MARALLA WEST WIND (RF) (PTY) LTD

PROPOSED MARALLA WEST 132KV TRANSMISSION LINE, NORTHERN CAPE

FINAL BASIC ASSESSMENT REPORT (DFFE REF: 14/12/16/3/3/1/2575)

11 AUGUST 2022

FINAL

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MARALLA WEST WIND (RF) (PTY) LTD

TYPE OF DOCUMENT (VERSION)
FINAL

PROJECT NO.: 41103480
DATE: AUGUST 2022

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QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Draft BAR	Final BAR DFFE Ref: 14/12/16/3/3/1/2575		
Date	June 2022	August 2022		
Prepared by	Lukanyo Kewana	Lukanyo Kewana		
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Project number	41103480	41103480		
Report number	01	02		
File reference	\\corp.pbwan.net\za\Central_Data\Projects\41100xxx\41103480 - Maralla Enviro Consents\41 ES\01-Reports\07-BAR\			

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This Final Basic Assessment Report (Report) for the proposed Maralla West 132 kV Transmission Line Project has been prepared by WSP Group Africa Proprietary Limited (WSP) on behalf and at the request of Maralla West Wind (RF) Proprietary Limited (Client), as part of the application process for Environmental Authorisation.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report.

DOCUMENT DESCRIPTION

CLIENT

Maralla West Wind (RF) (Pty) Ltd

PROJECT NAME

Maralla West 132kV Transmission Line, Northern Cape, South Africa

REPORT TYPE

Final Basic Assessment Report

DFFE REFERENCE NUMBER

14/12/16/3/3/1/2575

WSP PROJECT NUMBER

41103480

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Terrestrial Ecology Specialist	The Biodiversity Company: Andrew Husted
Heritage Specialist	ACO Associates: John Gribble
Palaeontology Specialist	Natura Viva cc: Dr John Edward Almond
Socio-economic Specialist	Tony Barbour Environmental Consulting: Tony Barbour
Wetland and Hydrology Specialist	WSP Group Africa: Thigesh Vather
Visual Specialist	LOGIS: Lourens Du Plessis

ACRONYMS

AEL	Atmospheric Emission Licence
AIS	Alien and Invasive Species
BA	Basic Assessment
BAR	Basic Assessment Report
BBBEE	Broad Based Black Economic Empowerment
BPEO	Best Practicable Environmental Option
BSP	Biodiversity Spatial Plan
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
CH	Critical Habitat
CIA	Cumulative Impact Assessment
CR	Critically Endangered
CRR	Comments and Responses Report
CV	Curriculum vitae
DFFE	Department of Forestry, Fisheries and the Environment
DMRE	Department of Mineral Resources and Energy
DoA	Department of Agriculture
DoT	Department of Transport
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EDL	episodic drainage line
EGI	Electricity Grid Infrastructure
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework

EMPr	Environmental Management Programme
EN	Endangered
EP	Equator Principles
EPL	Ecosystem Protection Level
EPFI	Equator Principles Financial Institution
ERA	Electricity Regulation Act (Act 4 of 2006)
ESA	Ecological Support Area
ESA	Early Stone Age
ESMS	Environmental and Social Management System
ETS	Ecosystem Threat Status
EWT	Endangered Wildlife Trust
FI	Financial Institution
FPIC	Free, Prior, and Informed Consent
GA	General Authorisation
GBIF	Global Biodiversity Information Facility
GM	Grievance Mechanism
GG	Government Gazette
GHG	Greenhouse Gases
GIIP	Good International Industry Practice
GN	Government Notice
GNR	Government Notice Regulation
GPS	Global Positioning System
IBA	Important Bird Area
ICAO	International Civil Aviation Organisation
ICP	Informed Consultation and Participation
IDP	Integrated Development Plan
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IPPPP	Independent Power Producer Procurement Programme
IRP	Integrated Resource Plan
IUCN	International Union for Conservation of Nature
LC	Least Concern

LSA	Later Stone Age
MF	Monitoring Forum
MP	Moderately Protected
MSA	Middle Stone Age
MSDS	Material Safety Data Sheets
NDP	National Development Plan
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMAQA	National Environment Management Air Quality Act (No. 39 of 2004)
NEMBA	National Environmental Management Biodiversity Act (Act 10 of 2004)
NEMPAA	National Environmental Management Protected Areas Act (Act 57 of 2003)
NEMWA	National Environmental Management Waste Act (Act 59 of 2008)
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resource Act (Act 25 of 1999)
NID	Notice of Intent to Develop
NIP	National Infrastructure Plan
NP	Not Protected
NT	Near Threatened
NWA	National Water Act (Act 36 of 1998)
OEC	Obstacle Evaluation Committee
OHPL	Overhead Powerline
OHSA	Occupational Health and Safety Act (Act 85 of 1993)
ONA	Other Natural Areas
PA	Protected Area
PES	Present Ecological State
PICC	Presidential Infrastructure Coordinating Commission
POSA	Plants of South Africa
PP	Poorly Protected
PPE	Personal Protective Equipment
PPP	Public Participation Process
PS	Performance Standard
PSDF	Provincial Spatial Development Framework

PVSEF	Photovoltaic Solar Energy Facility
REDZ	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAAF	South African Air Force
SA CATS	South African Civil Aviation Technical Standards
SACAA	South African Civil Aviation Authority
SAHRA	South African Heritage Resources Agency
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SAPAD	South Africa Protected Areas Database
SARPs	Standards and Recommended Practices
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SER	Stakeholder Engagement Report
SIA	Social Impact Assessment
SIP	Strategic Integrated Projects
SKEP	Succulent Karoo Ecosystem Programme
SO	Spatial objective
SPLUMA	Spatial Planning and Land Use Management Act (Act 16 of 2013)
STD	Sexually Transmitted Disease
UN	United Nations
VEC	Valued Environmental and Social Components
VU	Vulnerable
WBG	World Bank Group
WMA	Water Management Area
WML	Waste Management Licence
WP	Well Protected
WSP	WSP Group Africa (Pty) Ltd
WUL	Water Use Licence

CONTENTS OF THIS REPORT

As per the Environmental Impact Assessment (EIA) Regulations 2014, as amended, Appendix 1 of Government Notice Regulation (GNR) 326 identifies the legislated requirements that must be contained within a Basic Assessment Report (BAR) for the Competent Authority (CA) to consider and come to a decision on the application. **Table A** below details where the required information is located within the draft BAR (this report).

Table A: Legal Requirements as detailed in Appendix 1 of GNR 326 of the 2014 EIA Regulations, as amended

APPENDIX 1 OF GNR 326	DESCRIPTION	RELEVANT REPORT SECTION
3(1) (a)	Details of the EAP who prepared the report and the expertise of the EAP, including a curriculum vitae	**Section 1.3** **Appendix A**
3(1) (b)	The location of the activity	**Section 4.1** **Appendix E**
3(1) (c)	A plan which locates the proposed activity or activities applied for as well as associated structures and infrastructure at an appropriate scale	**Section 4.1 and 4.2**
3(1) (d)	A description of the scope of the proposed activity	**Section 4.2 and 4.3**
3(1) (e)	A description of the policy and legislative context within which the development is proposed	**Section 2**
3(1) (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 4.4**
3(1) (g)	A motivation for the preferred site, activity and technology alternative	**Section 5**
3(1) (h)	A full description of the process followed to reach the proposed alternative within the site	**Section 5**
3(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	**Section 3.4**
3(1) (j)	An assessment of each identified potentially significant impact and risk	**Section 7**
3(1) (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	**Section 3.3 and 3.4** **Section 6** **Section 7** **Section 8** **Section 9.1 and 9.2**
3(1) (l)	An environmental impact statement	**Section 9**
3(1) (m)	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management objectives, and the impact management outcomes for the development for inclusion in the Environmental Management Programme (EMPr).	**Section 7** **Appendix G**

APPENDIX 1 OF GNR 326	DESCRIPTION	RELEVANT REPORT SECTION
3(1) (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.	**Section 9**
3(1) (o)	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed	**Section 3.6**
3(1) (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	**Section 9**
3(1) (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 conducted, and the post construction monitoring requirements finalised	**N/A**
3(1) (r)	An undertaking under oath or affirmation by the EAP	**Appendix B**
3(1) (s)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts	**N/A**
3(1) (t)	Any specific information that may be required by the competent authority	**N/A**
3(1) (u)	Any other matters required in terms of section 24(4)(a) and (b) of the Act	**N/A**

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FIGURES

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F-5	Socio-Economic
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F-7	Visual
G	EMPR
H	SCREENING TOOL REPORT
I	PRE-APPLICATION MEETING MINUTES

1 INTRODUCTION

Changes made from the Draft Basic assessment Report (BAR) have been underlined in this Final BAR for ease of reference to the updates made in the reporting.

1.1 BACKGROUND AND TERMS OF REFERENCE

Maralla West Wind (RF) Proprietary Limited hereafter referred to as "Maralla" received an Environmental Authorisation on 14 November 2017 (Ref: 14/12/16/3/3/2/1774) for a 132kV powerline from the Maralla Wind Energy Facility (WEF) to the existing Komsberg Substation (**Figure 1-1**). It must be noted that this application will not replace the authorised powerline, however, once the final designs are available the Environmental Authorisation (EA) for the alignment that is not utilised will be withdrawn.

Maralla now proposes to investigate an alternative overhead powerline (OHPL) option which entails the construction of a 132 kV transmission line from the common substation at the proposed Maralla WEF to connect to the existing Karusa substation. The Maralla West WEF and proposed OHPL lie approximately 34km South of Sutherland in the Karoo Hoogland Local Municipality within the Namakwa District Municipality of the Northern Cape Province, South Africa **(Figure 1-2**).

On 16 February 2018, the Department of Environmental Affairs (DEA), now the Department of Forestry, Fisheries and the Environment (DFFE), gazetted the Renewable Energy Development Zones (REDZ) and Strategic Transmission Corridors and procedures for the assessment of large-scale wind and solar photovoltaic energy development activities (Government Notice (GN) 114) and grid infrastructure (GN 113). The proposed Maralla transmission integration project falls within the Central Strategic Transmission Corridor.

The OHPL project traverses Critical Biodiversity Areas (CBA 1 and CBA 2), Ecological Support Areas (ESA 1), according to the Western Cape CBA map (2016) (**Figure 1-3**), and falls within the Western Karoo National Protected Area Expansion Strategy (NPAES) focus area (**Figure 1-4**).

The proposed OHPL requires an EA in terms of the National Environmental Management Act (Act 107 of 1998), as amended (NEMA) and the associated Environmental Impact Assessment (EIA) Regulations (2014, as amended).

WSP Group Africa (Pty) Ltd (WSP) has been appointed by Maralla, as the independent Environmental Assessment Practitioner (EAP) to facilitate the Basic Assessment (BA) process in accordance with the EIA Regulations (2014, as amended).

The BA Process assessed six alternative routes (**Figure 1-2)** and has pre-negotiated the preferred route with the relevant landowners. The preferred 132kV grid connection alternative crosses the following properties:

- Farm Drie Roode Heuwels 180 Remainder
- Farm Orangefontein 203 Portion 1 and Remainder
- Farm Orangefontein 185 Remainder
- Farm Zwanepoelshoek 184 Remainder
- Farm De Hoop 202 Remainder

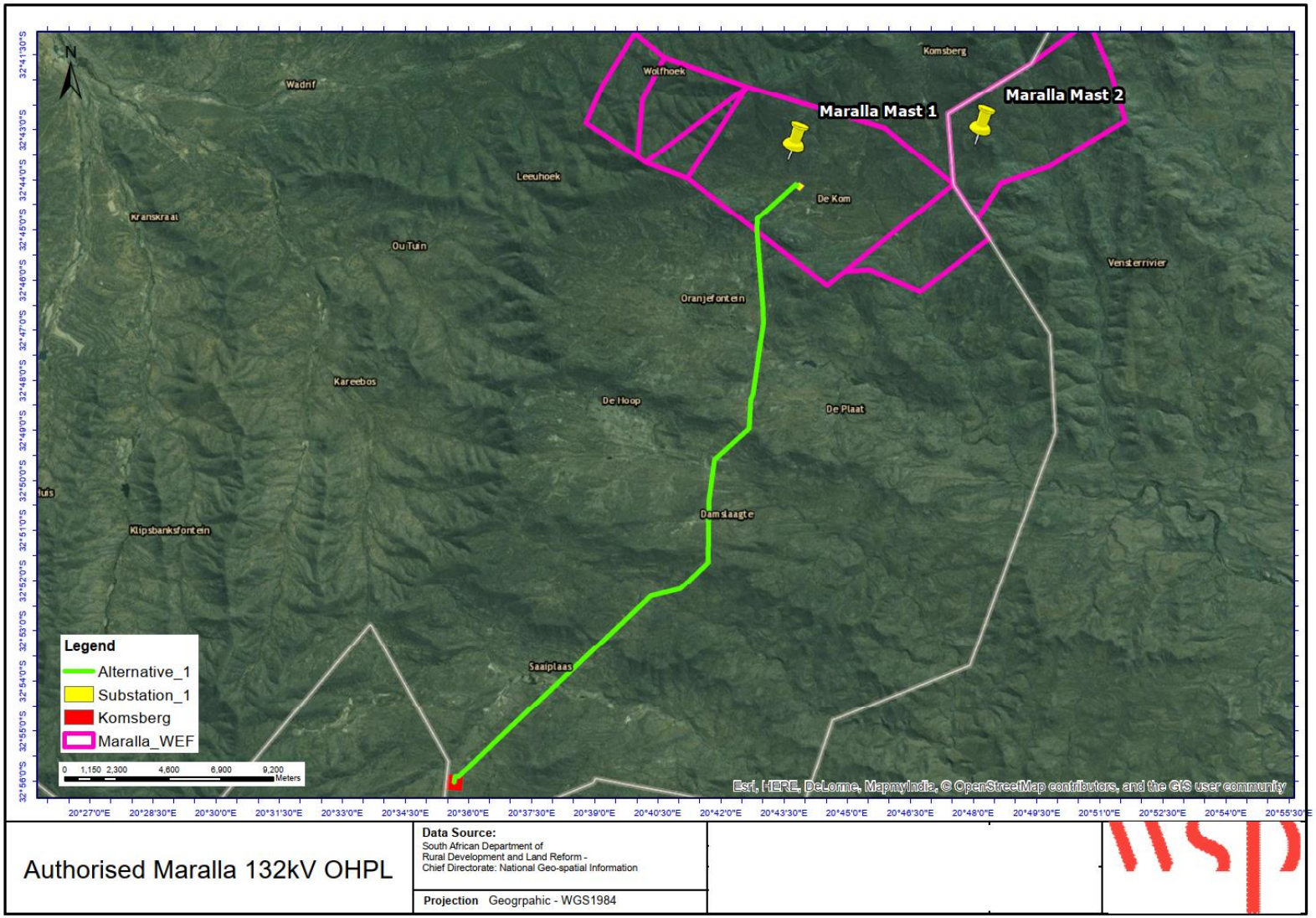


Figure 1-1: Location of the Authorised Maralla 132kV Transmission Line.

