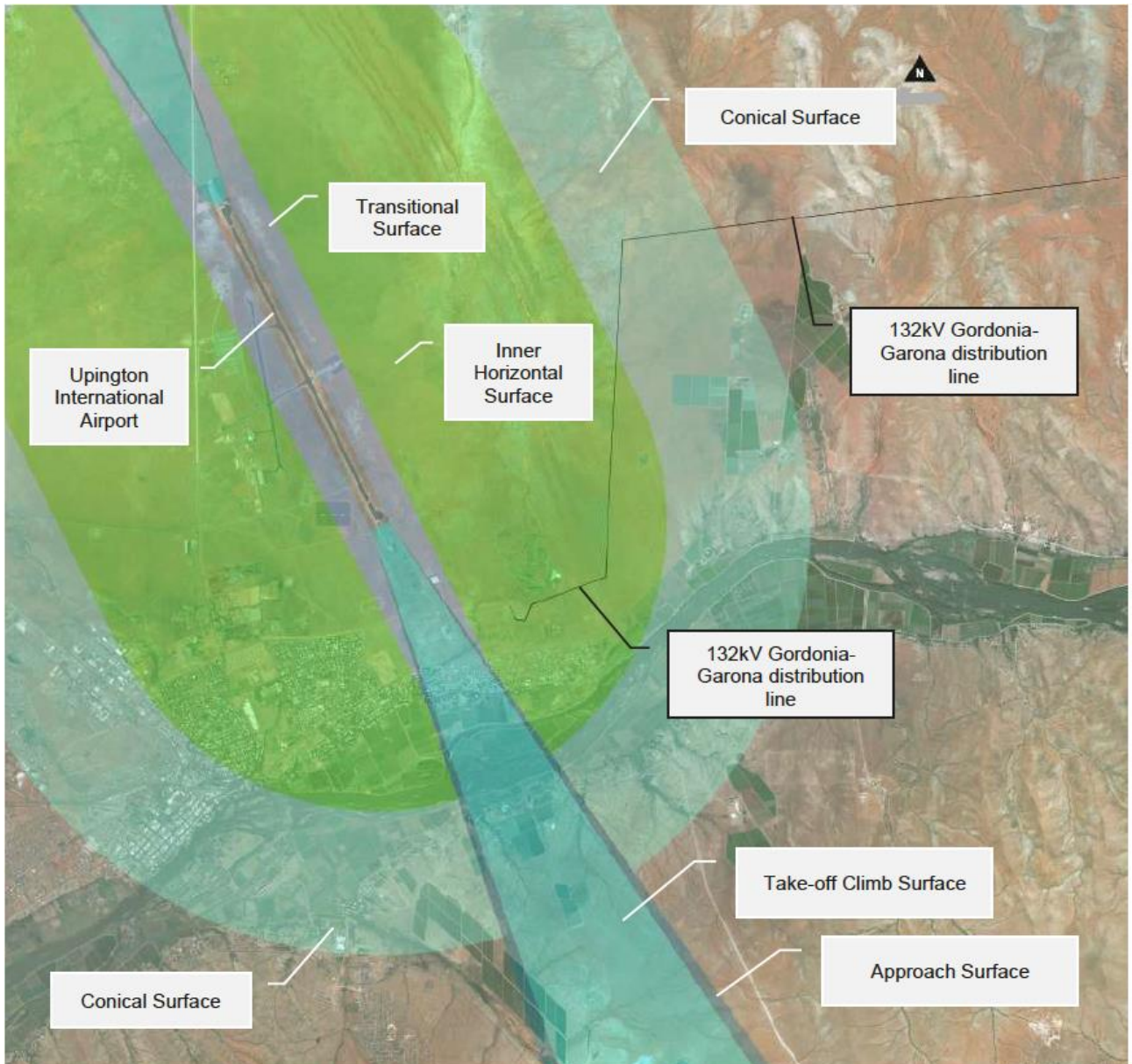


Figure 6-30: Obstacle limitation surfaces

Approach and take-off surfaces:

This is an inclined plane or combination of planes, preceding the runway threshold. The surface is bound by an edge perpendicular to the runway centreline, which is a set distance from the threshold.

From here it diverges at a specified rate (vertical and horizontal) and has an outer edge which is parallel to the inner edge.



For the code 4 non-precision runway conditions, the approach surface precedes both thresholds by 60m. As illustrated in Figure 6-30, the transmission line is situated outside the approach and take-off climb surfaces. Thus, no protrusions are anticipated in the approach and take-off climb surfaces.

Inner horizontal surface:

A surface located in the horizontal plane at a specified height above an aerodrome, the radius of which is specified and measured from a reference point on the aerodrome. The elevation of the surface is measured from a defined elevation datum for such a purpose.

The aerodrome reference point (ARP) was obtained from the AIP. The elevation at this point is approximately 850.7m.

The assessment of the inner horizontal surface provided the outcome as per Table 6-10 and Figure 6-31.

Table 6-10: Inner horizontal surface findings

Consideration	Reference elevation	Height of element	Consideration elevation
Inner Horizontal Surface	850.7m	45m	895.7m
Distribution line ground profile – highest point	829.8m	30m	859.8m

The assessment indicates that no protrusions on the Inner Horizontal Surface are anticipated.

Conical surface:

This is the surface which slopes upwards and outwards from the periphery of the inner horizontal surface. The upper limit is specified as a height above the inner horizontal surface.

For a non-precision approach code number 4 runway, the Conical Surface is at 100m above the inner horizontal surface. The divergence slope from the lower plane coincident with the Inner horizontal surface is 5% in both cases.

The assessment indicated no protrusions on the conical surface as a result of no observed protrusions in the inner horizontal surface.

6.14.2 Conclusions and recommendations

The undertaking of this high-level concept OLS assessment indicated that the location of the existing transmission line (and therefore the proposed upgrading of this line) does not cause any protrusion on the OLS on the bases that the maximum pylon remains below 30m as per the height of the existing lattice towers.