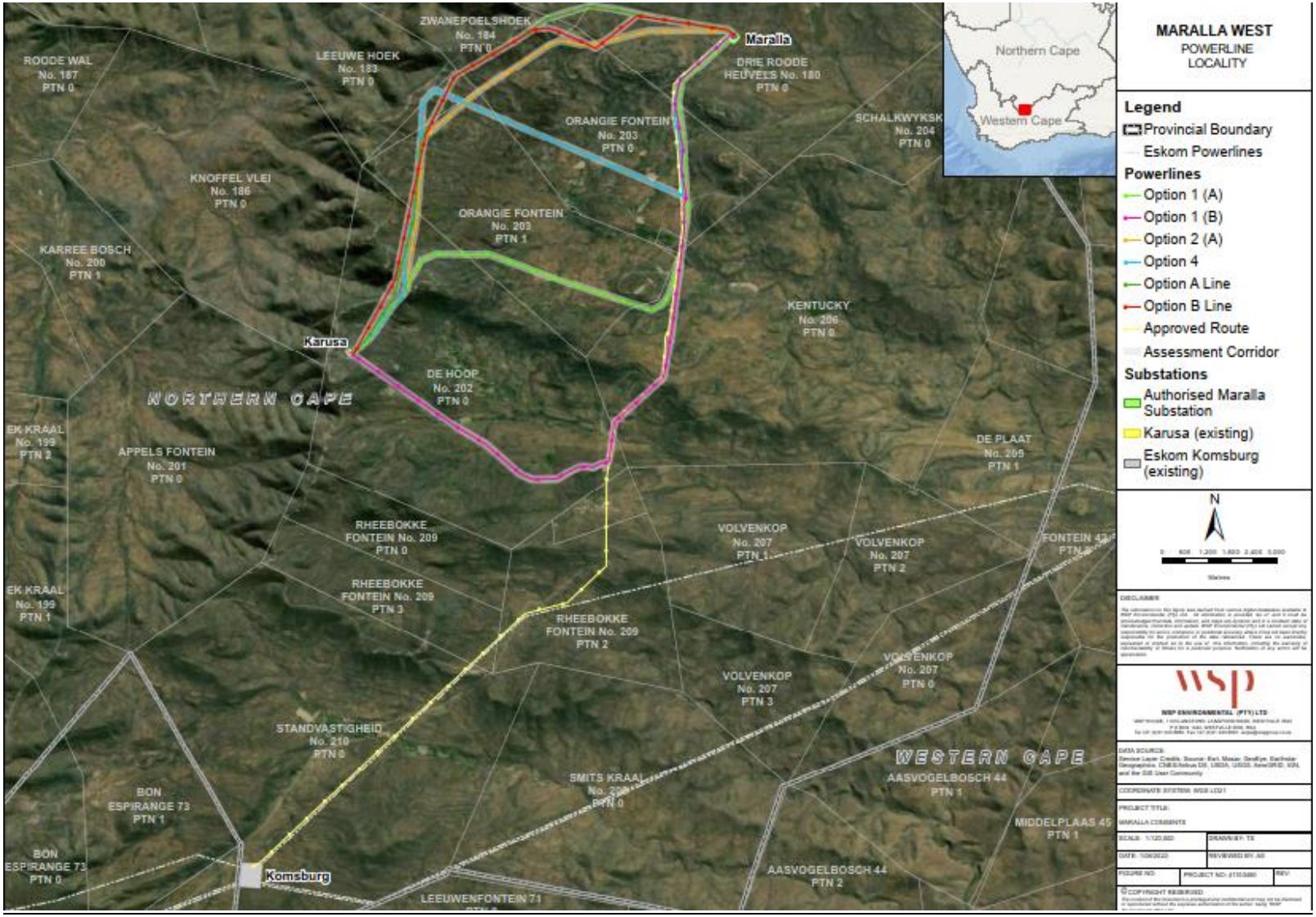


Figure 1-2: Location of the proposed Maralla 132kV OHPL Project.

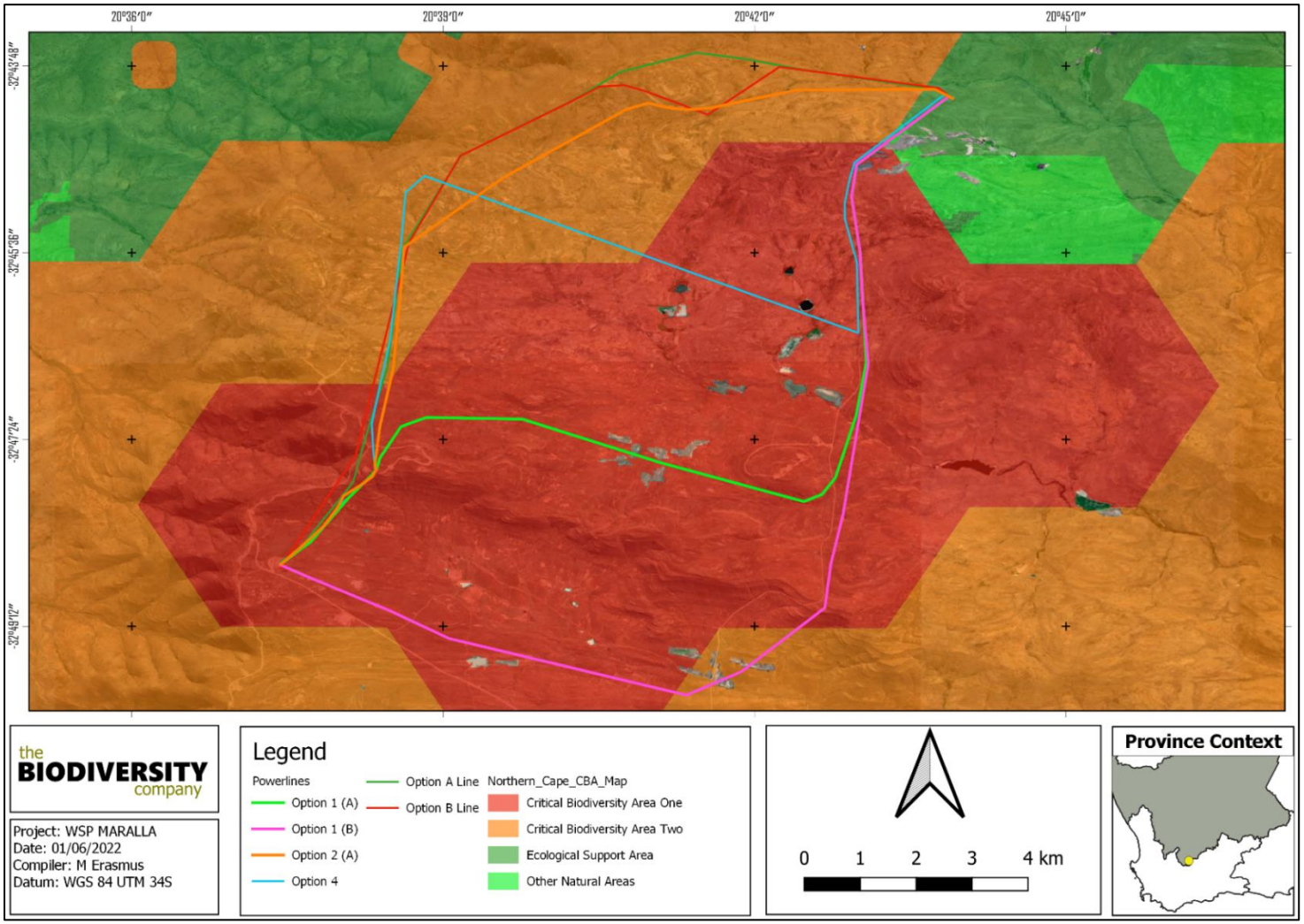


Figure 1-3: Critical Biodiversity Areas (CBA) and Ecological Sensitive Areas (ESA) proximal to the proposed project area.

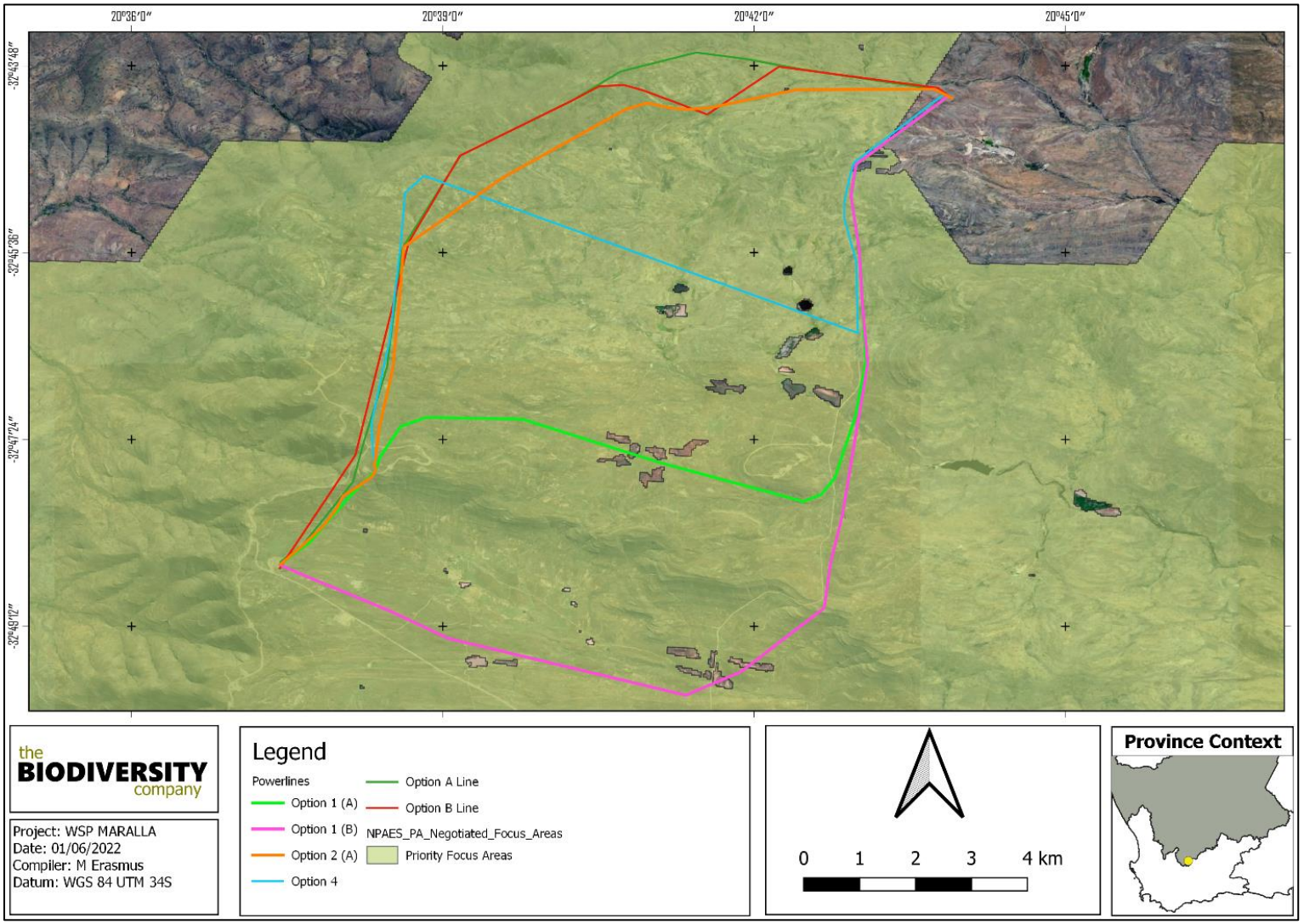


Figure 1-4: The project area in relation to the National Protected Area Expansion Strategy

1.2 PURPOSE OF THE BA PROCESS

The BA process is an interdisciplinary procedure to ensure that environmental and social considerations are included in decisions regarding projects. Simply defined, the process aims to identify the possible environmental and social effects of a proposed activity and how those impacts can be mitigated. In the context of this report, the purpose of the BA process is to inform decision-makers and the public of potential negative and positive consequences of the proposed construction of Maralla 132 kV transmission integration project. This provides the competent authority (CA) sufficient information to make an informed decision with regards to granting or refusing the EA applied for.

1.3 DETAILS OF KEY ROLE PLAYERS

1.3.1 PROJECT PROPONENT

Maralla West Wind (RF) (Pty) Ltd is the project proponent (Applicant) with regards to this application for the construction and operation of the proposed Maralla 132 kV OHPL project. **Table 1-1** provides the relevant details of the project proponent.

Table 1-1: Details of Project Proponent

PROPONENT: MARALLA WEST WIND (RF) PROPRIETARY LIMITED

Contact Person:	Werner Engelbrecht
Postal Address	Building 1, Leslie Ave East Design Quarter District, Fourways P O Box 69408, Bryanston 2021
Telephone:	011 367 4644
Email:	eiaadmin@biothermenergy.com

1.3.2 COMPETENT AND COMMENTING AUTHORITIES

Section 24C(2)(a) of NEMA stipulates that the Minister of Forestry, Fisheries and the Environment ("the Minister") must be identified as the competent authority if the activity has implications for international environmental commitments or relations. GN 779 of 01 July 2016 identifies the Minister as the CA for the consideration and processing of environmental authorisations and amendments thereto for activities related the Integrated Resource Plan (IRP) 2010 – 2030. The DFFE is the CA for the Maralla 132 kV OHPL project.

Table 1-2 provides the relevant details of the competent authority for the Project.

The commenting authorities for the project include:

- Department of Energy;
- Department of Agriculture;
- Department of Rural Development and Land Reform;
- Department of Water & Sanitation (DWS);
- Department of Public Works;

- Department of Science and Technology;
- South African National Roads Agency (SANRAL);
- Northern Cape Department of Environment and Nature Conservation (NC DENC);
- South African Heritage Resources Agency (SAHRA);
- Namakwa District Municipality; and
- Karoo Hoogland Local Municipality.

Table 1-2: Competent Authority

ASPECT	COMPETENT / COMMENTING AUTHORITY	CONTACT DETAILS
Competent Authority: Environmental Authorisation	Department of Forestry, Fisheries, and the Environment (DFFE)	Case Officer: Ms Samkelisiwe Dlamini Integrated Environmental Authorisations: National Infrastructure Projects DFFE Reference Number: 14/12/16/3/3/1/2575

ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed construction of the powerline. The CV of the EAP is available in **Appendix A**. The EAP declaration of interest and undertaking is included in **Appendix B**. **Table 1-3** details the relevant contact details of the EAP.

Table 1-3: Details of the EAP

EAP	WSP GROUP AFRICA (PTY) LTD
Contact Person:	Ashlea Strong
Physical Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
Postal Address:	P.O. Box 98867, Sloane Park 2151, Johannesburg
Telephone:	011 361 1392
Fax:	011 361 1301
Email:	Ashlea.Strong@wsp.com

STATEMENT OF INDEPENDENCE

Neither WSP nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment.

1.4 SPECIALISTS

Specialist input was required in support of this application for EA. The details of the specialists are provided in **Table 1-4** below. The specialist reports are attached in **Appendix F** and their declarations in **Appendix C**.

Table 1-4: Details of Specialists

ASSESSMENT	NAME OF SPECIALIST	COMPANY	SECTIONS IN REPORT	SPECIALIST REPORT ATTACHED AS
Avifauna	Chris van Rooyen	Chris van Rooyen	Section 6.1.12 Section 7.8 Section 9	**Appendix F1**
Biodiversity	Andrew Husted	The Biodiversity Company	Section 6.18 – 6.1.11 Section 7.7 Section 9	**Appendix F2**
Heritage	John Gribble	ACO Associates CC	Section 6.2.3 Section 7.12 Section 9	**Appendix F3**
Palaeontology	John Almond	Natura Viva	Section 6.2.4 Section 7.13 Section 9	**Appendix F4**
Socio-economic	Tony Barbour	Independent consultant	Section 6.2.1 and 6.2.2 Section 7.14 Section 9	**Appendix F5**
Surface Water	Thigesh Vather	WSP	Section 6.1.5 – 6.1.7 Section 7.3, 7.5 and 7.6 Section 9	**Appendix F6**
Visual	Lourens Du Plessis	LOGIS	Section 6.2.5 Section 7.9 Section 9	**Appendix F7**

1.5 BASIC ASSESSMENT REPORT STRUCTURE

The structure of the draft BAR (this report) is presented in **Table 1-5**.

Table 1-5: Structure of this report

SECTION	CONTENTS
1 – Introduction	Provides a brief background and outlines the purpose of this document, as well as identifying the key role players, content of the report and the assumptions and limitations applicable to the assessment.
2 – Governance Framework	Provides a brief summary and interpretation of the relevant legislation in terms of the proposed project.
3 – Basic Assessment Process	Provides a description of the BA process being undertaken and the methodology employed.
4 – Project Description	Describes the project location and surrounding area, project history, and a project description.

SECTION	CONTENTS
5 – Project Alternatives	Provides a summary description of the proposed project alternatives.
6 – Baseline Environment	Describes the biophysical and socio-economic characteristics of the affected environment against which potential project impacts are assessed.
7 – Environmental Impact Assessment	Describes the specialist studies undertaken and assesses the potential impacts of the project as well as project alternatives. The significance of the impacts and proposed mitigation measures are presented.
8 – Cumulative Impact Assessment	Describes the cumulative impacts identified by the EAP and Specialists and assesses the cumulative impacts. The significance of the impacts and proposed mitigation measures are presented.
9 – Environmental Impact Statement	Provides the Environmental Impacts Statement including principal findings as well as recommendations and the authorisation opinion.
10 –Way Forward	Outlines the stakeholder engagement details associated with the public review period.

2 GOVERNANCE FRAMEWORK

2.1 NATIONAL LEGAL AND REGULATORY FRAMEWORK

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 2-1** and **Table 2-2** below.

Table 2-1: Applicable Legislation

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
The Constitution of South Africa (No. 108 of 1996)	Section 24(b) of the Constitution provides that "*everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation [and] promote conservation.*" The Constitution cannot manage environmental resources as a stand-alone law, hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.
National Environmental Management Act (No. 107 of 1998)	In terms of Section 24(2) of the National Environmental Management Act (No. 107 of 1998) (NEMA), the Minister may identify activities which may not commence without prior authorisation. On 7 April 2017, the Minister thus published GNR 327 (Listing Notice 1), 325 (Listing Notice 2) and 324 (Listing Notice 3) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in GNR 326 EIA Regulations (2014, as amended). Listing Notice 1 and Listing Notice 3 identify activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require a Scoping and EIA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. **Listed Activities 11, 12, 19, 27 and 30 of GNR 327 and Listed Activities 4, 12 and 14 of GNR 324** are considered applicable to the Maralla 132 132 kV OHPL project and therefore, a BA process must be followed to obtain an EA.
Listing Notice 1: GNR 327	***Activity 11(i):*** ***The development of facilities or infrastructure for the transmission and distribution of electricity—*** ***(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;*** *or* *(ii) inside urban areas or industrial complexes with a capacity of 275 kilovolts or more;* *excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is —* *(a) temporarily required to allow for maintenance of existing infrastructure;* *(b) 2 kilometres or shorter in length;* *(c) within an existing transmission line servitude; and* *(d) will be removed within 18 months of the commencement of development.* **Applicability:** A 132 kV transmission line is to be established to connect the Maralla East and West WEFs to the national grid via the Karusa Substation. The potential expansion of the Karusa

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	Substation is also being considered. The transmission line and substation are outside of the urban edge. This activity is therefore triggered by the proposed construction of the transmission infrastructure..
	Activity 12 (ii), (a) and (c): *The development of—* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs—* *(a) within a watercourse; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse* **Applicability:** The powerline will require the erection of tower structures, which may require a construction area of approximately 100m^2. There is the potential that a tower structure or access road will transverse a watercourse (or drainage line). This activity will potentially be triggered by the proposed construction of the transmission infrastructure and access road.
	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* **Applicability:** The powerline will require the erection of tower structures and access roads. There is the potential that a tower structure or access road will transverse a watercourse (or drainage line) which will require excavation of removal of soil or sand from the watercourse. This activity will potentially be triggered by the proposed construction of the transmission infrastructure and access road.
	Activity 27: *The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.* **Applicability:** The powerline is considered a linear activity and therefore this activity is not triggered by the proposed construction of the transmission line. However, the potential expansion of the Karusa substation will require the clearance of indigenous vegetation of more than 1ha but less than 20 ha..
Listing Notice 3: GNR 324	***Activity 4 (g) (ii) (bb) and (ee):*** *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* *(g) Northern Cape-* *(ii) Outside urban areas* *(bb) National Protected Area Expansion Strategy Focus areas* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* **Applicability:**

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	The transmission line routes traverse CBA (as outlined on the Northern Cape CBA Map developed by the Northern Cape Department of Environment and Nature Conservation) and falls within the Western Karoo NPAES Focus Area. The transmission line will require an access road (of approximately 4 m in width) although it will likely be a two-track road. This activity is potentially triggered by the proposed construction of the access road..
	Activity 12 (g) (i) and (ii): *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.* ***Northern Cape*** *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans;* **Applicability:** The transmission line routes traverse CBAs (as outlined on the Northern Cape CBA Map developed by the Northern Cape Department of Environment and Nature Conservation) and falls within Western Karoo NPAES Focus Area. The powerline will require the erection of tower structures, an access road, and a common 132 kV on-site substation which will cumulatively require the clearance of indigenous vegetation of more than 300m^2.This activity is therefore triggered by the proposed construction of the transmission infrastructure and the access road.
	Activity 14 (ii) (a) and (c) (g) (i) (bb) and (ff): *The development of—* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs—* *(a) within a watercourse; or* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* ***Northern Cape*** *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.* **Applicability:** The transmission line routes traverse CBAs (as outlined on the Northern Cape CBA Map developed by the Northern Cape Department of Environment and Nature Conservation) and falls within Western Karoo NPAES Focus Area. The powerline will require the erection of tower structures and an access road, which may require a construction area of approximately 100m^2. There is the potential that a tower structure or access road will transverse a watercourse (or drainage line). This activity is therefore triggered by the proposed construction of the transmission infrastructure and the access road.
National Environmental Management Biodiversity Act (No. 10 of 2004)	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) was promulgated in June 2004, within the framework of NEMA, to provide for the management and conservation of national biodiversity. NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, and the fair and equitable sharing of benefits arising from

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	bioprospecting involving indigenous biological resources. In addition, NEMBA provides for the establishment and functions of the South African National Biodiversity Institute (SANBI). SANBI was established primarily to report on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems. The construction of the project, including the associated infrastructure may negatively impact on the biodiversity of the area, even though the transmission line corridor is within one of the Electricity Grid Infrastructure (EGI) strategic corridors and one of the Renewable Energy Development Zones (REDZ). As such, SANBI will be invited to provide comment on the proposed project and any licenses or permits that maybe applicable will be obtained. The Maralla WEF will be located within the Namakwa District Municipality. The Northern Cape CBA Map developed by the Northern Cape Department of Environment and Nature Conservation identifies Critical Biodiversity Areas (CBAs) which represent biodiversity priority areas which should be maintained in a natural to near natural state. The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding in order to meet national biodiversity objectives. As such an ecological assessment has been undertaken as part of the Basic Assessment Process. The Conservation of Agricultural Resources Act (No. 43 of 1993) (CARA) Regulations with regards to alien and invasive species have been superseded by the NEMBA- Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.
National Environmental Management Protected Areas Act (No. 57 of 2003)	The purpose of the National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) is to, inter alia, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas. Section 50(5) of NEMPAA states that "*no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority*." The Maralla OHPL route does not fall within any proclaimed protected areas as per NEMPAA. The OHPL route traverses a CBA and falls within a Western Karoo NPAES Focus Area.
National Water Act (No. 36 of 1998)	The purpose of the National Water Act (No. 36 of 1998) (NWA) is to provide a framework for the equitable allocation and sustainable management of water resources. Both surface and groundwater sources are national resources, which cannot be owned by any individual, and rights to which are not automatically coupled to land rights, but for which prospective users must apply for authorisation and register as users. The NWA also provides for measures to prevent, control and remedy the pollution of surface and groundwater sources. The Act aims to regulate the use of water and activities (as defined in Part 4, Section 21), which may impact on water resources through the categorisation of 'listed water uses.' Defined water use activities require the approval of DWS in the form of a General Authorisation (GA) or Water Use Licence (WUL) authorisation. The proposed OHPL route has several watercourse crossings. The proposed development will encroach into the 100 m GN509 regulated area, thus Water Use Authorisation (WUA) from the DWS, in the form of either a general authorisation (GA) or a water use licence (WUL) will be required prior to commencement of any construction.
National Heritage Resources Act (No. 25 of 1999)	The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resource Agency (SAHRA), and lists activities which require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development. In terms of the Section 38 of NHRA, any person who intends to undertake a linear development including, inter alia, a powerline, exceeding 300m in length or a development that exceeds 5000m^2 must notify the heritage resources authority and undertake the necessary assessment requested by that authority.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	As the proposed Maralla OHPL is approximately 18km in length. Comment from SAHRA will be required in terms of Section 38. Construction activities should be conducted carefully, and all activities ceased if any archaeological, cultural and heritage resources are discovered. SAHRA should be notified and investigation conducted in accordance with the Chance Find Procedure to be established for the Project before any activities can commence.
National Environmental Management Waste Act (No. 59 of 2008)	The National Environmental Management Waste Act (No. 59 of 2008) (NEMWA) is subsidiary and supporting legislation to NEMA. NEMA is a framework legislation that provides the basis for the regulation of waste management. NEMA also contains policy elements and gives a mandate for further regulations to be promulgated. It is anticipated that activities on the site will not trigger the NEM:WA. However, waste handling, storage and disposal during the construction and operational phase of the project must be undertaken in accordance with the requirements of this Act and the Best Practicable Environmental Option which will be incorporated into the site specific Environmental Management Programme (EMPr).
National Environment Management Air Quality Act (No. 39 of 2004)	The National Environment Management: Air Quality Act (No. 39 of 2004) (NEMAQA) came into effect on 11 September 2005. Persons undertaking such activities listed under GNR 893, as amended, are required to possess an Atmospheric Emissions License (AEL). The NEM:AQA aims to protect the environment by providing reasonable measures for the protection and enhancement of the quality of air in South Africa, to prevent air pollution and ecological degradation and to secure ecological sustainable development while promoting justifiable economic and social development. In line with Section 21 of NEM:AQA, GNR 893 of 2013 provides the listed activities for which an AEL is required and the associated minimum emission standards (MES) by emission category. In terms of Section 32 of the NEM:AQA The National Dust Control Regulations (GNR 827) were promulgated, which aim at prescribing general measures for the control of dust in both residential and non-residential areas. Although no AEL will be required for the construction and operation of the powerline, the dust control regulations will be applicable during construction.
Conservation of Agricultural Resources Act (No. 43 of 1983)	The Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) provides for the implementation of control measures for soil conservation works as well as alien and invasive plant species in and outside of urban areas. In terms of the amendments to the regulations under the CARA, landowners are legally responsible for the control of alien species on their properties. Various Acts administered by the DFFE and the DWS, as well as other laws (including local by-laws), spell out the fines, terms of imprisonment and other penalties for contravening the law. Although no fines have yet been placed against landowners who do not remove invasive species, the authorities may clear their land of invasive alien plants and other alien species entirely at the landowners' cost and risk. The CARA Regulations with regards to alien and invasive species have been superseded by NEMBA Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.
Civil Aviation Act (No. 13 of 2009)	Civil aviation in South Africa is governed by the Civil Aviation Act (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by SACAA as an agency of the Department of Transport (DoT). SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations. As of the 1st of May 2021, Air Traffic and Navigation Services (ATNS) has been appointed as the new Obstacle application Service Provider for Windfarms and later Solar Plants. Their responsibility would pertain to the assessments, maintenance, and all other related matters in respect to Windfarms and in due time Power Plant assessments.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	The Sutherland Aerodrome is approximately 50km north east of the OHPL. The DEA Screening Tool Report identified Civil Aviation as having medium sensitivity for the proposed OHPL. SACAA and ATNS will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought from these authorities as applicable.
Occupational Health and Safety Act (No. 85 of 1993)	The National Occupational Health and Safety Act (No. 85 of 1993) (OHSA) and the relevant regulations under the Act are applicable to the proposed project. This includes the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations is essential.
National Energy Act (No. 34 of 2008)	The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantitates, and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors. The Act provides the legal framework which supports the development of renewable energy facilities for the greater environmental and social good. The main objectives of the Act are to: — Ensure uninterrupted supply of energy to the Republic; — Promote diversity of supply of energy and its sources; — Facilitate effective management of energy demand and its conservation; — Promote energy research; — Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy; — Ensure collection of data and information relating to energy supply, transportation and demand; — Provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development; — Provide for certain safety, health and environment matters that pertain to energy; — Facilitate energy access for improvement of the quality of life of the people of Republic; — Commercialise energy-related technologies; — Ensure effective planning for energy supply, transportation, and consumption; and — Contribute to sustainable development of South Africa's economy. In terms of the act, the Minister of Energy is mandated to develop and, on an annual basis, review and publish the Integrated Energy Plan (IEP) in the Government Gazette. The IEP analyses current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this to project future energy requirements, based on different scenarios. The IEP and the Integrated Resource Plan are intended to be updated periodically to remain relevant. The framework is intended to create a balance between energy demand and resource availability so as to provide low-cost electricity for social and economic development, while taking into account health, safety and environmental parameters.
Electricity Regulation Act (No. 4 of 2006)	The Electricity Regulation Act (No. 4 of 2006) (ERA) aims to: — Achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa; — Ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency. effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in the Republic: — Facilitate investment in the electricity supply industry; — Facilitate universal access to electricity; — Promote the use of diverse energy sources and energy efficiency;

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	— Promote competitiveness and customer and end user choice; and — Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public. The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.

Table 2-2: Applicable Policies

APPLICABLE POLICY	DESCRIPTION OF POLICY
National Development Plan	The National Development Plan (NDP) aims to eliminate poverty and reduce inequality by 2030. The NDP identifies a number of enabling milestones. Of relevance to the proposed development the NDP refers to the need to produce sufficient energy to support industry at competitive prices and ensure access for poor households, while reducing carbon emissions per unit of power by about one-third. In this regard the infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development. Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green low-carbon economy, is one of these challenges. In terms of implementation the NDP identifies three phases. The first two are of specific relevance to the proposed project. The first phase (2012–2017) notes that ensuring the supply of energy and water is reliable and sufficient for a growing economy. The second phase (2018–2023) involves building on the first phase to lay the foundations for more intensive improvements in productivity. The provision of affordable and reliable energy is a key requirement for this to take place. Chapter 4, Economic infrastructure, notes that economic infrastructure provides the foundation for social and economic development. In this regard South Africa must invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The plan envisages that, by 2030, South Africa will have an energy sector that promotes: — Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. — Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. More specifically, South Africa should have adequate supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted. The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation. In this regard coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources, will play a much larger role.
Integrated Resource Plan 2010 – 2030	The Integrated Resource Plan (IRP) is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the then Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas

APPLICABLE POLICY	DESCRIPTION OF POLICY
	(GHG) emissions, reduced water consumption, diversified electricity generation sources, localisation and regional development. The IRP recognises that Solar photovoltaic (PV), wind and concentrated solar power (CSP) with storage present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain.
New Growth Path	Government released the New Economic Growth Path Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water and housing.
National Infrastructure Plan	The South African Government adopted a National Infrastructure Plan (NIP) in 2012. The NIP aims to transform the South African economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. It outlines the challenges and enablers which needs to be addressed in the building and developing of infrastructure. The Presidential Infrastructure Coordinating Commission (PICC) was established by the Cabinet to integrate and coordinate the long-term infrastructure build. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools and dams will contribute to improved economic growth.
Strategic Integrated Projects	As part of the NIP and in terms of Section 8(1)(a) read with Section 7(1) of the Infrastructure Development Act, as amended (Act 23 of 2014), large-scale infrastructure projects, known as Strategic Integrated Projects (SIPs), have been identified across all nine provinces. Eighteen (18) SIPs have been prioritised as part of the NIP. SIPs cover catalytic projects that can fast-track development and growth. Work is being aligned with key cross-cutting areas: human settlement planning and skills development. The SIPs comprise: — Five Geographically focussed SIPs (SIP 1 to 5); — Three Spatial SIPs (SIP 6, 7 and 11); — Three Energy SIPs (SIP 8 to 10); — Three Social Infrastructure SIPs (SIP 12 to 14); — Two Knowledge SIPs (SIP 15 and 16); — One Regional Integration SIP (SIP 17); and — One Water and Sanitation SIP (SIP 18). **SIP 10: Electricity Transmission and Distribution for All** aims to "*expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development*" in South Africa. SIP 10 recognises that a reliable transmission network with adequate capacity to meet customer needs is a fundamental condition for the provision of a reliable electricity supply in South Africa. To remain reliable, the transmission system requires not only maintenance, but must also be developed and expanded to meet changing electricity demand and energy generation requirements. A reliable transmission network and an effective process for enabling network expansion, is therefore critical to the realisation of development plans and services, including job creation, the provision of quality education and health care, and the upliftment of previously disadvantaged communities. The Strategic Environmental Assessment (SEA) for Electricity Grid Infrastructure (EGI) in South Africa (CSIR, 2016) identified five Strategic Transmission Corridors that are of strategic importance for the rollout of the supporting large-scale electricity transmission and distribution infrastructure in terms of SIP 10. The EGI SEA identified the optimal location

APPLICABLE POLICY	DESCRIPTION OF POLICY
	for strategic corridors where transmission infrastructure expansion is needed to enable the regionalised balancing of future demand and supply requirements, whilst minimising negative impacts to the environment. GN 113 of 16 February 2018 approved the Strategic Transmission Corridors, which support areas where long-term electricity grid infrastructure will be developed and where an integrated decision-making process for applications for EA in terms of NEMA will be followed. Applications for EA for large scale electricity transmission and distribution facilities, when such facilities trigger Activity 9 of Listing Notice 2 of the EIA Regulations (2014, as amended) and any other listed activities necessary for the realisation of such facilities, and where the greater part of the proposed facility is to occur in one or more such Strategic Transmission Corridors, must follow a BA procedure (and not a full S&EIA). The timeframe for decision-making is 57 days. Routes that have been pre-negotiated with landowners must be submitted as part of the application for an EA. The proposed Maralla 132kV OHPL falls within the Central Strategic Transmission Corridor of the promulgated Strategic Transmission Corridors per GN 113 and will therefore be subject to the shorter decision-making timeframes.
Integrated Energy Plan	The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives are identified, namely: — Objective 1: Ensure security of supply. — Objective 2: Minimise the cost of energy. — Objective 3: Promote the creation of jobs and localisation. — Objective 4: Minimise negative environmental impacts from the energy sector. — Objective 5: Promote the conservation of water. — Objective 6: Diversify supply sources and primary sources of energy. — Objective 7: Promote energy efficiency in the economy. — Objective 8: Increase access to modern energy. The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others. Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives. As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios: — The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term. — The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy.