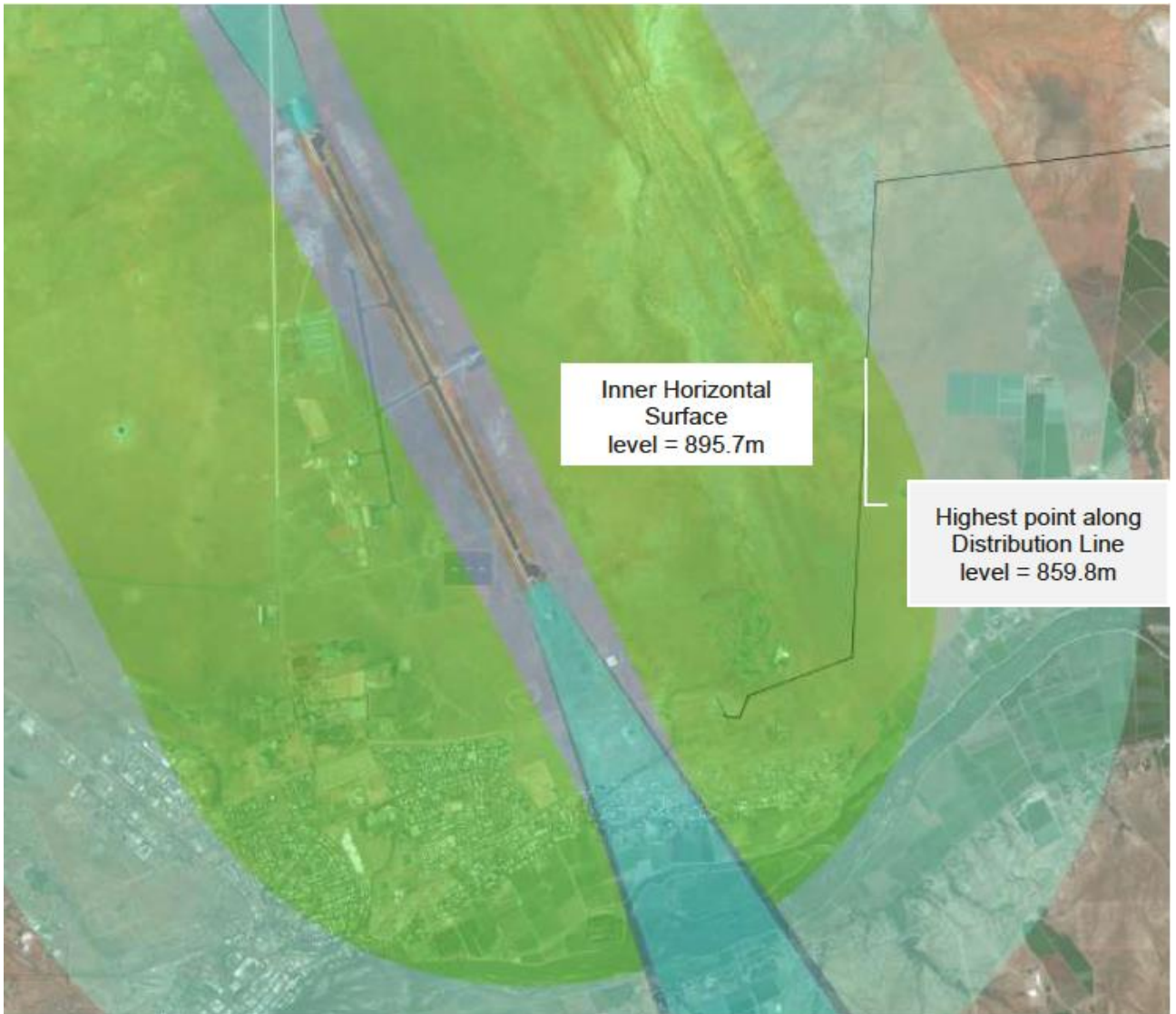


Figure 6-31: Inner horizontal surface and transmission line interaction

6.15 Civil Aviation Compliance Assessment

Government Notice No. 320 of 20 March 2020 stipulates the protocol for assessment and minimum report content for impacts on civil aviation installations, for activities that require environment authorisation. The reporting requirements are associated with the level of sensitivity as identified by the national environmental screening tool, which sensitivity level determines the requirement for the CAA compliance statement. A site sensitivity verification assessment must confirm or dispute the current use of the land and the environment sensitivity as identified by the screening tool.

An assessment was conducted from the information provided and from available aerial imagery and lidar survey to identifying possible nearby civil aviation installations with the potential of being impacted.



6.15.1 Baseline description

Figure 6 illustrate the proposed development footprint overlaid on the civil aviation sensitivity map as generated by the DFFE screening tool.

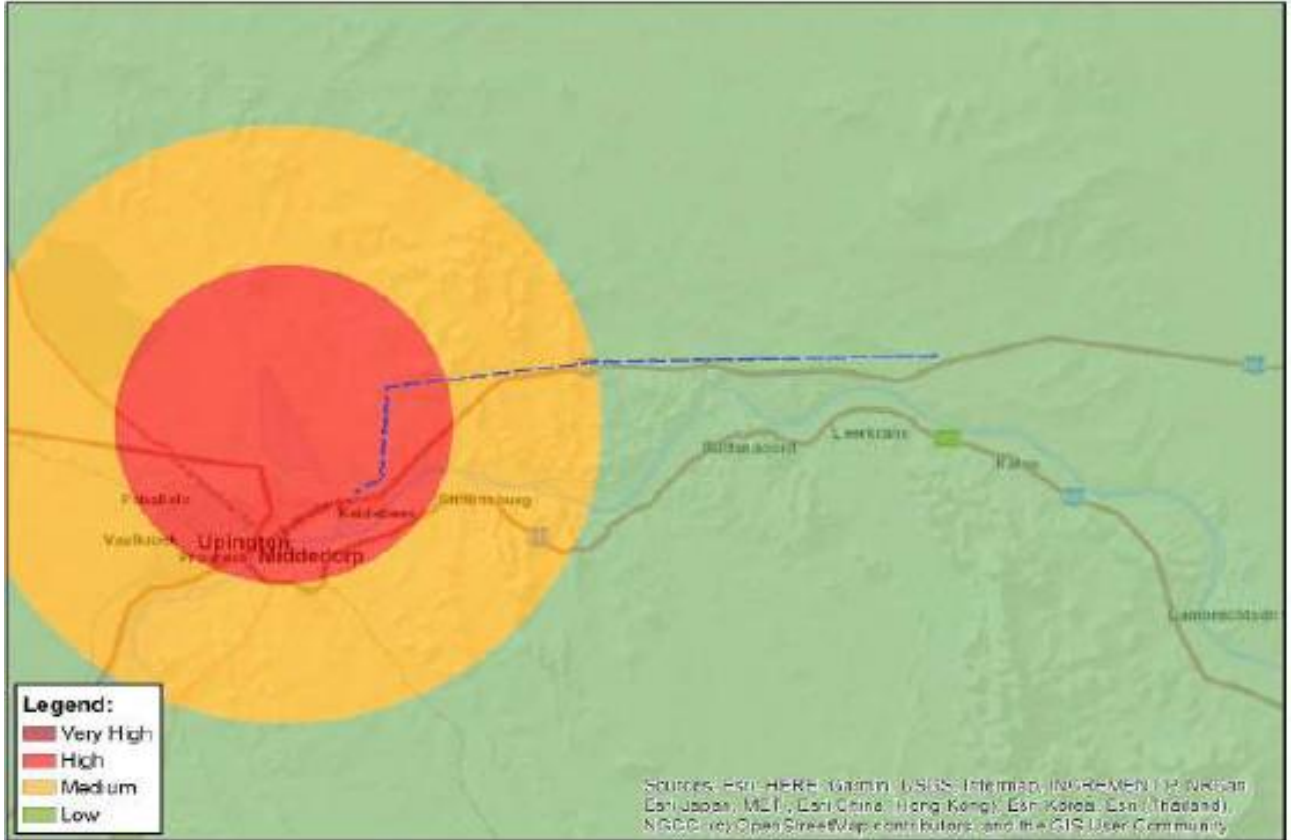


Figure 6-32: Map of relative civil aviation theme sensitivity (DFFE screening tool)

Findings illustrated in Figure 6 indicates the high sensitivity feature of the distribution line in relation to Uptington International Airport. Our analysis shows agreement with the High sensitivity rating.

The OLS assessment conducted however indicates no interaction between the upgrading of the existing portion of the 132kV Gordonia-Garona distribution line and the OLS.

6.15.2 Conclusion and recommendation

Although the planned infrastructure falls within the high sensitivity rating, it is not foreseen that these civil aviation installations are impacted by the planned activities with consideration of the OLS.



7 ENVIRONMENTAL IMPACT STATEMENT

The potential impacts associated with the proposed upgrading of the transmission line for connection of the Avondale Hybrid Solar project are summarised in Table 7-1. With mitigation measures in place as set out in chapter 6 and detailed in the generic EMPr (Annexure G), post mitigation impacts are anticipated to be negligible to moderate negative significance.

The final monopole pylon positions to be determined during the detailed design phase must be informed by the conditions of the EA together with the sensitivities as described by the specialists. Furthermore, these pylon positions must remain along the existing centreline. An environmental sensitivities map related to the existing pylon positions and indicating areas that new pylons must avoid is included in Annexure I. For clarity, this sensitivities map has been divided into five smaller scale maps (Figure 7-1 to Figure 7-5) in order to show the main sensitivities associated with the proposed development site and is provided at the end of this chapter. All new pylon positions must remain outside of the identified sensitivities which mainly relate to aquatic features that need to be avoided. The map also illustrates the seasonal no-go areas, Martial Eagle nest and Verreaux's Eagle nest as provided by the avifaunal specialist.

From a cumulative perspective the proposed project will not contribute to any unacceptable changes in the impacts of the existing line. Vegetation clearance will be minimal, and the botanical specialist has indicated that the disturbed areas will naturally be able to recover. The existing access and services tracks for the line crosses some seasonal drainage lines (only flowing after rain) and the proposed project will not contribute to cumulative impacts on these features that are not already occurring. Furthermore the mitigation and management measures provided by the aquatic specialist and contained in the EMPr can adequately address any issues that may arise (note construction will likely occur during the dry season, which decreases erosion potential). From visual, palaeontological, archaeological and agricultural perspectives the proposed project will not result in any cumulative impacts that cannot be appropriately avoided, managed or mitigated. In context it has to be noted that the line has been operational for over 30 years and if this project does not go ahead, will remain in place and operational with the same impacts still occurring, whilst if the project goes ahead impacts can be improved by installing BFD's and pylons avoiding aquatic features.

Anticipated impacts to botanical ecology of the site will mainly be associated with disturbance and loss of intact vegetation. Only one plant of *Hoodia officinalis* subsp. *officinalis* was found during the survey. The coordinates of the plant were recorded. Should there be the need to disturb this plant, it should be removed and transplanted in similar habitat nearby that would not be affected by the power line project. One plant of *Euphorbia braunsii* was found (it is Least Threatened) and this plant should also be moved and transplanted to a suitable site. The ECO needs to ensure that these plants are not damaged/disturbed/destroyed and can undertake the transplant. The majority of the potential impacts are expected to occur during the construction phase, while operational impacts also include risk of soil erosion and invasion of alien plant species. Significance of impacts on botanical ecology with mitigation measures in place was rated minor negative for the preferred alternative and the specialist indicated that there is no objection to the proposed project.

Upgrading the existing transmission line provides an opportunity to reduce the overall risks of impact to the receiving avifaunal community compared to the current risks present along the corridor as there are no BFDs currently on the existing transmission line. The main negative impact on avifauna besides the electrocution of birds and birds colliding with power lines, relates to the existing SCC nests that were observed on two of the existing lattice structures. This impact can be mitigated by adhering to the seasonal no-go zone as recommended by the specialist. Alternative nesting structures must be provided successfully with specialist input as per the Avifauna specialist report. Construction activities within the SCC buffer zones may only be conducted outside of the breeding season. Other impacts include electrical



faults caused by bird's excreta when roosting or breeding on the power lines. Loss of habitat and disturbance to avifaunal species is not expected to occur for the preferred alternative as this is an existing transmission line servitude. Significance of impacts on avifauna with mitigation measures in place was rated between minor and moderate negative significance and the specialist stated that the proposed project will not result in any unacceptable avifaunal impacts that would warrant the project to not go ahead, in fact the mitigations measures to be put in place will improve the negative avifaunal impacts currently taking place as a result of the existing line.

The proposed development occurs within the D73E catchment associated with alluvial systems of the Nama Karoo ecoregion. These mainstem watercourses are short tributaries of the Orange River (ca. 1 to 7 km from any given point within the study area), which are ephemeral in nature and only contained one wetland element within the proposed alignment corridor, namely a small depression (pan) 0.5 ha in size. The small depression can be avoided/spanned by the development activities as the pylons could easily be placed outside of this system. Overall, these drainage systems and the pan, are largely in a natural state, when compared the Orange River, which has modified floodplains and flows. Current and existing impacts occur in localised areas within the corridor and includes existing tracks and evidence of grazing (small livestock). Potential impacts of the proposed transmission line upgrades on aquatic resources/ecosystems, include physical disturbance of sensitivity systems, changes to the riparian form and function and impacts on water quality. These impacts are anticipated during the construction and decommissioning phases. While increase in sedimentation and erosion could also potentially occur during the operational phase. Significance of impacts on aquatic ecology with mitigation measures in place was rated between moderate and minor negative significance and the project is therefore supported from an aquatic ecology perspective.