APPLICABLE POLICY	DESCRIPTION OF POLICY
	— The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply. — The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the NDP, are met. The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth. By 2020, various import options become available, and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs. In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy. An assessment of each scenario against the eight objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered. In terms of promoting job creation and localisation potential the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with natural gas and coal making a smaller contribution. The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type.
National Protected Area Expansion Strategy, 2010	The National Protected Area Expansion Strategy 2010 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints, and opportunities (NPAES, 2010). The OHPL falls within an NPAES focus area.

2.2 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

Table 2-3: Provincial and Municipal Legislation and Plans

APPLICABLE LEGISLATION / PLAN	DESCRIPTION OF LEGISLATION / PLAN
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	The purpose of the act is to provide for the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; to provide for offences and penalties for contravention of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act and to provide for the issuing of permits and other authorisations. Schedule 1 and 2 of the Act give extensive lists of specially protected and protected fauna and flora species.
Northern Cape CBA Map (2016)	The Northern Cape CBA Map identifies biodiversity priority areas, CBAs and Ecological Support Areas (ESAs), which, together with Protected Areas, are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape as a whole. The Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province. These include the: — Namakwa District Biodiversity Sector Plan; - Cape Fine-Scale Plan (only the extent of the areas in the Northern Cape i.e. Bokkeveld and Nieuwoudtville); and - Richtersveld Municipality Biodiversity Assessment. As the proposed Maralla 132kV OHPL traverses a CBA, a biodiversity impact assessment has been undertaken as part of the BA Process.
Northern Cape Provincial Growth and Development Plan	The Northern Cape Provincial Growth and Development Plan (NCPGDP) is aligned with NDP-2030 and seeks to eradicate poverty, inequality and halve unemployment by 2030. The NCPGDP identifies four key drivers to achieve the vision and reduce poverty and unemployment. Economic transformation and growth, social transformation and human welfare and environmental sustainability and resilience are relevant to identifying and assessing needs. — Economic transformation and growth, which is aimed at creating employment opportunities and thereby reducing poverty. Skills development and training is identified as a key need. — Social transformation and human welfare, which is aimed at improving education levels, access to affordable and quality health care, improved safety, and security, and creating sustainable human settlements. Environmental sustainability and resilience, which is aimed at protecting the regions natural resources and addressing the threats posed by climate change.
Northern Cape Provincial Growth and Development Strategy	The Northern Cape Provincial Growth and Development Plan (NCPGDP) is aligned with NDP-2030 and seeks to eradicate poverty, inequality and halve unemployment by 2030. The NCPGDP identifies four key drivers to achieve the vision and reduce poverty and unemployment. Economic transformation and growth, social transformation and human welfare and environmental sustainability and resilience are relevant to identifying and assessing needs. — Economic transformation and growth, which is aimed at creating employment opportunities and thereby reducing poverty. Skills development and training is identified as a key need.

APPLICABLE LEGISLATION / PLAN	DESCRIPTION OF LEGISLATION / PLAN
	— Social transformation and human welfare, which is aimed at improving education levels, access to affordable and quality health care, improved safety, and security, and creating sustainable human settlements. — Environmental sustainability and resilience, which is aimed at protecting the regions natural resources and addressing the threats posed by climate change. The NCPGDS identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include: — Agriculture and Agro-processing; — Fishing and Mariculture; — Mining and mineral processing; — Transport; — Manufacturing; and — Tourism. However, the NCPGDS also notes that economic development in these sectors also requires: — Creating opportunities for lifelong learning; — Improving the skills of the labour force to increase productivity; — Increasing accessibility to knowledge and information. The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are: — Developing requisite levels of human and social capital; — Improving the efficiency and effectiveness of governance and other development institutions; and — Enhancing infrastructure for economic growth and social development. Of specific relevance to the OHPL, the NCPGDS make reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. In this regard the NCPGDS notes "the development of energy sources such as wind and solar energy, the natural gas fields, bio-fuels, etc., could be some of the means by which new economic opportunity and activity is generated in the Northern Cape". The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised. The NCPGDS also highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed OHPL therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province. In this regard care will need to be taken to ensure that the proposed OHPL does not negatively impact on the region's natural environment. In this regard the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the province's exceptional natural and cultural attributes, it has the potential to become the preferred adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable

APPLICABLE LEGISLATION / PLAN	DESCRIPTION OF LEGISLATION / PLAN
	energy projects, such as the proposed solar energy facility and associated OHPL, do not affect the tourism potential of the province.
Northern Cape Provincial Spatial Development Framework	The Northern Cape Provincial Spatial Development Framework (NCSDF) (2012) lists a number of sectoral strategies and plans are to be read and treated as key components of the PSDF. Of these there are a number that are relevant to the proposed OHPL. These include: — Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government; — Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development; — Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism; — Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism; — Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism; and — Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism). Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. The objectives are listed below: — Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts. — Develop and institute innovative new energy technologies to improve access to reliable, sustainable, and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution, and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector. — Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013. Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector. — The construction of infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic, aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible. EIAs undertaken for such construction must assess the impacts of such activities.
Namakwa Biodiversity Sector Plan	Northern Cape Department of Environment and Nature Conservation published the Namakwa Biodiversity Sector Plan in 2008. The purpose of the plan is to ensure that biodiversity information can be accessed and utilized by local municipalities within the Namakwa District Municipality (NDM) to inform land use planning and development as well as decision making processes within the NDM. Furthermore, it is intended to help guide land use planning, environmental assessments and authorisations and natural resource management in order to promote development that occurs in a sustainable manner. The plan includes a map of CBAs for the Namakwa District. The CBA map indicates the most efficient selection and classification of land portions requiring safeguarding to meet national biodiversity objectives. As the proposed Maralla OHPL traverses a CBA, a biodiversity impact assessment has been undertaken as part of the BA Process.

APPLICABLE LEGISLATION / PLAN	DESCRIPTION OF LEGISLATION / PLAN
Karoo Hoogland Integrated Development Plan	The KH IDP (2017-2022) identifies four Key Performance Areas (KPAs). KPA 1, Basic Service Delivery and KPA 2, Local Economic Development, are the most relevant to the proposed project. **KPA 1: Basic Service Delivery** **KPA 2: Local Economic Development** In terms of KPA 2, Local Economic Development (LED), the IDP highlights the importance of private public partnerships for achieving economic development in the KH. The LED policy framework identifies a number of LED Policy Pillars/Thrusts. Of relevance to the Needs Assessment these include building a diverse economic base, developing learning and skilful economies, and enterprise development and support. The IDP identifies a number of projects associated with the LED Pillar/Thrusts. Of relevance these include: ***Building a diverse economic base*** — Investigate possible opportunities for development of renewable energy. ***Developing learning and skilful local economies*** — Identify skill gaps and implements skills development and training programmes ***Developing inclusive economies*** — Support the informal and rural economy. — Support development of women and the youth. — Establish community gardens. The IDP also highlights the need to support for the rural economy, with specific reference to the One House Hold One Hectare (1HH1HA) Programme. The Objectives of the 1HH1HA Programme include reducing poverty in rural areas, creating opportunities for Black Commercial Smallholding Farmers, improving security of tenure for HD rural communities and develop farming skills. The benefits for the 1HH1HA Programme include job creating, poverty alleviation, food security, skills development, security of tenure and restoration of dignity to marginalised HD rural communities. KPA 2, Local Economic Development (LED) identifies the need to address the challenges facing vulnerable groups in the KH, including the youth and physically and mentally challenged members of the community. The high unemployment levels and the lack of meaningful employment opportunities represents a key challenge faced by the youth in the KH. There are also inadequate educational facilities/institutions such as Technikons, FET colleges and Universities in the KH and ND. The IDP also refers to the need to interact with National and Provincial and District agencies aimed at youth development. The provision of quality education at Early Child Development (ECD) is also a key need. The challenges facing ECDs include lack of proper facilities and support material at learning centres, lack of funding, and food security. The IDP also highlights the threat posed by climate change, noting it threatens food security, poverty alleviation and sustainable socio-economic growth. Vulnerable households are at most risk. A combination of increasing temperatures and reduced and/or more variable rainfall could have severe negative impacts for the Namakwa District, including the KHM. In this regard the KHM is characterised by high levels of poverty and inequality, isolated communities, and a large geographical area, which results in a vulnerable population. Large numbers of people, both private and communal, are also directly dependent on agriculture, and therefore on functioning ecosystems and water regimes, for their livelihoods. These communities and households are therefore directly affected by the risks posed by climate change. The IDP notes that the KHM is likely to be one of the most affected municipalities in terms of the impact of climate change on water quality and availability. Addressing these threats and the needs associated with the threat posed by climate change is therefore a key challenge.

APPLICABLE LEGISLATION / PLAN	DESCRIPTION OF LEGISLATION / PLAN
Karoo Hoogland Spatial Development Framework	The KH Spatial Development Framework (SDF) (2019) identifies list four strategies, namely: **Strategy 1: Enhance local connectivity** The objectives of Strategy 1 include improving the connection between the towns of Sutherland, Williston and Fraserberg and the surrounding rural areas, and support for the diversification of economies, tourism, the knowledge economy, the green economy and alternative energy-related enterprise development. **Strategy 2: Protecting local resources** The objectives of Strategy 2 include integrated management and prioritisation of Karoo Hoogland's natural and man-made cultural landscape resources and protection of high value agricultural land. The actions identified include alien vegetation clearing and riverine and wetland management and environmental awareness and education programmes. **Strategy 3: Urban and rural development** The objectives of Strategy 3 include more sustainable land reform process and in areas closer to urban centres, creating opportunities for increased food security and economic development for rural dwellers, creation of sustainable and accessible employment opportunities, and improved opportunities in the Tourism Sector. The actions identified include establishing opportunities for urban agriculture (home, school and community gardens) to promote household food security and improved nutrition, create opportunities for local food producers to market their products (farmers markets, etc.), and establishment of artisan workshops to provide local population with the chance to develop skills to participate within the economic sectors. Tourism and the renewable energy sector are identified as key drivers in terms of development in the KH. **Strategy 4: Enhance infrastructure development** The objectives of Strategy 3 include, maintain basic services and addressing backlogs, improving public facilities and access to these facilities, improving public transport and access to public transport and recycling programmes.

2.3 INTERNATIONAL STANDARDS AND GUIDELINES

2.3.1 IFC PERFOMANCE STANDARDS

The International Finance Corporation (IFC) is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development in developing countries. The IFC is a member of the World Bank Group (WBG) and is headquartered in Washington, D.C., United States. It was established in 1956 as the private sector arm of the WBG to advance economic development by investing in strictly for-profit and commercial projects that purport to reduce poverty and promote development.

The IFC's stated aim is to create opportunities for people to escape poverty and achieve better living standards by mobilizing financial resources for private enterprise, promoting accessible and competitive markets, supporting businesses and other private sector entities, and creating jobs and delivering necessary services to those who are poverty-stricken or otherwise vulnerable. Since 2009, the IFC has focused on a set of development goals that its projects are expected to target. Its goals are to increase sustainable agriculture opportunities, improve health and education, increase access to financing for microfinance and business clients, advance infrastructure, help small businesses grow revenues, and invest in climate health.

The IFC is owned and governed by its member countries but has its own executive leadership and staff that conduct its normal business operations. It is a corporation whose shareholders are member governments that provide paid-in capital and which have the right to vote on its matters. Originally more financially integrated with the WBG, the IFC was established separately and eventually became authorized to operate as a financially autonomous entity and make independent investment decisions. It offers an array of debt and equity financing services and helps companies face their risk exposures, while refraining from participating in a management capacity. The corporation also offers advice to companies on making decisions, evaluating their impact on the environment and

society, and being responsible. It advises governments on building infrastructure and partnerships to further support private sector development.

The IFC's Sustainability Framework articulates the Corporation's strategic commitment to sustainable development and is an integral part of IFC's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments, roles, and responsibilities related to environmental and social sustainability. IFC's Access to Information Policy reflects IFC's commitment to transparency and good governance on its operations and outlines the Corporation's institutional disclosure obligations regarding its investment and advisory services. The Performance Standards (PSs) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the PSs to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives. The PSs may also be applied by other financial institutions (FIs).

The Project is considered a Category B project in terms of the IFC Policy on E&S Sustainability (2012), having the potential to cause limited adverse environmental or social risks and/or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures.

The objectives and applicability of the eight PSs are outlined in **Table 2-4**.

Table 2-4: Objectives and Applicability of the IFC Performance Standards

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts			
Overview	Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.		
Objectives	— To identify and evaluate environmental and social risks and impacts of the project. — To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. — To promote improved environmental and social performance of clients through the effective use of management systems. — To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. — To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.		
Aspects	1.1	Policy	The IFC Standards state under PS 1 (Guidance Note 23) that "*the breadth, depth and type of analysis included in an ESIA must be proportionate to the nature and scale of the proposed project's potential impacts as identified during the course of the assessment process.*" This document is the final deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr has been compiled and is included in **Appendix G**.
	1.2	Identification of Risks and Impacts	
	1.3	Management Programmes	
	1.4	Organisational Capacity and Competency	
	1.5	Emergency Preparedness and Response	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	1.6	Monitoring and Review	
	1.7	Stakeholder Engagement	
	1.8	External Communication and Grievance Mechanism	
	1.9	Ongoing Reporting to Affected Communities	
Performance Standard 2: Labour and Working Conditions;			
Overview	Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.		
Objectives	— To promote the fair treatment, non-discrimination, and equal opportunity of workers. — To establish, maintain, and improve the worker-management relationship. — To promote compliance with national employment and labour laws. — To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. — To promote safe and healthy working conditions, and the health of workers. — To avoid the use of forced labour.		
Aspects	2.1	— Working Conditions and Management of Worker Relationship — Human Resources Policy and Management — Working Conditions and terms of Engagement — Workers organisation — Non- Discrimination and Equal Opportunity — Retrenchment — Grievance Mechanism	PS2 is not considered highly applicable as construction activities will not be significant for a project of this nature and scale. This BA Report and the EMPr, however, incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors. Formal human resource and labour policies will be compiled in the event that the project is developed in the future.
	2.2	— Protecting the Workforce — Child Labour — Forced Labour	
	2.3	Occupational health and Safety	
	2.4	Workers Engaged by Third Parties	
	2.5	Supply Chain	
Performance Standard 3: Resource Efficiency and Pollution Prevention			
Overview	Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world.		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
Objectives	— To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. — To promote more sustainable use of resources, including energy and water. — To reduce project related GHG emissions.		
Aspects	3.1	— Policy Resource Efficiency — Greenhouse Gases — Water Consumption	PS3-related impacts, such as the management of construction waste, hazardous substances, and stormwater are assessed in **Section 7** of this report. There are no material resource efficiency issues associated with the Project. Refer to the EMPr for general resource efficiency measures. The project is not GHG emissions intensive and a climate resilience study or a GHG emissions-related assessment is not deemed necessary for a project of this nature. However, as supporting infrastructure to the Maralla WEF, the OHPL seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase has been adequately addressed in the EMPr. The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures have been included in the EMPr. Land contamination of the site from historical land use (i.e. low intensity agricultural / grazing) is not considered to be a cause for concern. The waste generation profile of the project is not complex. Waste mitigation and management measures have been included in EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. The EMPr identifies these anticipated hazardous materials and recommends relevant mitigation and management measures.
	3.2	— Pollution Prevention — Air Emissions — Stormwater — Waste Management — Hazardous Materials Management — Pesticide use and Management	
Performance Standard 4: Community Health, Safety, and Security			
Overview	Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts.		
Objectives	— To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. — To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities		
Aspects	4.1	— Community Health and Safety — Infrastructure and Equipment Design and Safety — Hazardous Materials Management and Safety — Ecosystem Services — Community Exposure to Disease — Emergency Preparedness and Response	The requirements included in PS 4 have been addressed in the BAR process and the development of the EMPr. The following generic plans have been included in the EMPr: — Emergency Response Plan; — Transport Management Plan; — HIV/AIDS Management Plan; and — Security Policy. All plans will be made site specific as part of the financial close process, in the event that the project is developed in the future. The location of the powerline inside of the security perimeter of the Maralla WEF reduces the potential risk of electrocution and potential electromagnetic fields exposure. Standard safety and security measures and included in the EMPr.
	4.2	Security Personnel	

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
Performance Standard 5: Land Acquisition and Involuntary Resettlement			
Overview	Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.		
Objectives	— To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. — To avoid forced eviction. — To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. — To improve, or restore, the livelihoods and standards of living of displaced persons. — To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.		
Aspects	5.1	— Displacement — Physical Displacement — Economic Displacement — Private Sector Responsibilities under Government Managed Resettlement	PS5 is not applicable to the proposed Maralla OHPL as no physical or economic displacement or livelihood restoration will be required. The proposed OHPL route is located on privately owned land that is utilised for agriculture by the landowners. The land will continue to be used for agriculture without impediment by the OHPL.
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
Overview	Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.		
Objectives	— To protect and conserve biodiversity. — To maintain the benefits from ecosystem services. — To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.		
Aspects	6.1	Protection and Conservation of Biodiversity	The powerline route traverses a CBA and ESA. A Biodiversity Impact Assessment as well as a Freshwater Impact Assessment have been undertaken for the proposed Maralla OHPL. Refer to **Appendix F.** The methodologies for the specialist assessments included a combination of literature review, in-field surveys and sensitivity mapping. This substantively complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa. The prevalence of invasive alien species on the site is low; however, the BAR process had noted the propensity for the spread of alien invasive species in the construction and operational phases and mitigation and management measures are included in the EMPr.
Performance Standard 7: Indigenous People			
Overview	Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.		
Objectives	— To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples. — To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. — To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. — To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life cycle. — To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. — To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.		
Aspects	7.1	General — Avoidance of Adverse Impacts — Participation and Consent	As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area.
	7.2	Circumstances Requiring Free, Prior, and Informed Consent — Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use — Critical Cultural Heritage — Relocation of Indigenous Peoples from Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use	
	7.3	Mitigation and Development Benefits	
	7.4	Private Sector Responsibilities Where Government is Responsible for Managing Indigenous Peoples Issues	
Performance Standard 8: Cultural Heritage			
Overview	Performance Standard 8 recognizes the importance of cultural heritage for current and future generations.		
Objectives	— To protect cultural heritage from the adverse impacts of project activities and support its preservation. — To promote the equitable sharing of benefits from the use of cultural heritage.		
Aspects	8.1	Protection of Cultural Heritage in Project Design and Execution	In accordance with prevailing national legislation, a comment is required from SAHRA in terms of Section 38 of the NHRA. The Heritage Impact Assessment (inclusive of palaeontology) undertaken as part of the BA process and is included in **Appendix F**. A Chance Find Procedure is included in the EMPr (**Appendix G**).