Heritage resources include archaeological, paleontological and cultural heritage material. Apart from a limited number of farming related features, mostly watering points for livestock, the material that was identified is stone tools dating to the Middle and Later Stone Age. This occurs as a very thin scatter sporadically across the landscape. The material is viewed to be of mainly low significance. Anticipated impacts on heritage resources are likely to occur during the construction phase and the significance of impacts with mitigation measures in place was rated as minor negative and acceptable. A chance fossil finds procedures is included in the EMPr.

It is anticipated that direct impacts on the socio-economic environment will be of largely of local extent. During the construction and decommissioning phase potential impacts include, harm to social networks with the presence of external construction workers and social networks associated with the influx of job seekers, risk to safety of farmers and farm workers, livestock and damage to farm infrastructure, and increased risk of grass fire. Significance of impacts with mitigation measures in place was rated minor negative, mainly due to the relatively small size of the project. Positive impacts identified during the construction and decommissioning phases includes the creation of employment and business opportunities as well as the operational support of development of renewable energy.

The components of the project that can impact on soils, agricultural resources and productivity include occupation of the site by the footprint of the facility, and construction activities that disturb the soil profile and vegetation. The agricultural impacts of an overhead power line in this kind of an environment are considered negligible by the agricultural specialist because, in terms of agricultural land use, the transmission line corridor is located entirely on land that has only ever had grazing as an agricultural land use.

The sensitive receptors in the vicinity of the development include viticulture associated with the Orange River, the Upington built environment, the N14 national road, the REDZ7 renewable energy development and low intensity cattle and game farming. The visual impact of the proposed project is rated as minor negative to moderate negative.



The proposed upgrading of the 132 kV transmission line was assessed and found to be acceptable by all specialists..

A summary of all the impacts assessed by the specialist team is included in the table below as well as the combined sensitivity maps.

No-go alternative:

The no-go alternative implies that the status quo of the site would be maintained. This option would prevent the new Avondale Hybrid Solar project from exporting their energy to the national grid as the existing 30-year-old transmission line is unreliable and prone to regular failure. This would mean that the positive impacts associated with the development of the Avondale Hybrid Solar project (and this associated grid connection infrastructure), such as job creation, local economic development, energy security and a decreasing reliance on fossil fuel industries would not be realised. It would also mean that the current negative impacts associated with the line like not having BFD's and some pylons located inside aquatic features, will persist.



Table 7-1: Impact summary table

Ref:	Project phase	Impact	Without mitigation						With mitigation					
			Nature	Duration	Extent	Intensity	Probability	Significance	Nature	Duration	Extent	Intensity	Probability	Significance
1	Construction	Loss of aquatic sensitivity systems	Negative	Long term	Regional	Very high	Certain / definite	Major - negative	Negative	Long term	Local	Low	Probable	Minor - negative
2	Construction	Hydrological changes: Increase in surface water runoff	Negative	Long term	Local	Low	Certain / definite	Moderate - negative	Negative	Long term	Local	Low	Probable	Minor - negative
3	Construction	Increase in sedimentation and erosion	Negative	Long term	Local	Low	Certain / definite	Moderate - negative	Negative	Long term	Local	Very low	Probable	Minor - negative
4	Construction	Impact on localised surface water quality	Negative	Long term	Local	Low	Certain / definite	Moderate - negative	Negative	Long term	Local	Very low	Probable	Minor - negative
5	Construction	Avifauna habitat destruction associated with the removal of existing lattice structures	Negative	Long term	Municipal area	Extremely high	Certain / definite	Major - negative	Negative	Short term	Local	Very high	Certain / definite	Moderate - negative
6	Construction	Disturbance and displacement of avifauna associated with the replacement of existing lattice structures	Negative	Long term	Local	High	Almost certain / Highly probable	Moderate - negative	Negative	Short term	Local	Low	Likely	Minor - negative
7	Construction	Direct impact on avifauna associated with the replacement of existing lattice structures	Negative	Brief	Local	Low	Likely	Minor - negative	Negative	Immediate	Limited	Low	Probable	Negligible - negative



Ref:	Project phase	Impact	Without mitigation						With mitigation					
			Nature	Duration	Extent	Intensity	Probability	Significance	Nature	Duration	Extent	Intensity	Probability	Significance
		and construction of new transmission line												
8	Operation	Disturbance and displacement associated with periodic maintenance works	Negative	On-going	Local	High	Almost certain / Highly probable	Moderate - negative	Negative	On-going	Local	High	Probable	Minor - negative
9	Operation	Direct impact to avifauna associated with periodic maintenance works during operational phase	Negative	On-going	Local	High	Almost certain / Highly probable	Moderate - negative	Negative	On-going	Local	High	Almost certain / Highly probable	Moderate - negative
10	Decommissioning	Habitat destruction	Negative	Short term	Local	Low	Likely	Minor - negative	Negative	Short term	Local	Low	Likely	Minor - negative
11	Decommissioning	Disturbance and displacement of avifaunal species	Negative	Short term	Local	High	Certain / definite	Moderate - negative	Negative	Short term	Local	Low	Probable	Minor - negative
12	Decommissioning	Direct impact to avifaunal SCCs	Negative	Long term	Local	Low	Probable	Minor - negative	Negative	Long term	Local	Very low	Probable	Minor - negative
13	Construction	Impact on identified heritage features	Negative	Permanent	Limited	Low	Unlikely	Minor - negative	Negative	Permanent	Limited	Low	Unlikely	Minor - negative
14	Construction	Impact on fossil heritage	Negative	Permanent	Limited	Low	Highly unlikely / none	Negligible - negative	Negative	Permanent	Limited	Low	Highly unlikely / none	Negligible - negative
15	Construction	Alternative 1: Loss of landscape	Negative	Short term	Local	Moderate	Almost certain /	Minor - negative	Negative	Short term	Local	Moderate	Almost certain / Highly probable	Minor - negative



Ref:	Project phase	Impact	Without mitigation						With mitigation					
			Nature	Duration	Extent	Intensity	Probability	Significance	Nature	Duration	Extent	Intensity	Probability	Significance
		character due to the replacement of the existing lattice structure with a similar sized monopole.					Highly probable							
16	Operation	Alternative 1: Loss of landscape character due to the operation of the transmission line.	Negative	Permanent	Local	Moderate	Almost certain / Highly probable	Moderate - negative	Negative	Permanent	Local	Moderate	Almost certain / Highly probable	Moderate - negative
17	Decommissioning	Alternative 1: Loss of landscape character due to the deconstruction of the transmission line	Negative	Short term	Local	Moderate	Almost certain / Highly probable	Minor - negative	Negative	Short term	Local	Moderate	Almost certain / Highly probable	Minor - negative
18	Construction	Alternative 2: Loss of landscape character due to the construction of the new transmission line adjacent to the existing lattice structure line.	Negative	Short term	Local	Moderate	Likely	Minor - negative	Negative	Short term	Local	Moderate	Likely	Minor - negative
19	Operation	Alternative 2: Loss of landscape character due to the construction	Negative	On-going	Local	Low	Likely	Minor - negative	Negative	Permanent	Local	Low	Likely	Minor - negative



Ref:	Project phase	Impact	Without mitigation						With mitigation					
			Nature	Duration	Extent	Intensity	Probability	Significance	Nature	Duration	Extent	Intensity	Probability	Significance
		of the new transmission line adjacent to the existing lattice power line.												
20	Decommissioning	Alternative 2: Loss of landscape character due to the deconstruction of the ADDITIONAL transmission line.	Negative	Short term	Local	Low	Likely	Minor - negative	Negative	Short term	Local	Low	Likely	Minor - negative
21	Construction	Loss of vegetation type: Gordonia Duneveld	Negative	Long term	Local	Low	Probable	Minor - negative	Negative	Long term	Local	Very low	Probable	Minor - negative
22	Construction	Loss of vegetation type: Kalahari Karroid Shrubland	Negative	Long term	Local	Low	Probable	Minor - negative	Negative	Long term	Local	Very low	Probable	Minor - negative



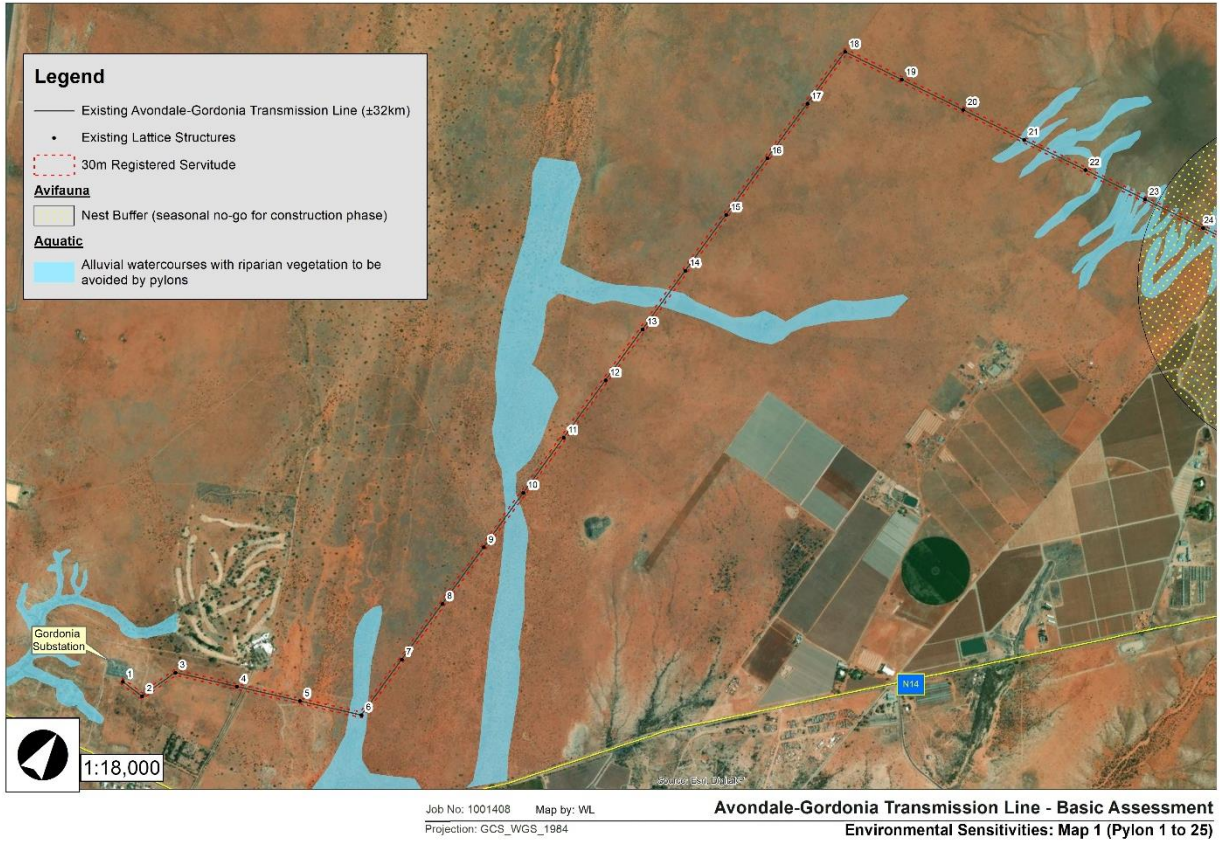


Figure 7-1: Combined sensitivity map 1 (pylons 1 to 23)