2.3.2 EQUATOR PRINCIPLES

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing, and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EPs apply globally to all industry sectors and to five financial products 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, 4) Bridge Loans and 5) Project-Related Refinance and Project-Related Acquisition Finance. The relevant thresholds and criteria for application is described in detail in the Scope section of the EP. Currently 118 Equator Principles Financial Institutions (EPFIs) in 37 countries have officially adopted the EPs, covering the majority of international project finance debt within developed and emerging markets. EPFIs commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

While the EPs are not intended to be applied retroactively, EPFIs apply them to the expansion or upgrade of an existing project where changes in scale or scope may create significant environmental and social risks and impacts, or significantly change the nature or degree of an existing impact. The EPs have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market.

The EPs have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry and have supported member banks in developing their own Environmental and Social Risk Management Systems.

The requirements and applicability of the EPs are outlined in **Table 2-5**. It should be noted that Principles 8 and 10 relate to a borrower's code of conduct and are therefore not considered relevant to the BA process and have not been included in this discussion.

Table 2-5: Requirements and Applicability of the Equator Principles

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
Principle 1: Review and Categorisation		
Overview	When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise such project based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of the IFC. Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale, and stage of the Project, and with the level of environmental and social risks and impacts. The categories are: — Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; — Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and — Category C: Projects with minimal or no adverse environmental and social risks and/or impacts.	Based upon the significance and scale of the Project's environmental and social impacts, the proposed project is regarded as a Category B project i.e. a project with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
Principle 2: Environmental and Social Assessment		
Overview	For all Category A and Category B Projects, the EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts, whether prepared by the client, consultants or external experts. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken. For other Category B and potentially C Projects, a limited or focused environmental or social assessment may be appropriate, applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process. The client is expected to include assessments of potential adverse Human Rights impacts and climate change risks as part of the ESIA or other Assessment, with these included in the Assessment Documentation.	This document is the draft deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr has been compiled and is included in **Appendix G**.
Principle 3: Applicable Environmental and Social Standards		
Overview	The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI's due diligence will include, for all Category A and Category B Projects globally, review and confirmation by the EPFI of how the Project and transaction meet each of the Principles. For Projects located in Non-Designated Countries, the Assessment process evaluates compliance with the then applicable IFC PS and WBG EHS Guidelines. For Projects located in Designated Countries, compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.	As South Africa has been identified as a non-designated country, the reference framework for environmental and social assessment is based on the IFC PS. In addition, this BAR process has been undertaken in accordance with NEMA (the host country's relevant legislation).

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
Principle 4: Environmental and Social Management System and Equator Principles Action Plan		
Overview	For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the Assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree on an Equator Principles Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.	BTE Renewables has a corporate ESMS which aligns with the Equator Principles, the IFC Performance Standards and applicable World Bank/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable GIIP. All BTE renewables' renewable energy projects, from inception, development, construction, operation, and any decommissioning are required to fully comply with the requirements of the ESMS requirements and expectations. A formal project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlines in the EMPr will serve as the basis for an ESMS for the proposed Project.
Principle 5: Stakeholder Engagement		
Overview	EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. To accomplish this, the appropriate assessment documentation, or non-technical summaries thereof, will be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner. The borrower will take account of and document the process and results of the consultation, including any actions agreed resulting from the consultation. Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. All Projects affecting Indigenous Peoples will be subject to a process of Informed Consultation and Participation, and will need to comply with the rights and protections for Indigenous Peoples contained in relevant national law, including those laws implementing host country obligations under international law.	The BA process includes an extensive stakeholder engagement process which complies with the South African EIA Regulations. The process includes consultations with local communities, nearby businesses and a range of government sector stakeholders (state owned enterprises, national, provincial and local departments). The stakeholder engagement process solicits interest from potentially interested parties through the placement of site notices and newspaper advertisements as well as written and telephonic communication. The stakeholder engagement process is detailed in Section 3.6.
Principle 6: Grievance Mechanism		
Overview	For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution	The EMPr includes a *Grievance Mechanism Process for Public Complaints and Issues*. This procedure effectively allows for external communications with members of the public to be undertaken in a transparent and structured manner. This procedure will be revised and updated as part of

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY
	of concerns and grievances about the Project's environmental and social performance. The borrower will inform the Affected Communities and Workers about the grievance mechanism in the course of the stakeholder engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a culturally appropriate manner, and is readily accessible, at no cost, and without retribution to the party that originates the issue or concern.	the EMPr amendment process in the event that the project is developed in the future.
Principle 7: Independent Review		
Overview	For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.	This principle will only become applicable in the event that that the project is developed in the future.
Principle 9: Independent Monitoring and Reporting		
Overview	To assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting for all Category A, and as appropriate, Category B projects. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required.	This principle will only become applicable in the event that the project is developed in the future.

2.4 OTHER GUIDELINES AND BEST PRACTICE RECOMMENDATIONS

2.4.1 WORLD BANK GROUP ENVIRONMENTAL, HEALTH, AND SAFETY GUIDELINES

EHS GENERAL GUIDELINES

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of GIIP. They contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. The EHS General Guidelines contain information on cross-cutting environmental, health and safety issues potentially applicable to all industry sectors, used together with the relevant industry sector guideline(s), to guide the development of management and monitoring strategies for various project-related impacts.

EHS GUIDELINES FOR ELECTRIC POWER TRANSMISSION AND DISTRIBUTION

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas. The Guidelines includes industry-specific impacts and management, provides a summary of EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of a facility, along with recommendations for their management. Additionally, it includes performance indicators and monitoring related to the environment an occupational health and safety. These Guidelines have been considered in the impact assessment and formulation of mitigation measures in this BAR.

2.4.2 GENERIC EMPR RELEVANT TO AN APPLICATION FOR SUBSTATION AND OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE

NEMA requires that an EMPr be submitted where an EIA has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation. The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations, 2014, as amended, or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice, that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the applicant and the CA.GN 435 of 22 March 2019 identified a generic EMPr relevant to applications for substations and overhead electricity transmission and distribution infrastructure which require authorisation in terms of Section 42(2) of NEMA. Applications for overhead electricity transmission and distribution infrastructure that trigger Activity 11 of Listing Notice 1 or Activity 9 of Listing Notice 2 and any other listed or specified activities must use the generic EMPr.

The objective of the generic EMPrs is "to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature."[1]

The generic EMPrs have been used as a basis for the Maralla OHPL EMPr included as **Appendix G**.

[1] DEA (2019) *Appendix 1: Generic Environmental Management Programme (EMPr) for the Development and Expansion for Overhead Electricity Transmission and Distribution Infrastructure*

3 BASIC ASSESSMENT PROCESS

3.1 OBJECTIVES OF THE BASIC ASSESSMENT PROCESS AS PER THE PROCEDURAL FRAMEWORK

As defined in Appendix 1 of the EIA Regulations, 2014 (as amended), the objective of the impact assessment process is to, through a consultative process:

- 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;
- Identify the alternatives considered, including the activity, location, and technology alternatives;
- Describe the need and desirability of the proposed alternatives;
- 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—
  - The nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and
  - The degree to which these impacts—
    - Can be reversed;
    - May cause irreplaceable loss of resources; and
    - Can be avoided, managed, or mitigated.
- 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–
  - Identify and motivate a preferred site, activity and technology alternative;
  - Identify suitable measures to avoid, manage or mitigate identified impacts; and
  - Identify residual risks that need to be managed and monitored.

3.2 DFFE WEB-BASED ENVIRONMENTAL SCREENING TOOL

DFFE has developed the National Web-based Environmental Screening Tool in order to flag areas of potential environmental sensitivity related to a site as well as a development footprint and produces the screening report required in terms of regulation 16 (1)(v) of the EIA Regulations (2014, as amended). The *Notice of the requirement to submit a report generated by the national web-based environmental screening tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended* (GN 960 of July 2019) states that the submission of a report generated from the national web-based environmental screening tool, as contemplated in Regulation 16(1)(b)(v) of the EIA Regulations, 2014, published under Government Notice No. R982 in Government Gazette No. 38282 of 4 December 2014, as amended, is compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the EIA Regulations, 2014 as of 04 October 2019.

The Screening Report generated by the National Web-based Environmental Screening Tool contains a summary of any development incentives, restrictions, exclusions or prohibitions that apply to the proposed development footprint as well as the most environmentally sensitive features on the footprint based on the footprint sensitivity screening results for the application classification that was selected.

A screening report for the proposed transmission line was generated on **23 July 2021** and is attached as **Appendix H**. The Screening Report for the project identified various sensitivities for the site. The report also generated a list of specialist assessments that should form part of the BA based on the development type and the environmental

sensitivity of the site. Assessment Protocols in the report provide minimum information to be included in a specialist report to facilitate decision-making.

Table 3-1 below provides a summary of the sensitivities identified for the development footprint.

Table 3-1: Sensitivities identified in the screening report

THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVIY
Agricultural Theme	✓			
Animal Species Theme		✓		
Aquatic Biodiversity Theme	✓			
Archaeological and Cultural Heritage Theme		✓		
Civil Aviation Theme			✓	
Defence Theme				✓
Palaeontology Theme	✓			
Plant Species Theme			✓	
Terrestrial Biodiversity Theme	✓			

Based on the selected classification, and the environmental sensitivities of the proposed development footprint, the following list of specialist assessments have been identified for inclusion in the assessment report:

- Agricultural Impact Assessment
- Landscape/Visual Impact Assessment
- Archaeological and Cultural Heritage Impact Assessment
- Palaeontology Impact Assessment
- Terrestrial Biodiversity Impact Assessment
- Aquatic Biodiversity Impact Assessment
- Avian Impact Assessment
- Civil Aviation Assessment
- RFI Assessment
- Geotechnical Assessment
- Plant Species Assessment
- Animal Species Assessment

3.2.1 MOTIVATION FOR SPECIALIST STUDIES

The report recognises that "it is the responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study including the provision of photographic evidence of the footprint situation."

As summarised in **Table 3-1** above, the following specialist assessments have been undertaken for the project based on the environmental sensitivities identified by the Screening Report and are attached as **Appendix H**:

- Terrestrial Biodiversity Impact Assessment;
- Avifauna Impact Assessment;
- Freshwater Impact Assessment;
- Visual Impact Assessment;
- Palaeontology
- Soils and Agricultural Potential Assessment;
- Social Impact Assessment; and
- Archaeological and Cultural Heritage Desktop Assessment.

Three of the identified specialist studies have not been undertaken as part of the BA process for the proposed Maralla 132 OHPL project. Motivation for the exclusion of these specialist studies is provided below.

GEOTECHNICAL ASSESSMENT

A Geotechnical Assessment will not be undertaken as part of the BA Process as this will be undertaken during the design phase, in the event that the project is developed in the future.

CIVIL AVIATION

The Civil Aviation Authority will be included on the project stakeholder database. They will be informed of the proposed Project, and comment will be sought.

RFI ASSESSMENT

A Radio Frequency Interference (RFI) Study will not be undertaken. During the previous EIA and BA processes the SKA-SA confirmed that Maralla WEF is located within the Northern Cape and will have no impact on the SKA. The Maralla WEF is located a significant distance from the SKA and so will have a very low impact risk of impact. SKA-SA will be engaged with as part of the Public Participation Process.

3.3 APPLICATION FOR ENVIRONMENTAL AUTHORISATION

The application phase consisted of a pre-application consultation with DFFE and subsequently completing the appropriate application form as well as the submission and registration of the application for EA with the DFFE. The pre-application meeting was held with DFFE on **28 July 2021** (meeting minutes attached as **Appendix I**) and the application form was submitted to the DFFE on **23 June 2022**. A reference number has been included in this Final BAR following acknowledgment of receipt from the DFFE.

3.4 BASELINE ENVIRONMENTAL ASSESSMENT

The description of the environmental attributes of the Project area was compiled through a combination of desktop reviews and site investigations. Desktop reviews made use of available information including existing reports, aerial imagery, and mapping. The specialist teams undertook site investigations between July and September 2021 to provide impact assessments for the proposed transmission line route.

3.5 IMPACT ASSESSMENT METHODOLOGY

3.5.1 ASSESSMENT OF IMPACTS AND MITIGATION

The assessment of impacts and mitigation evaluates the likely extent and significance of the potential impacts on identified receptors and resources against defined assessment criteria, to develop and describe measures that will be taken to avoid, minimise or compensate for any adverse environmental impacts, to enhance positive impacts, and to report the significance of residual impacts that occur following mitigation.

The key objectives of the risk assessment methodology are to identify any additional potential environmental issues and associated impacts likely to arise from the proposed project, and to propose a significance ranking. Issues / aspects will be reviewed and ranked against a series of significance criteria to identify and record interactions between activities and aspects, and resources and receptors to provide a detailed discussion of impacts. The assessment considers direct,[2] indirect,[3] secondary[4] as well as cumulative[5] impacts.

A standard risk assessment methodology is used for the ranking of the identified environmental impacts pre-and post-mitigation (i.e. residual impact). The significance of environmental aspects is determined and ranked by considering the criteria[6] presented in **Table 3-2**.

Table 3-2: Impact Assessment Criteria and Scoring System

CRITERIA	SCORE 1	SCORE 2	SCORE 3	SCORE 4	SCORE 5
Impact Magnitude (M) The degree of alteration of the affected environmental receptor	Very low: No impact on processes	Low: Slight impact on processes	Medium: Processes continue but in a modified way	High: Processes temporarily cease	Very High: Permanent cessation of processes
Impact Extent (E) The geographical extent of the impact on a given environmental receptor	Site: Site only	Local: Inside activity area	Regional: Outside activity area	National: National scope or level	International: Across borders or boundaries
Impact Reversibility (R) The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change	Reversible: Recovery without rehabilitation		Recoverable: Recovery with rehabilitation		Irreversible: Not possible despite action
Impact Duration (D) The length of permanence of the impact on the environmental receptor	Immediate: On impact	Short term: 0-5 years	Medium term: 5-15 years	Long term: Project life	Permanent: Indefinite
Probability of Occurrence (P) The likelihood of an impact occurring in the absence of pertinent environmental management measures or mitigation	Improbable	Low Probability	Probable	Highly Probability	Definite
Significance (S) is determined by combining the above criteria in the following formula:	$[S = (E + D + R + M) \times P]$ $Significance = (Extent + Duration + Reversibility + Magnitude) \times Probability$				
IMPACT SIGNIFICANCE RATING					
Total Score	0 – 30		31 to 60		61 – 100
Significance Rating (Negative (-)	**Low (-)**		**Moderate (-)**		**High (-)**
Significance Rating (Positive (+)	**Low (+)**		**Moderate (+)**		**High (+)**

[2] Impacts that arise directly from activities that form an integral part of the Project.
[3] Impacts that arise indirectly from activities not explicitly forming part of the Project.
[4] Secondary or induced impacts caused by a change in the Project environment.
[5] Impacts are those impacts arising from the combination of multiple impacts from existing projects, the Project and/or future projects.
[6] The definitions given are for guidance only, and not all the definitions will apply to all the environmental receptors and resources being assessed. Impact significance was assessed with and without mitigation measures in place.