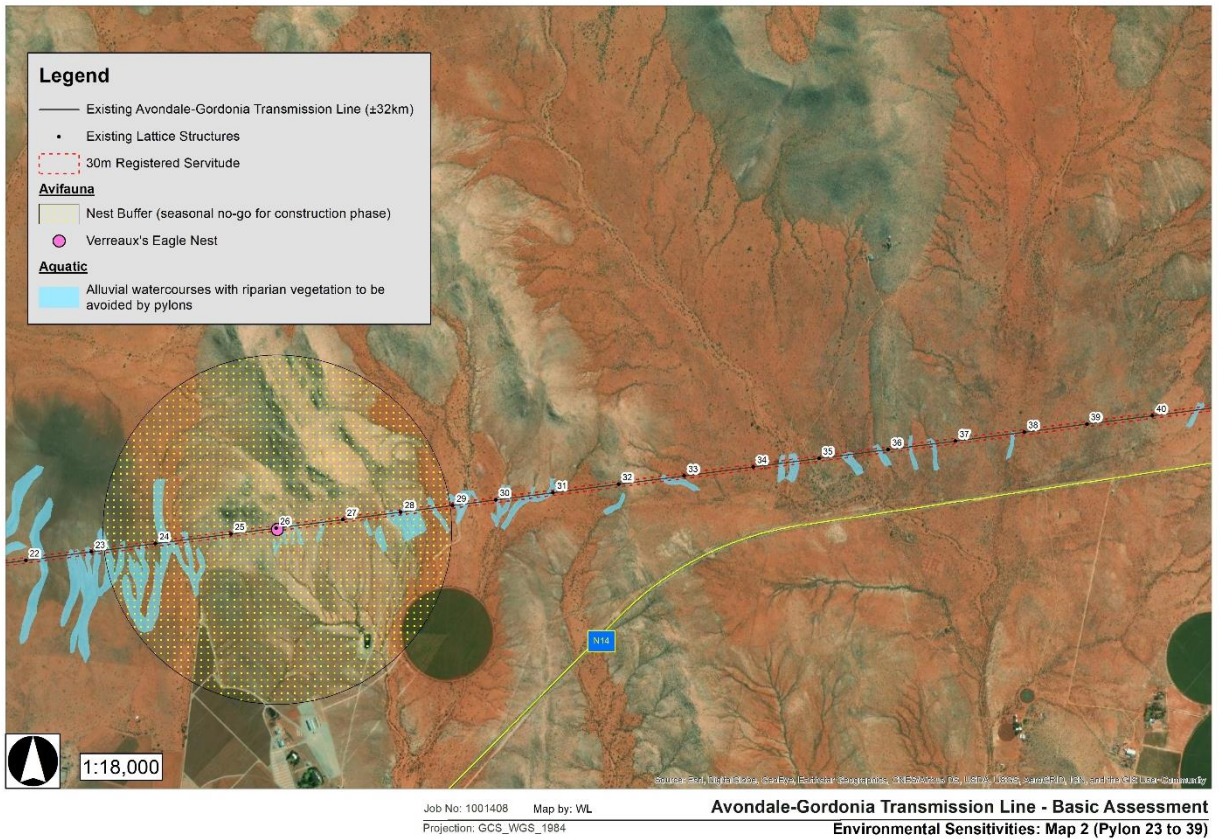


Figure 7-2: Combined sensitivity map 2 (pylons 23 to 39)



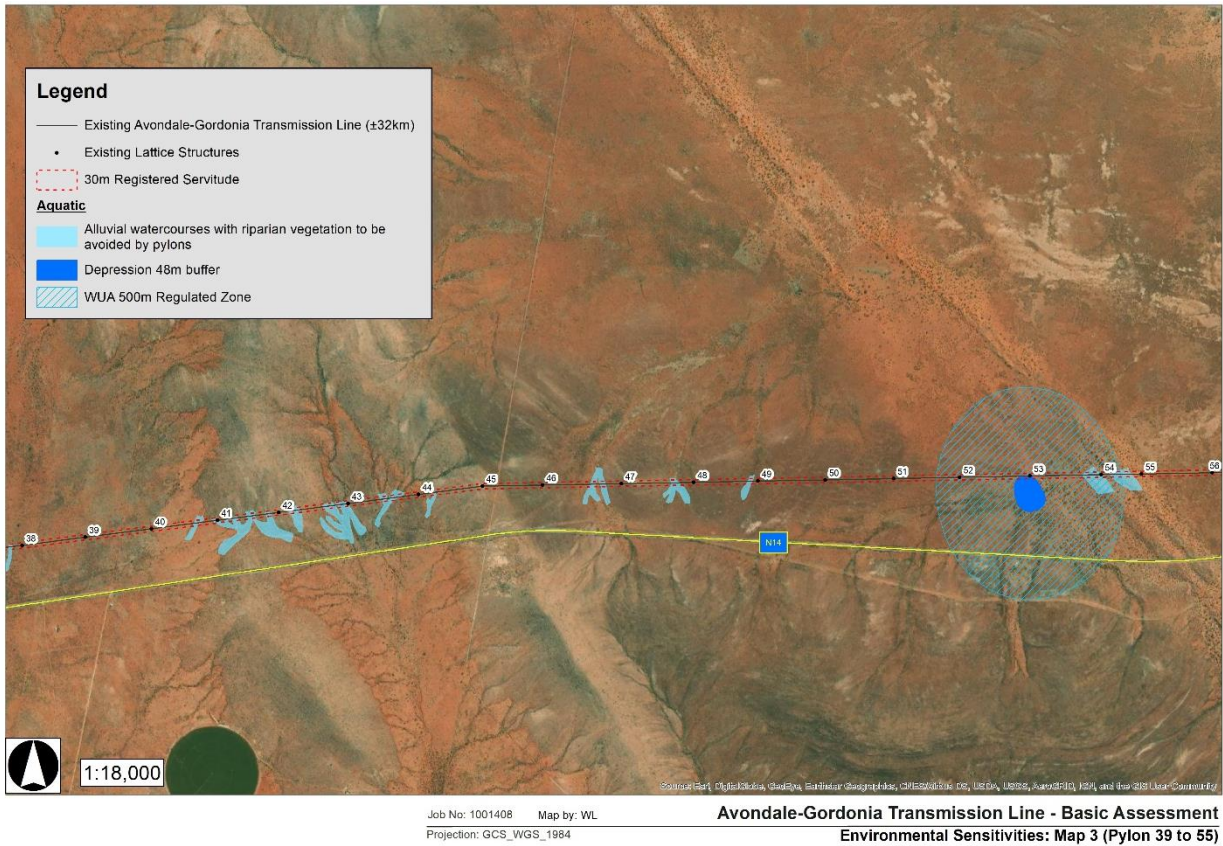


Figure 7-3: Combined sensitivity map 3 (pylons 39 to 55)