3.5.2 IMPACT MITIGATION

The impact significance without mitigation measures will be assessed with the design controls in place. Impacts without mitigation measures in place are not representative of the proposed development's actual extent of impact and are included to facilitate understanding of how and why mitigation measures were identified. The residual impact is what remains following the application of mitigation and management measures and is thus the final level of impact associated with the development. Residual impacts also serve as the focus of management and monitoring activities during Project implementation to verify that actual impacts are the same as those predicted in this report.

The mitigation measures chosen are based on the mitigation sequence/hierarchy which allows for consideration of five (5) different levels, which include avoid/prevent, minimise, rehabilitate/restore, offset and no-go in that order. The mitigation sequence/hierarchy is shown in **Figure 3-1** below.

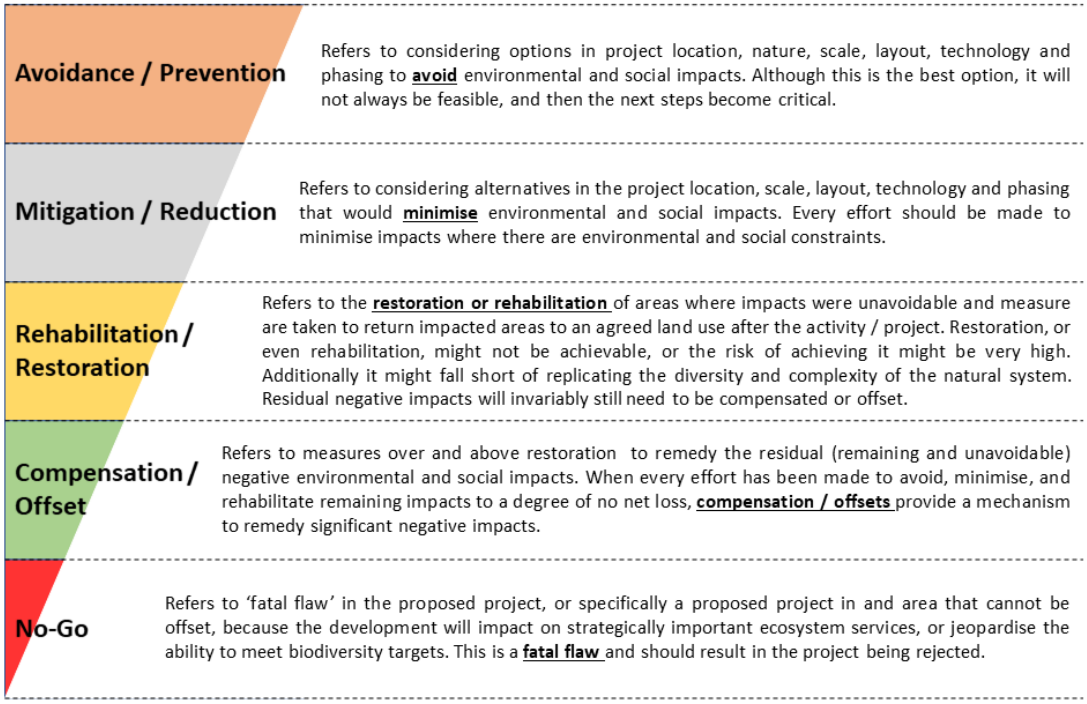


Figure 3-1: Mitigation Sequence/Hierarchy

The idea is that when project impacts are considered, the first option should be to avoid or prevent the impacts from occurring in the first place if possible, however, this is not always feasible. If this is not attainable, the impacts can be allowed, however they must be minimised as far as possible by considering reducing the footprint of the development for example so that little damage is encountered. If impacts are unavoidable, the next goal is to rehabilitate or restore the areas impacted back to their original form after project completion. Offsets are then considered if all the other measures described above fail to remedy high/significant residual negative impacts. If no offsets can be achieved on a potential impact, which results in full destruction of any ecosystem for example, the no-go option is considered so that another activity or location is considered in place of the original plan.

3.6 STAKEHOLDER ENGAGEMENT PROCESS

Stakeholder engagement (public participation) is a requirement of the BA process. It consists of a series of inclusive and culturally appropriate interactions aimed at providing stakeholders with opportunities to express their views, so that these can be considered and incorporated into the BA decision-making process. Effective engagement requires the prior disclosure of relevant and adequate project information to enable stakeholders to understand the risks, impacts, and opportunities of the proposed project. The objectives of the stakeholder engagement process can be summarised as follows:

- Identify relevant individuals, organisations and communities who may be interested in or affected by the proposed project;
- Clearly outline the scope of the proposed project, including the scale and nature of the existing and proposed activities;
- Identify viable proposed project alternatives that will assist the relevant authorities in making an informed decision;
- Identify shortcomings and gaps in existing information;
- Identify key concerns, raised by Stakeholders that should be addressed in the specialist studies;
- Highlight the potential for environmental impacts, whether positive or negative; and
- To inform and provide the public with information and an understanding of the proposed project, issues, and solutions.

A Stakeholder Engagement Report (SER) has been included in **Appendix D** and will be updated in the final BAR, detailing the project's compliance with Chapter 6 of the NEMA EIA Regulations 2014, as amended.

3.6.1 STAKEHOLDER CONSULTATION

As part of the pre-application consultation meeting held with DFFE on 28 July 2021, the proposed plan for public participation was discussed. A public participation plan was subsequently submitted to DFFE, along with the meeting minutes, for approval on 05 August 2021. The meeting minutes and public participation plan were approved by DFFE on 10 August 2021. Refer to the SER for details of the approved public participation plan and stakeholder consultation undertaken to date.

3.6.2 PUBLIC REVIEW

The Draft BAR was placed for public review for a period of 30 days from **23 June 2022** to **25 July 2022**, at the following public places:

- Majtiesfontein – Majtiesfontein Community Hall;
- Laingsburg Public Library;
- Sutherland Public Library; and
- WSP website (https://www.wsp.com/en-ZA/services/public-documents).

WSP has collated the comments received during the public review phase and has compiled a Comments and Responses Report (CRR) that is attached to the Final BAR in the SER in **Appendix D**.

3.7 ASSUMPTIONS AND LIMITATIONS

General assumptions and limitations relating to the BA process are listed below:

- The information provided by Maralla and the specialists is assumed to be accurate;
- WSP's assessment of the significance of impacts of the proposed project on the affected environment has been based on the assumption that the activities will be confined to those described in Section 4. If any substantial changes to the project description are made, impacts may need to be reassessed;
- Where detailed design information is not available, the precautionary principle (i.e. a conservative approach that overstates negative impacts and understates benefits) has been adopted;
- The competent authority would not require additional specialist input, as per the proposals made in this report, in order to make a decision regarding the application; and
- All information is assumed to be accurate and relevant at the time of writing this report.

Key assumptions and limitations relevant to the specialist assessments include:

Avifauna

This study assumed that the sources of information used in this report are reliable enough to form the basis of confident conclusions. However, the following must be noted:

- Cumulative impacts include all wind energy projects with grid connections within a 10km radius that currently have open applications or have been approved by the Competent Authority as per the 2021 Q4 database from the DFFE.
- Despite thorough and extremely onerous and time-consuming internet searches, details of all the proposed grid connections of all the registered wind energy projects within a 10km radius could not be located. The accuracy of the ones that were located can also not be guaranteed as amendments are taking place on an ongoing basis.
- Conclusions in this study are based on experience of these and similar species in different parts of South Africa. Bird behaviour can never be entirely reduced to formulas that will be valid under all circumstances.

Biodiversity

The following assumptions and limitations are applicable for this assessment:

- The assessment area was based on the project area and infrastructure provided by the client and any alterations to the route would have affected the area surveyed;
- The project area was only surveyed during a single site visit and therefore, this assessment does not consider temporal trends;
    - Due to time constraints, only certain parts of the power line alternatives were assessed in field, portions not accessed will be assessed by extrapolation of field data.
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by 5 m.

Freshwater

- The location and associated infrastructure were determined from information provided by BTE Renewables;
- Wetlands and/or riparian systems identified for delineation within the adjacent properties were based on a desktop review of available information and through a site inspection. This is reliant on various published data sources (e.g., aerial imagery and mapping) which have been assumed by WSP to be representative of site conditions;
- The wetland/riparian boundary comprises a gradually changing gradient of wetland/riparian indicators and varies both temporally and spatially; the wetland delineation thus occurs within a certain degree of tolerance;
- It should be recognised that there are several confounding effects on the interpretation of the historic and current extent, and functioning of the respective systems such as the historic and current industrial practices, roads, infilling, excavations/erosion, etc.;
- The wetland/riparian boundaries were accurately delineated based on the initial desktop review and site observations. The remaining watercourses were delineated at a desktop level and broadly verified in the field to obtain an extent of the wetland/riparian areas;
- This report accounts for the potential impacts of the proposed project and associated activities only; and,
- The findings, results, observations, conclusions and recommendations given in this report are based on WSP's best scientific and professional knowledge as well as available information.

Heritage

Access to large portions of the proposed OHL routes was difficult as they fall within the Karusa and Soetwater WEFs which is currently under construction and most farm access points were subject to access control. The field team was able to negotiate access to WEF, but its movements were somewhat constrained by the construction work taking place at places on the site.

Furthermore, a full day of field assessment was lost to heavy rain and snow, so only portions of the proposed OHL routes could be surveyed.

Where access was possible, principally along route Options 2(A) and 1(B), vegetation cover was such that surface visibility was generally good for the purposes of the archaeological survey and it was possible to obtain a good general sense of the archaeological potential of affected area.

Palaeontology

Since most fossils are buried beneath the surface, their nature and distribution cannot be directly assessed during field surveys of the development footprint. Palaeontological assessments therefore rely on extrapolating palaeontological sensitivities within the footprint from desktop data and field surveys of well-exposed sedimentary rocks, mostly from sites *outside*, and often well away from, the footprint itself. This approach assumes that the rock exposures seen are representative - in palaeontological terms - of the rock units (formations, members *etc*) that will be impacted by the proposed development.

The accuracy and reliability of palaeontological specialist studies as components of heritage impact assessments are generally limited by the following constraints:

- Inadequate database for fossil heritage for much of the RSA, given the large size of the country and the small number of professional palaeontologists carrying out fieldwork here. Most development study areas have never been surveyed by a palaeontologist.
- Variable accuracy of geological maps which underpin these desktop studies. For large areas of terrain these maps are largely based on aerial photographs alone, without ground-truthing. The maps generally depict only significant ("mappable") bedrock units as well as major areas of superficial "drift" deposits (alluvium, colluvium) but for most regions give little or no idea of the level of bedrock outcrop, depth of superficial cover (soil *etc*), degree of bedrock weathering or levels of small-scale tectonic deformation, such as cleavage. All of these factors may have a major influence on the impact significance of a given development on fossil heritage and can only be reliably assessed in the field.
- Inadequate sheet explanations for geological maps, with little or no attention paid to palaeontological issues in many cases, including poor locality information.
- The extensive relevant palaeontological "grey literature" - in the form of unpublished university theses, impact studies and other reports (*e.g*. of commercial mining companies) - that is not readily available for desktop studies.
- Absence of a comprehensive computerized database of fossil collections in major RSA institutions which can be consulted for impact studies. A Karoo fossil vertebrate database is now accessible for impact study work.

In the case of palaeontological desktop studies without supporting Phase 1 field assessments these limitations may variously lead to either:

- *underestimation* of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or
- *overestimation* of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by tectonism or weathering or are buried beneath a thick mantle of unfossiliferous "drift" (soil, alluvium *etc*).

Since most areas of the RSA have not been studied palaeontologically, a palaeontological desktop study usually entails inferring the presence of buried fossil heritage within the study area from relevant fossil data collected from similar or the same rock units elsewhere, sometimes at localities far away. Where substantial exposures of bedrocks or potentially fossiliferous superficial sediments are present in the study area, the reliability of a palaeontological impact assessment may be significantly enhanced through field assessment by a professional palaeontologist.

In the case of the Maralla West WEF and Maralla East WEF powerline study area near Sutherland in the Northern Cape, preservation of potentially fossiliferous bedrocks is favoured by the semi-arid climate and sparse vegetation. However, bedrock exposure is highly constrained by extensive superficial deposits, especially in areas of low relief, as well as pervasive Karoo *bossieveld* vegetation (Central Mountain Shale Renosterveld, Koedoesberg – Moordenaars Karoo, Tanqua Wash Riviere). Much of the study area is hilly or mountainous with few access roads, especially in rugged upland areas. However, sufficient bedrock exposures were examined during the course of several field studies in the Klein-Roggeveldberge region to assess the palaeontological heritage sensitivity of the main rock units represented within the grid connection project area (See reference list). Confidence levels for this impact assessment are consequently rated as Medium.

Socio-economic

- Strategic importance of the project

  The strategic importance of promoting renewable energy and associated grid infrastructure is supported by the national and provincial energy policies. The power line route is also located within Komsberg REDZ and Central Transmission Line Corridor. However, this does not mean that site related issues can be ignored or overlooked.

- Fit with planning and policy requirements

  Legislation and policies reflect societal norms and values. The legislative and policy context therefore plays an important role in identifying and assessing the potential social impacts associated with a proposed development. In this regard a key component of the SIA process is to assess the proposed development in terms of its fit with key planning and policy documents. As such, if the findings of the study indicate that the proposed development in its current format does not conform to the spatial principles and guidelines contained in the relevant legislation and planning documents, and there are no significant or unique opportunities created by the development, the development cannot be supported. However, the study recognises the strategic importance of solar energy and the technical, spatial and land use constraints required for solar energy facilities.

  The route is also located within the Komsberg REDZ and Central Transmission Line Corridor. The area has therefore been identified as being suitable for the establishment renewable energy facilities and associated grid infrastructure.

- Demographic data

  The information contained in some key policy and land use planning documents, such as Integrated Development Plans etc., may not contain data from Community Household Survey if 2016. However, this will not have a material impact on the findings of the study.

Visual

This assessment was undertaken during the planning stage of the project and is based on information available at that time.

4 PROJECT DESCRIPTION

This section provides a description of the location of the project area and the site location alternatives considered for the project. The descriptions encompass the activities to be undertaken during the construction and operational phases as well as the consideration for site accessibility, water demand, supply, storage, and site waste management. This section also considers the need and desirability of the project in accordance with Appendix 1 of GNR 326.

4.1 LOCATION OF THE PROPOSED PROJECT

The proposed Project is located in the Karoo Hoogland Local Municipality under the jurisdiction of the Namakwa District Municipality which falls within the Northern Cape Province (**Figure 4-1**). The Project area is located approximately 34km south-west of the town of Sutherland (at the closest) The proposed OHPL project entails the construction of a 132 kV transmission line from the onsite substation at the authorised Maralla WEF to connect to the existing Karusa substation.

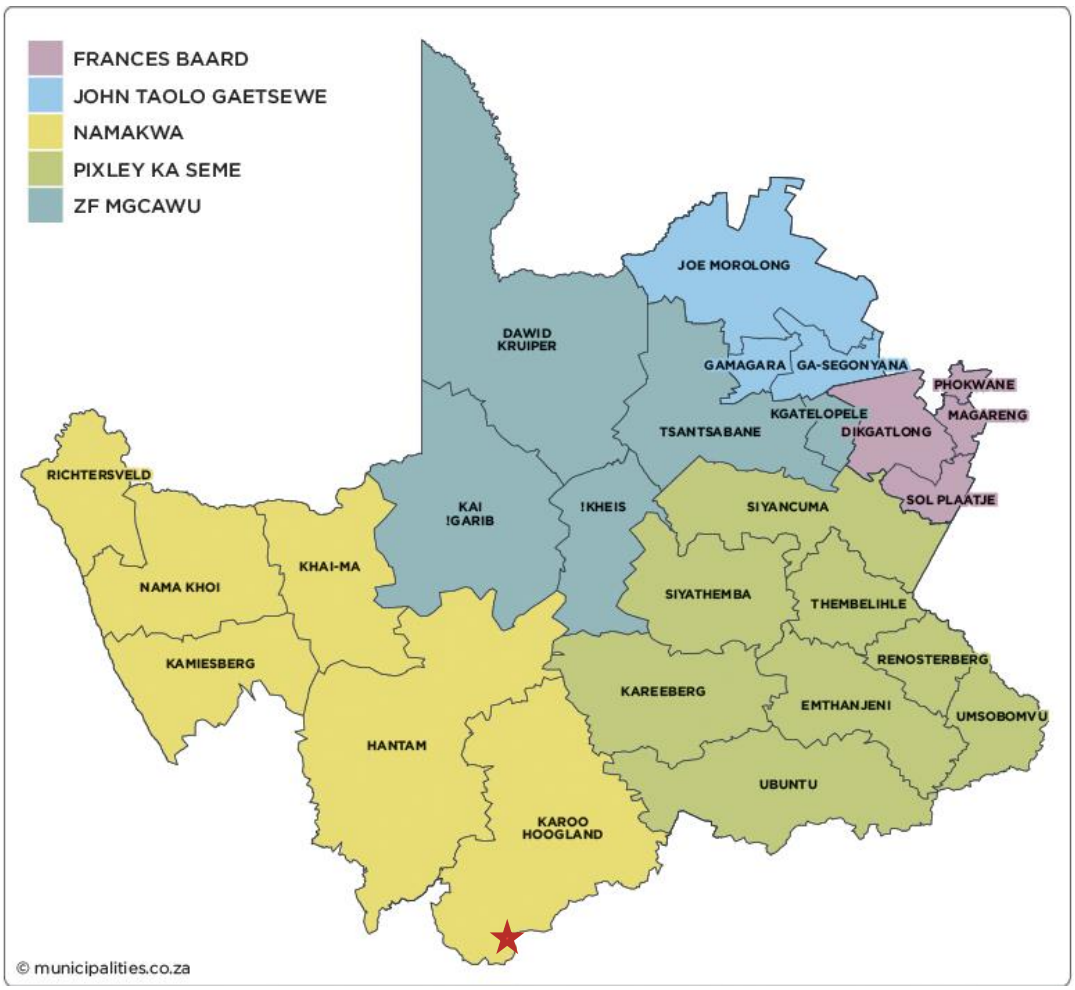


Figure 4-1: The study area (red star) in relation to the Northern Cape District and Local Municipalities

The proposed Maralla 132 kV powerline is proposed to be located over seven (7) properties with six (6) different landowners (**Table 4-1**)**.** The location and layout of the properties on which the six powerline alternative alignments are located is provided in **Figure 4-2**.

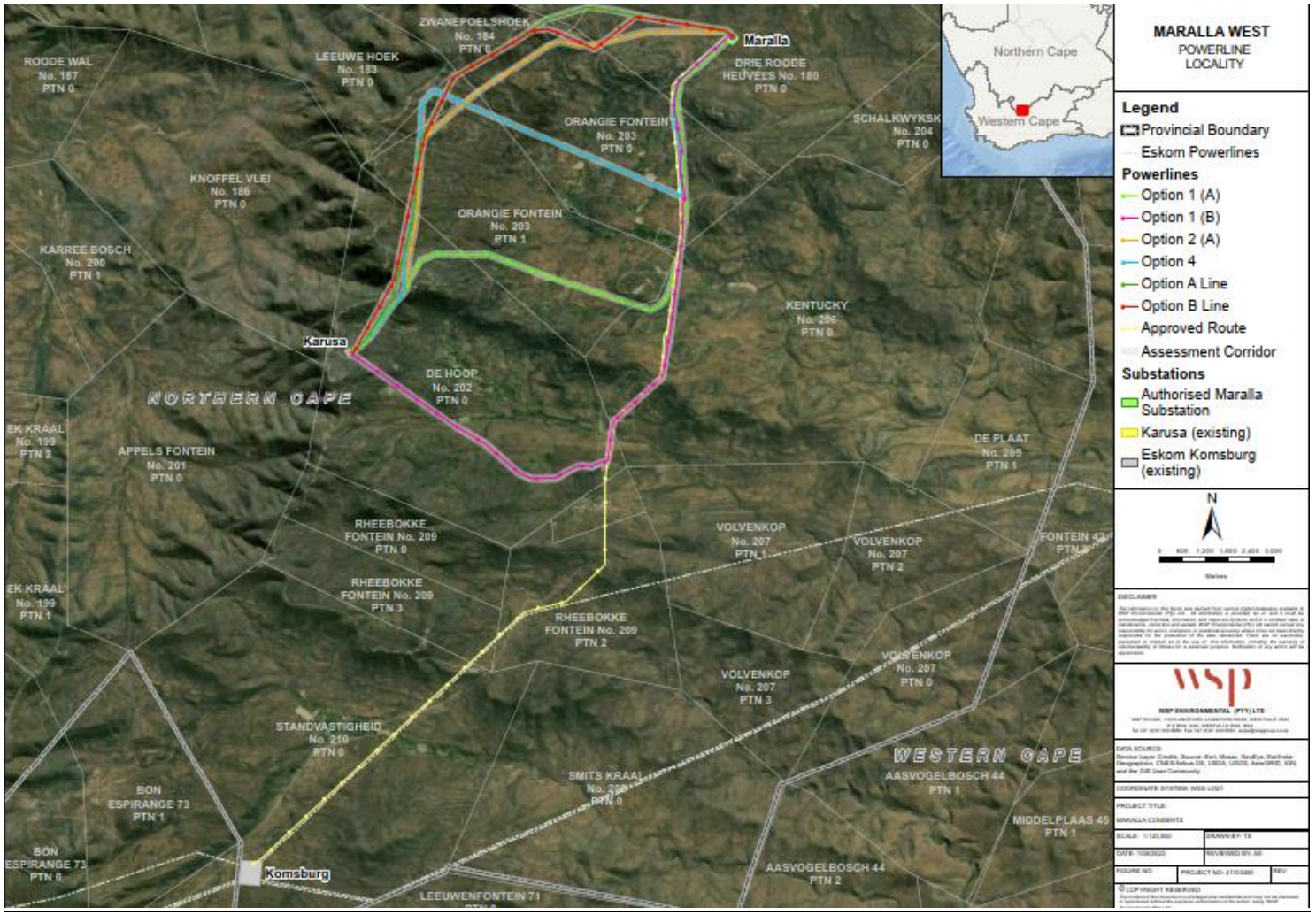


Figure 4-2: The proposed powerline alternative alignments in relation to affected land portions

Table 4-1: Farm portions on which the proposed development is located

FARM NAME AND NUMBER	OWNER	21 DIGIT SG CODE	MUNICIPALITY / PROVINCE	RELEVANT ALTERANTIVE
Farm Kentucky 206 remainder	Eldri Van Zyl Trust	C07200000000020600000	Karoo Hoogland LM / Namakwa DM / Northern Cape	Option 1 A Option 1 B
Farm Drie Roode Heuwels 180 Remainder	Gielie Hanekom Family Trust	C07200000000018000000	Karoo Hoogland LM / Namakwa DM / Northern Cape	All Options
Farm Orangefontein 203 Portion 1	Jordaan Hilletje and Susanna Maria	C07200000000020300001	Karoo Hoogland LM / Namakwa DM / Northern Cape	Option 1A Option 2A Option 4 Option A Option B
Farm Orangefontein 203 Portion 2	Nicolaas Paulsen	C07200000000020300002	Karoo Hoogland LM / Namakwa DM / Northern Cape	Option 1 A Option 1 B
Farm Orangefontein 185 Remainder	Jordaan Hilletje and Susanna Maria	C07200000000020300000	Karoo Hoogland LM / Namakwa DM / Northern Cape	Option 4 Option A Option B
Farm De Hoop 202 Remainder	Dirk Van Zyl Trust	C07200000000020200000	Karoo Hoogland LM / Namakwa DM / Northern Cape	All Options
Farm Annex Drie Roode Heuvels 181 Remainder	Gielie Hanekom Family Trust	C07200000000018100000	Karoo Hoogland LM / Namakwa DM / Northern Cape	Option A
Farm Zwanepoelshoek 184 Remainder	Nicolaas Paulsen	C07200000000018400000	Karoo Hoogland LM / Namakwa DM / Northern Cape	Option A Option B

There are several watercourses/ drainage channels present within the proposed (preferred) transmission integration site, the main river being the Kamberg River, which runs through the site. Given the arid climatic condition of the region, majority of the watercourses within the site where the proposed powerline and substation are located, are ephemeral and are likely to only convey water during infrequent high rainfall events.

4.2 PROJECT INFRASTRUCTURE

4.2.1 TRANSMISSION LINE

The transmission line will be a 132kV steel single or double structure with a kingbird conductor. The powerline towers will either be steel lattice or monopole structures.

Standard overhead line construction methodology will be employed – placement of poles, stringing of conductors. It is not envisaged that any large excavations and stabilized backfill will be required, however this will only be verified on site once the geotechnical assessment has been undertaken at each pole position (as part of construction works).

Figure 4-3 below provides an example of a conventional lattice tower compared with a monopole structure. Pole positions will only be available once the powerline design has started. It is anticipated that towers will be located approximately 200m to 250m apart.

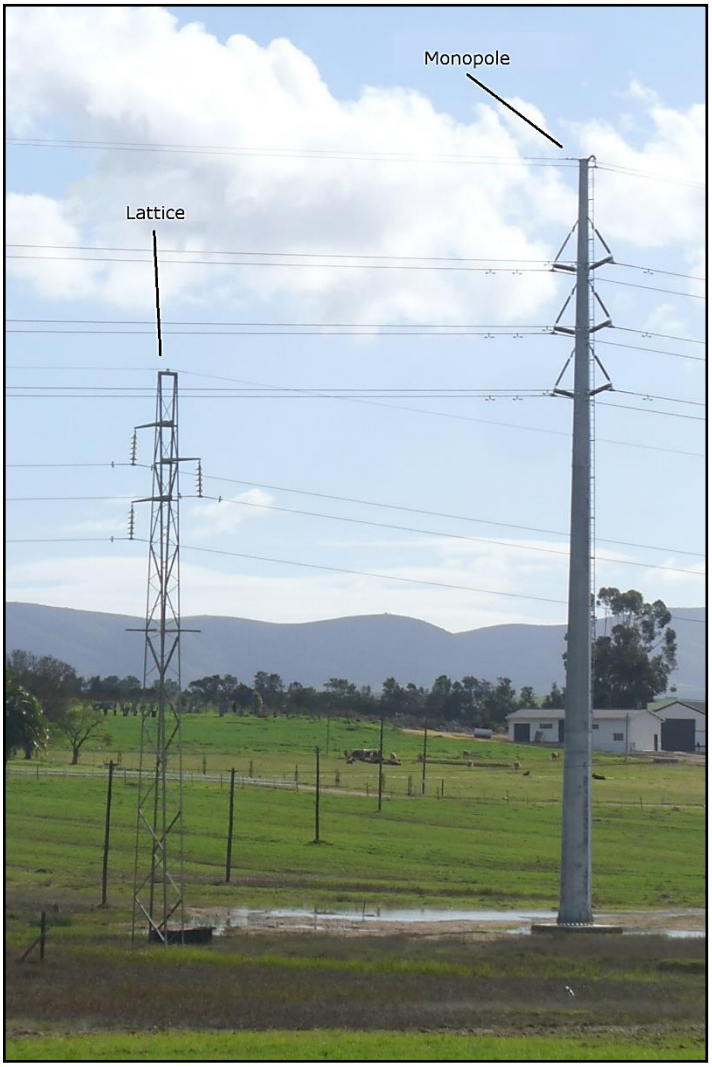


Figure 4-3: Conventional lattice powerline tower compared to a steel monopole structure

4.2.2 SERVITUDE

The servitude width of the 132 kV transmission line (single and double circuit) is between 36 and 40m and the length of the transmission line is approximately 18km, which will result in a servitude area of approximately 72 ha.

The servitude is required to ensure safe construction, maintenance and operation of the powerline. Registration of the servitude grants Maralla the right to erect, operate and maintain the powerline and to access the land to carry out such activities, but it does not constitute full ownership of the land. It should be noted that the OHPL will be ceded to Eskom post-construction. Construction and operation activities and access to the powerline must be carried out with due respect to the affected landowners. The servitude required for the Project will be registered at the Deeds Office and will form part of the title deed of the relevant properties once the environmental authorisation has been obtained.

4.2.3 SUBSTATIONS

An onsite substation will be established within the extent of the authorised Maralla WEF. The IPP portion of the substation authorised as part of the Maralla West WEF EA (Ref: 14/12/16/3/3/2/963) whilst the Eskom portion of the substation was authorised with the currently authorised powerline (Ref: 14/12/16/3/3/2/1774).

The proposed new OHPL alignment will connect to the existing Karusa substation. It is anticipated that an additional busbar and platform will be required to allow for the connection of the Maralla OHPL. A footprint of 1ha is assumed.

The site itself is very homogenous and there are no significant features in the immediate vicinity of the substation location that might be affected by the development. The following infrastructure is proposed:

- A high voltage substation yard to allow for multiple 132 kV feeder bays and transformers;
- The control building, telecommunication infrastructure, oil dams(s) etc; and
- All the access road infrastructure to and within the substation.

4.2.4 SITE ACCESS

The Maralla WEF and surrounding areas are already easily accessible. The preferred OHPL route is accessible via the service roads associated authorised Maralla, Soetwater and Karusa WEFs. New access roads or tracks may be required to provide access to sections of the powerline route. Access roads will be approximately 4m in width and will be mostly a two-track gravel road under the OHPL in order to access pylons for construction and maintenance purposes.

4.3 PROPOSED PROJECT DEVELOPMENT ACTIVITIES

- The typical steps involved in the construction and operation of a transmission line is summarised
- below:
- Planning Phase
  - Step 1: Surveying of the development area and negotiation with affected landowners; and
  - Step 2: Final design and micro-siting of the infrastructure based on geotechnical, topographical conditions and potential environmental sensitivities.
- Construction Phase
  - Step 3: Vegetation clearing and construction of access roads/tracks (where required);
  - Step 4: Construction of tower structure foundations;
  - Step 5: Assembly and erection of infrastructure on site;

- Step 6: Stringing of conductors; and
- Step 6: Rehabilitation of disturbed areas and protection of erosion sensitive areas.

— Operation Phase
- Step 7: Continued maintenance during operation.

4.3.1 CONSTRUCTION PHASE

CONSTRUCTION SCHEDULE

Construction of the OHPL is anticipated to take 12 - 24 months.

SITE ESTABLISHMENT AND TRANSPORTATION OF MATERIALS AND EQUIPMENT TO SITE

The selected Contractor will establish a temporary site camp including, but not be limited to, temporary offices, laydown areas for equipment and materials, storage facilities, ablutions, waste storage and handling area, and parking area. The location and extent of the Contractors camp, to be established within the Project area, will be undertaken in line with specifications detailed within the EMPr. Materials are to be collected on a daily basis from the contractor laydown area for the construction activities along the servitude. This limits areas to be impacted for storage along the servitude as well as for security purposes when activities cease at the end of each day.

The required materials and equipment will be transported to the site via public roads and private farm roads/tracks along the proposed servitude as far as possible. Large mobile plant including mechanical/hydraulic augers, mobile cranes, bucket trucks/cherry pickers will be used during installation of the OHPL.

LABOUR REQUIREMENTS

During site preparation and installation of Project related infrastructure the selected Contractor, working on behalf of Maralla, is anticipated to require 20-30 people to undertake the required works. Approximately 5% of workers would be highly skilled, 15% medium skilled, and 80% low skilled.

VEGETATION CLEARING

Due to the nature of the vegetation within the Project area, which is predominantly low shrubs, limited vegetation clearing will be required. Clearing of vegetation will be limited to pylon areas to facilitate installation of each pylon. Clearing will be done in phases along the OHPL route as required prior to installation activities.

INSTALLATION OF OHPL

Standard OHPL installation methods will be employed, which entails the drilling of holes, planting of monopoles (compaction only, no concrete casting) and stringing of the conductors. It is not envisaged that any large excavations and stabilized backfill will be required. However, this will be verified on site once the geotechnical assessment has been undertaken at each monopole position (part of construction works).

The Project will utilise steel single or double structure with a kingbird conductor, which are reported to have a life expectancy of more than 25 years. The actual height of the pylons will vary based on the site topography to maintain the specified clearance of the transmission lines.

The next stage of the process requires installation of insulators on the pylons to support the conductors as well as the equipment necessary for running out and stringing the conductors. Once the pylons have been installed, the lines will be strung. The Contractor in collaboration with Eskom will be responsible for functional testing and commissioning of the Transmission Line. This consists of connecting the line from the WEF facility to the national grid, to transmit power.

ONSITE SUBSTATION

A new onsite substation will be established within the extent of the authorized Maralla WEF.

An extension to the Karusa substation is anticipated. The area to be cleared will be approximately 1ha in size.

DEMOBILISATION

Upon completion of the installation phase, any temporary infrastructure will be removed, and the affected areas rehabilitated.

4.3.2 OPERATIONAL PHASE

Eskom will be responsible for managing the operations of the OHPL in line with their internal management systems. Eskom is considered to have the requisite expertise to operate and maintain the transmission line. Eskom will adhere to all existing Safety Codes and Guidelines for the operation and maintenance of the OHPL infrastructure.

During the operational phase there will be little to no Project-related movement along the servitude as the only activities are limited to maintaining the servitude (including maintenance of access roads and cutting back or pruning of vegetation to ensure that vegetation does not affect the OHPL), inspection of the powerline infrastructure and repairs when required. Limited impact is expected during operation since there will not be any intrusive work done outside of maintenance in the event that major damage occurs to site infrastructure.

Operation of the OHPL will involve the following activities, discussed below.