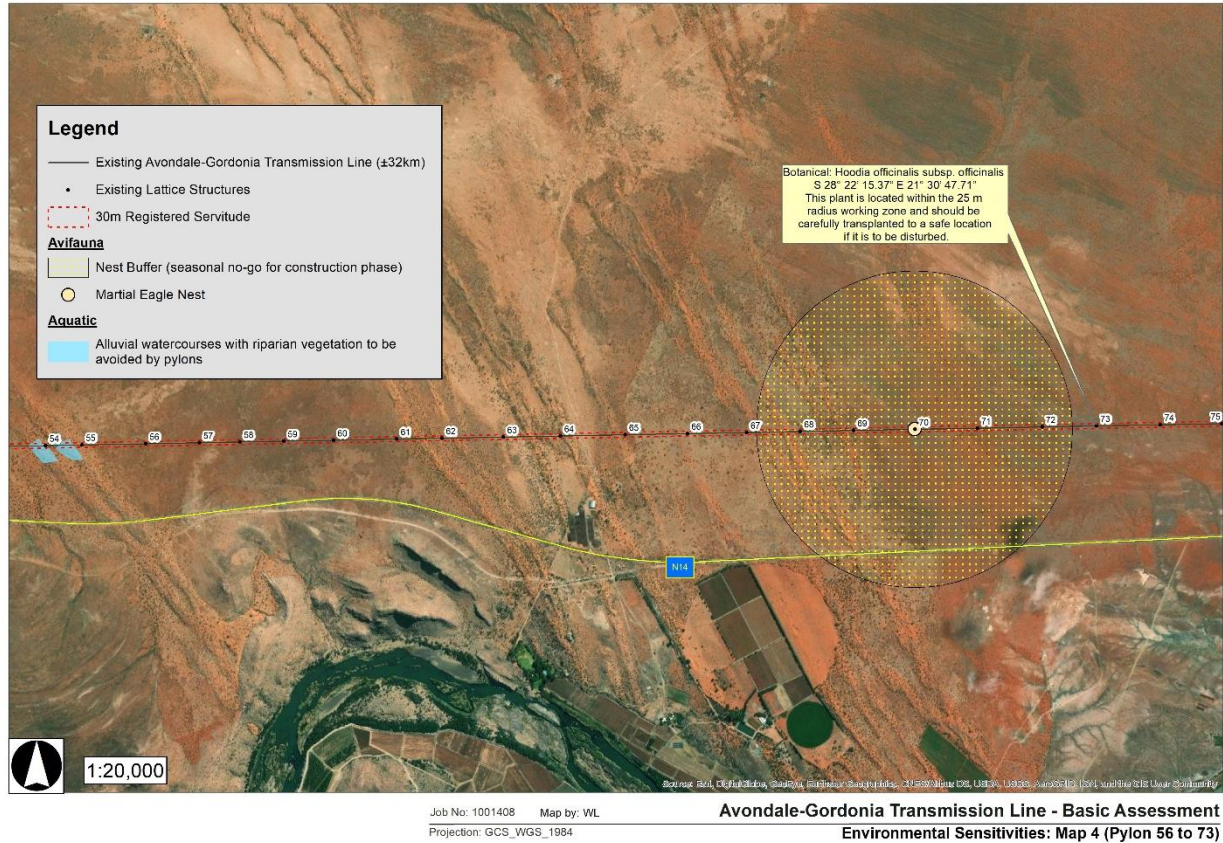


Figure 7-4: Combined sensitivity map 4 (pylons 56 to 73)



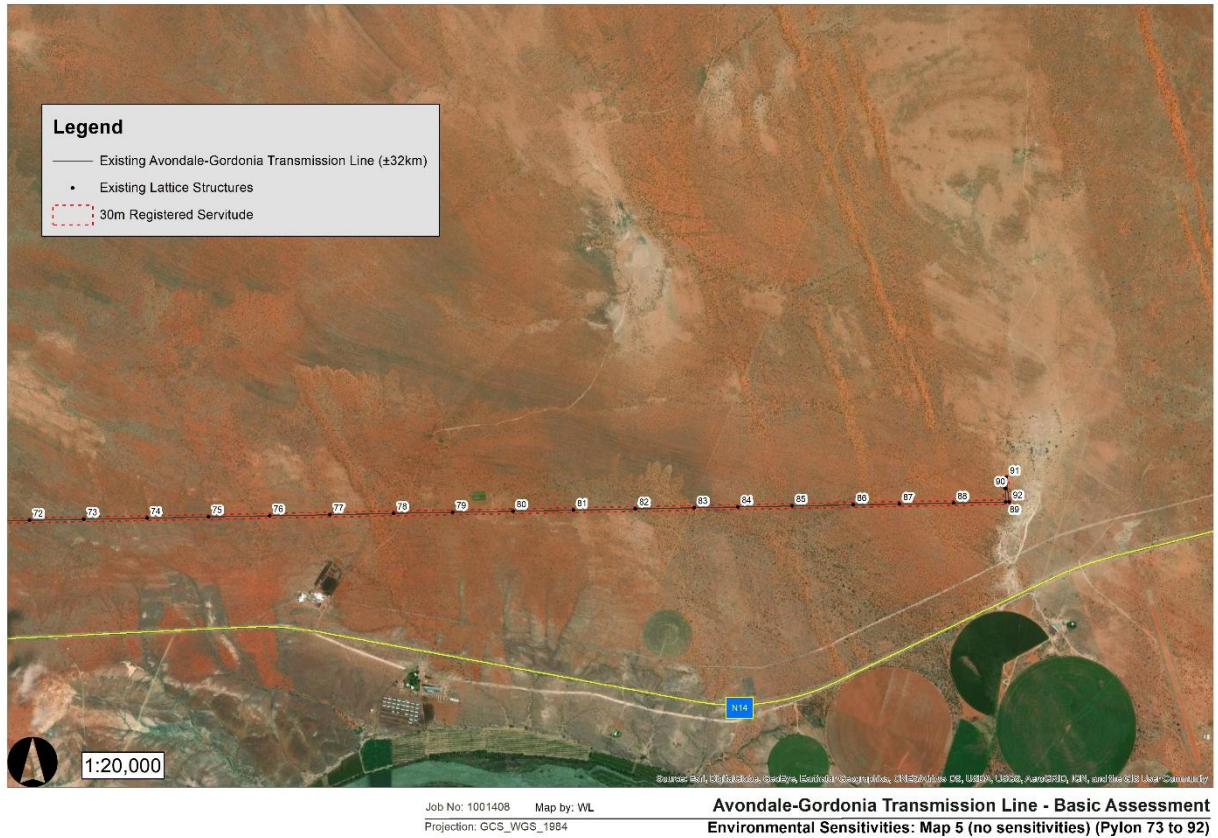


Figure 7-5: Combined sensitivity map 5 (pylons 73 to 92).

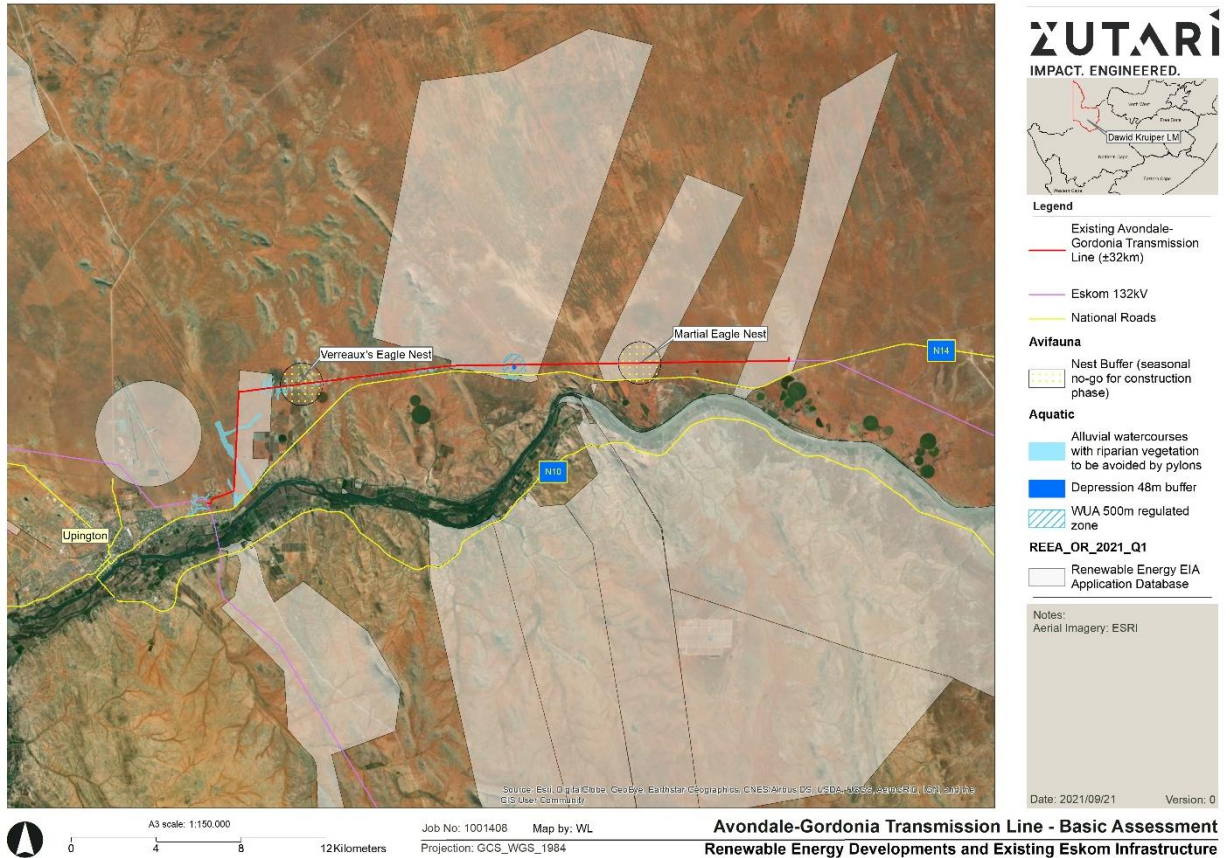


Figure 7-6: Renewable Energy Developments and existing Eskom infrastructure near the site.



7.1 Proposed Specific Conditions of Authorisation

Validity of the Environmental Authorisation

- The Environmental Authorisation is valid for a period of five years from the date of the decision.

Final Pylon Positions

- The list of coordinates of the final pylon positions to be determined during the detailed design phase must be submitted to the department prior to construction commencing.

Avifauna

- Appropriate BFDs are to be attached to the transmission line for a distance of at least 5.2 km each side of the Verreaux's Eagle nest and 5 km each side of the Martial Eagle nest (i.e. areas identified as being of Very High and High Site Ecological Importance).
- Alternative nesting platforms for the Verreaux's Eagle nest and Martial Eagle nest must be constructed and the nests moved prior to construction activities taking place in its vicinity. An avifaunal specialist must be appointed to facilitate moving the nests and to consult on the type of structure to be constructed.

Aquatic Ecology

- New pylons must avoid the aquatic features as identified by the aquatic specialist as no-go.

Environmental Management Programme

- The EMPr submitted with the Final Basic Assessment is approved and the final list of pylon coordinates must be included in the EMPr when the list is available.
- The holder of the EA must appoint a suitably qualified ECO prior to the commencement of construction activities.

Access

- Existing tracks and the Eskom service track must be used to access the site.



8 CONCLUSIONS AND WAY FORWARD

Based on the information presented within this basic assessment report and associated annexures, and taking the proposed mitigation measures into account, it is recommended that the preferred alternative (Alternative 1) for the proposed upgrading of the Gordonia-Avondale 132 kV transmission line be granted a positive Environmental Authorisation.

This 2nd Draft BAR will be updated where necessary following the 30-day public comment period. All comments received on the BAR will be collated, responded to, and included in the updated Public Participation Report (Annexure C). Where necessary the BAR will be updated to address the received comments. The final BAR will be submitted to the DFFE for review and decision-making (for 107 days) whereby an Environmental Authorisation would be granted or refused. All registered I&APs will be notified of the outcome.

As per the requirements of NEMA, this BA has reviewed the array of potential environmental impacts associated with the proposed activities on the Gordonia-Avondale 132 kV transmission line site. Table 8-1 provides a summary of the description of the preferred alternative for the proposed project (Chapter 4).

Table 8-1: Summary of proposed project description (preferred alternative)

Component	Description
Overhead Powerline	132kV single-circuit Extending from the Gordonia sub-station to the new Avondale hybrid solar PV power site. The transmission line will be located within the existing 32m servitude. Length ±32km The line is accessed via existing access/farm roads and the Eskom a service track running underneath the line.
New monopole structures	New structures will be up to 28m tall. Monopoles (Self-supporting) is proposed to be used (stayed pylons may potentially be used for long spans, but unlikely). Disturbance footprint per pylon of approximately 16m ² (4m x 4m).
New Conductor type	Upgrade to Tern conductor
Project footprint	1 472m ² total footprint (permanent)
Existing lattice structures	Existing lattice structures are approximately 30 years old. 92 lattice structures within the relevant section of the line. Lattice structure pylons are to be upgraded with new monopole structures. Existing lattice structures are approximately 26m tall.



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10 ANNEXURES

Annexure A, Details of the EAP

Annexure B, Correspondence with DFFE

Annexure C, Public Participation

Annexure D, Specialist reports

Annexure D.1, Aquatic Assessment

Annexure D.2, Botanical Assessment

Annexure D.3, Avifauna Assessment

Annexure D.4, Archaeology and Heritage Assessment

Annexure D.5, Palaeontology Assessment

Annexure D.6, Visual Impact Assessment

Annexure D.7, Agricultural Statement

Annexure D.8, Electromagnetic Assessment

Annexure D.9, Obstacle Limitation Assessment and CAA compliance

Annexure D.10, Geotechnical Desktop Report

Annexure D.11, Terrestrial Biodiversity Compliance Statement

Annexure D.12, Terrestrial Animal Species Compliance Statement

Annexure D.13, Defence Compliance Statement

Annexure E, Screening Tool Report

Annexure F, Bend Point Coordinates of Existing Transmission Line

Annexure G, Generic EMPr updated

Annexure H, Site photographs

Annexure I, Maps

Annexure J, Declarations