SERVITUDE MANAGEMENT AND ACCESS ROAD MAINTENANCE

Servitude and access road maintenance is aimed at eliminating hazards and facilitating continued access to the transmission line. The objective is to prevent all forms of potential interruption of power supply due to overly tall vegetation/climbing plants or establishment of illegal structures within the right servitude. It is also to facilitate ease of access for maintenance activities on the transmission line. During the operational phase of the project, the servitude will be maintained to ensure that the Transmission Line functions optimally and does not compromise the safety of persons within the vicinity of the Transmission Line.

TRANSMISSION LINE MAINTENANCE AND OPERATIONS

Eskom will develop comprehensive planned and emergency programmes through its technical operations during the operation and maintenance phase for the Transmission Line. The maintenance activities will include:

- Eskom's Maintenance Team will carry out periodic physical examination of the Transmission Line and its safety, security and integrity.
- Defects that are identified will be reported for repair. Such defects may include defective conductors, flashed over insulators, defective dampers, vandalised components, amongst others.
- Maintenance / repairs will then be undertaken.

4.3.3 DECOMMISSIONING PHASE

Decommissioning will be considered when the OHPL is regarded obsolete and will be subject to a separate authorisation and impact assessment process. This is not expected to occur in the near future.

4.4 NEED AND DESIRABILITY OF THE PROJECT

The DEA&DP Guideline (2013) states that the essential aim of need and desirability is to determine the suitability (i.e. is the activity proposed in the right location for the suggested land-use/activity) and timing

(i.e. is it the right time to develop a given activity) of the development. Therefore, need and desirability addresses whether the development is being proposed at the right time and in the right place. Similarly, the 'Best Practicable Environmental Option' (BPEO) as defined in NEMA is "*the option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term*."

The development of renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of, and investment in, renewable energy and associated energy distribution infrastructure is supported by the National Development Plan, New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure. The development of the proposed power line is therefore supported by key policy and planning documents and is in line with South Africa's strategic energy planning context (Refer to **Section 2**).

Furthermore, the proposed Maralla 132 kV OHPL is located within the Komsberg REDZ and Central Strategic Transmission Corridor as per GN 114 and GN 113 of 2018. Strategic Transmission Corridors support areas where long-term electricity grid infrastructure will be developed (Refer to **Section 2** for more details). **Figure 4-4** below shows the location of the five corridors and the approximate location of the Maralla OHPL within the Central Corridor.

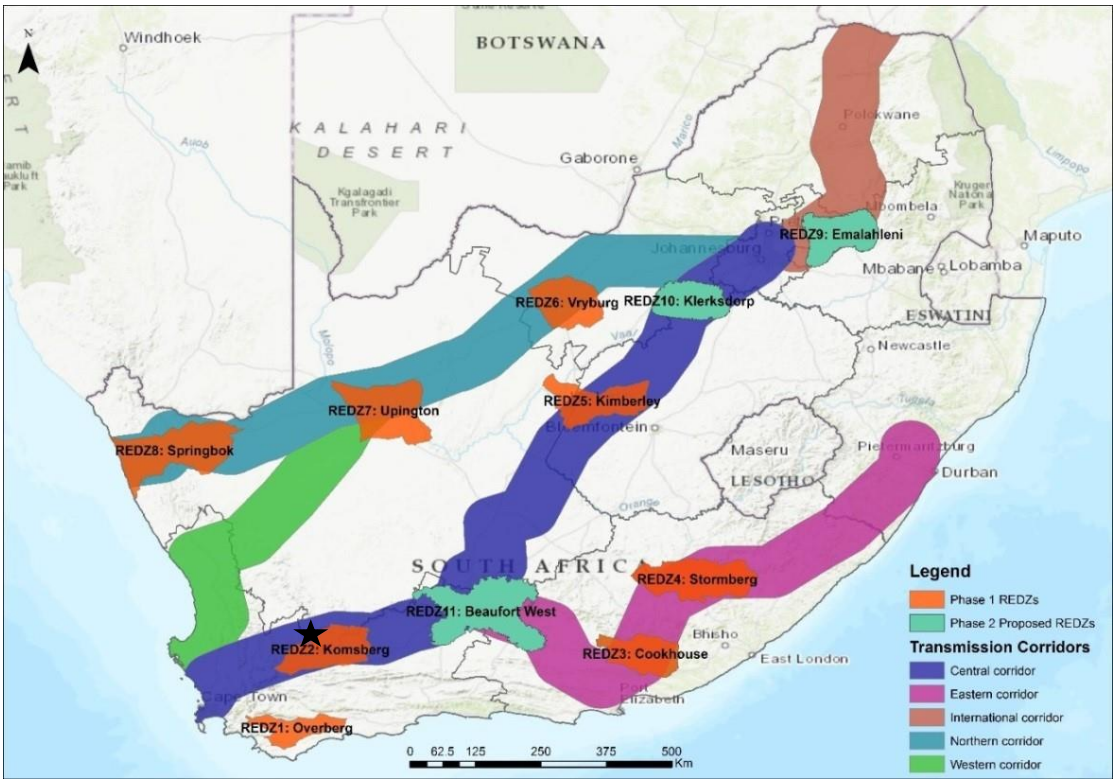


Figure 4-4: Strategic Transmission Corridors (GN 113 of 2018) (black star is approximate location of Maralla 132 kV OHTL)

The energy security benefits associated with the proposed Maralla WEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. The proposed OHPL is therefore essential supporting infrastructure to the solar energy development, which, once developed, will generate power from renewable energy resources.

It is acknowledged that Maralla received an Environmental Authorisation (EA) on 14 November 2017 (Ref: 14/12/16/3/3/2/1774) for a 132kV powerline from the Maralla Wind Energy Facility (WEF) to the existing Komsberg Substation. Subsequent to the receipt of the authorisation, an opportunity was presented to the developer whereby the power from the Maralla WEF could be evacuated to the newly operational Karusa Substation. This option provides the option of a shorter line to be developed instead of the longer authorised line.

A number of alternatives has been investigated as part of the recent studies for power to be evacuated to the Karusa substation. During the engagements with landowners following the specialist studies it was however clear that only one proposed line routing will be accepted by the landowners. This preferred routing has been verified by all specialist and the associated impacts for this routing can be mitigated to acceptable levels.

It is a requirement for Bid Window 6 ("BW6") that a valid EA be in place during bid submission and although the preferred alternative is as indicated in this basic assessment report, in order to fulfil bid submission requirements, the existing EA needs to remain in place pending finalization of the authorisation process for the preferred alignment.

Lastly, the final grid 132 kV overhead line to be used for the grid will be determined during the Budget Quote (BQ) process post preferred bidder award. Following the BQ and detailed design stage as well as approval by Eskom Holdings (SOC) Limited (Eskom), one of the two EAs granted for the 132 kV overhead lines (OHLs) will be withdrawn prior to Financial Closure (FC).

The land on which the OHPL will be constructed is located between the proposed Maralla WEF site and the existing Karusa substation. No physical or economic displacement will be required along the proposed route.

Furthermore, negative environmental impacts associated with the activity will be mitigated to acceptable levels in accordance with the EMPr (**Appendix G**). Refer to **Section 7** below for the Environmental Impact Assessment and recommended mitigation measures.

5 PROJECT ALTERNATIVES

In terms of the EIA Regulations, feasible alternatives are required to be considered. All identified, feasible alternatives are required to be evaluated in terms of social, biophysical, economic, and technical factors. A key challenge of the BA Process is the consideration of alternatives. Most guidelines use terms such as 'reasonable', 'practicable', 'feasible' or 'viable' to define the range of alternatives that should be considered.

Effectively there are two types of alternatives:

- Incrementally different (modifications) alternatives to the project; and
- Fundamentally (totally) different alternatives to the project.

"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 –

a) the property on which or location where it is proposed to undertake the activity;
b) the type of activity to be undertaken;
c) the design or layout of the activity;
d) the technology to be used in the activity;
e) the operational aspects of the activity; and
f) the option of not implementing the activity (i.e. no-go).

The relevant alternatives to the proposed Project are discussed below.

5.1 ACTIVITY ALTERNATIVE

Only one activity has been assessed (i.e., an overhead powerline). Alternative activities for the current Project are not reasonable or feasible as the purpose of this OHPL is to transmit electrical energy generated by the proposed Maralla WEF to the existing Karusa substation for distribution via the national electrical grid network.

5.2 TECHNOLOGY ALTERNATIVES

There are two methods of power transmission, these being overhead lines and underground cables. Underground cables are considerably more difficult and expensive to install and maintain, relative to overhead lines. Considering the proposed terrain of the proposed OHPL, which traverses several watercourses including the Maintjiesplaas and Roggeveld Rivers, which flow into the Buffels River, underground cables would require extensive trenching which would result in greater environmental impacts. Underground distribution lines are therefore not considered feasible for the proposed Project.

Therefore, only one technology has been assessed, namely distribution of electricity via a 132kV OHPL, as this is considered the most appropriate technology and is in line with Eskom design requirements.

5.3 LAYOUT ALTERNATIVES

Six powerline alternative alignments were considered for the transmission of generated power from Maralla WEF substation to the existing Karusa substation (see **Figure 4-2**).

- **Option 1 (A):** This option is 17.6km long and runs directly south for approximately 8km from the proposed Maralla onsite substation, then turns sharply west for approximately 6km, and then turns south again for approximately 3km into the Karusa Substation.
- **Option 1 (B):** This option is 19km long and runs south adjacent to the existing district road from the proposed Maralla Substation for about 13km, before turning west for about 6km until it terminates in the Karusa Substation.

- **Option 2 (A):** This option is 15.4km long and runs in a broadly south-westerly direction from the proposed Maralla Substation to the Karusa Substation.
- **Option 4:** This option is about 19.4km long and runs south adjacent to the existing district road from the proposed Maralla Substation for about 4.8km, before turning north-west for about 7.1km, and then south again for about 7.5km until it terminates in the Karusa Substation.
- **Option A Line**: This option is 15.9km long, runs west for about 4km, before it gradually curves to the south and terminates in the Karusa Substation approximately 12km further.
- **Option B Line**: This is a variation of Option 4A, and follows basically the same course, except for a small deviation in the north. The total length of this option is 16.1km.

Table 5-1 through to **Table 5-6** below provide the co-ordinates of the points along the six powerline alternative alignments for the Maralla 132 kV OHPL. In addition to the above, **Figure 5-1** provides the co-ordinates of all the bend points along the alignments.

Table 5-1: Option 1 A powerline alternative alignment co-ordinates for the Maralla 132 kV powerline

POINT	LATITUDE	LONGITUDE
A	32° 48' 36.029" S	20° 37' 26.248" E
B	32° 48' 23.232" S	20° 37' 43.377" E
C	32° 47' 57.600" S	20° 38' 5.495" E
D	32° 47' 41.403" S	20° 38' 21.434" E
E	32° 47' 34.588" S	20° 38' 23.519" E
F	32° 47' 16.448" S	20° 38' 35.725" E
G	32° 47' 11.212" S	20° 38' 50.327" E
H	32° 47' 12.183" S	20° 39' 45.897" E
I	32° 47' 59.845" S	20° 42' 28.664" E
J	32° 47' 55.680" S	20° 42' 39.024" E
K	32° 47' 46.195" S	20° 42' 46.727" E
L	32° 47' 10.352" S	20° 42' 58.730" E
M	32° 46' 39.181" S	20° 43' 4.650" E
N	32° 45' 35.672" S	20° 43' 1.049" E
O	32° 45' 3.690" S	20° 42' 56.142" E
P	32° 44' 44.995" S	20° 42' 59.137" E
Q	32° 44' 5.978" S	20° 43' 52.059" E

Table 5-2: Option 1 B powerline alternative alignment co-ordinates for the Maralla 132 kV powerline

POINT	LATITUDE	LONGITUDE
1A	32° 48' 34.510" S	20° 37' 21.749" E
1B	32° 49' 27.542" S	20° 38' 50.949" E
1C	32° 49' 38.937" S	20° 39' 10.199" E

POINT	LATITUDE	LONGITUDE
1D	32° 49' 53.659" S	20° 39' 39.940" E
1E	32° 50' 19.116" S	20° 40' 14.773" E
1F	32° 50' 23.892" S	20° 40' 27.213" E
1G	32° 50' 23.688" S	20° 40' 51.542" E
1H	32° 50' 13.543" S	20° 41' 14.478" E
1I	32° 50' 13.795" S	20° 41' 29.744" E
1J	32° 50' 9.073" S	20° 41' 44.674" E
1K	32° 49' 35.070" S	20° 41' 50.568" E
1L	32° 48' 57.891" S	20° 42' 40.213" E
1M	32° 48' 17.079" S	20° 42' 48.807" E
1N	32° 46' 50.956" S	20° 43' 1.693" E
1O	32° 46' 32.086" S	20° 43' 0.898" E
1P	32° 46' 25.871" S	20° 43' 3.196" E
1Q	32° 45' 58.939" S	20° 42' 58.792" E
1R	32° 45' 40.875" S	20° 43' 1.168" E
1S	32° 45' 2.588" S	20° 42' 52.202" E
1T	32° 44' 43.886" S	20° 42' 57.826" E
1U	32° 44' 5.144" S	20° 43' 48.938" E
1V	32° 44' 8.440" S	20° 43' 53.000" E

Table 5-3: Option 2 A powerline alternative alignment co-ordinates for the Maralla 132 kV powerline

POINT	LATITUDE	LONGITUDE
2A	32° 48' 36.158" S	20° 37' 26.187" E
2B	32° 48' 14.158" S	20° 37' 50.879" E
2C	32° 47' 56.496" S	20° 38' 2.565" E
2D	32° 47' 45.340" S	20° 38' 19.227" E
2E	32° 47' 41.184" S	20° 38' 21.394" E
2F	32° 47' 38.977" S	20° 38' 20.504" E
2G	32° 46' 42.854" S	20° 38' 31.207" E
2H	32° 45' 32.811" S	20° 38' 37.308" E
2I	32° 44' 12.938" S	20° 40' 46.112" E
2J	32° 44' 9.476" S	20° 40' 58.523" E

POINT	LATITUDE	LONGITUDE
2K	32° 44' 13.259" S	20° 41' 21.055" E
2L	32° 44' 1.792" S	20° 42' 24.410" E
2M	32° 44' 1.453" S	20° 43' 44.219" E
2N	32° 44' 6.674" S	20° 43' 54.568" E

Table 5-4: Option 4 powerline alternative alignment co-ordinates for the Maralla 132 kV powerline

POINT	LATITUDE	LONGITUDE
4A	32° 48' 35.515" S	20° 37' 26.387" E
4B	32° 48' 1.662" S	20° 38' 0.710" E
4C	32° 47' 42.530" S	20° 38' 20.786" E
4D	32° 47' 14.723" S	20° 38' 18.784" E
4E	32° 46' 26.447" S	20° 38' 29.389" E
4F	32° 45' 1.282" S	20° 38' 38.213" E
4G	32° 44' 51.527" S	20° 38' 49.312" E
4H	32° 46' 22.358" S	20° 43' 0.083" E
4I	32° 45' 41.442" S	20° 42' 59.186" E
4J	32° 45' 7.256" S	20° 42' 52.135" E
4K	32° 44' 43.886" S	20° 42' 57.826" E
4L	32° 44' 4.420" S	20° 43' 49.892" E

Table 5-5: Option A line powerline alternative alignment co-ordinates for the Maralla 132 kV powerline

Point	LATITUDE	LONGITUDE
A1	32° 48' 34.698" S	20° 37' 26.206" E
A10	32° 44' 6.674" S	20° 43' 54.568" E
A2	32° 48' 25.356" S	20° 37' 38.721" E
A3	32° 47' 48.554" S	20° 38' 8.005" E
A4	32° 46' 41.915" S	20° 38' 27.851" E
A5	32° 45' 33.921" S	20° 38' 36.307" E
A6	32° 44' 39.667" S	20° 39' 10.445" E
A7	32° 43' 51.279" S	20° 40' 42.756" E
A8	32° 43' 40.259" S	20° 41' 26.684" E
A9	32° 44' 1.453" S	20° 43' 44.219" E

Table 5-6: Option B line powerline alternative alignment co-ordinates for the Maralla 132 kV powerline

Point	LATITUDE	LONGITUDE
B1	32° 48' 38.365" S	20° 37' 25.790" E
B10	32° 44' 5.898" S	20° 43' 53.141" E
B2	32° 47' 33.029" S	20° 38' 9.489" E
B3	32° 45' 29.962" S	20° 38' 40.333" E
B4	32° 44' 39.909" S	20° 39' 9.983" E
B5	32° 43' 59.861" S	20° 40' 30.324" E
B6	32° 43' 58.996" S	20° 40' 44.597" E
B7	32° 44' 16.119" S	20° 41' 32.916" E
B8	32° 43' 48.448" S	20° 42' 14.454" E
B9	32° 44' 0.810" S	20° 43' 46.668" E

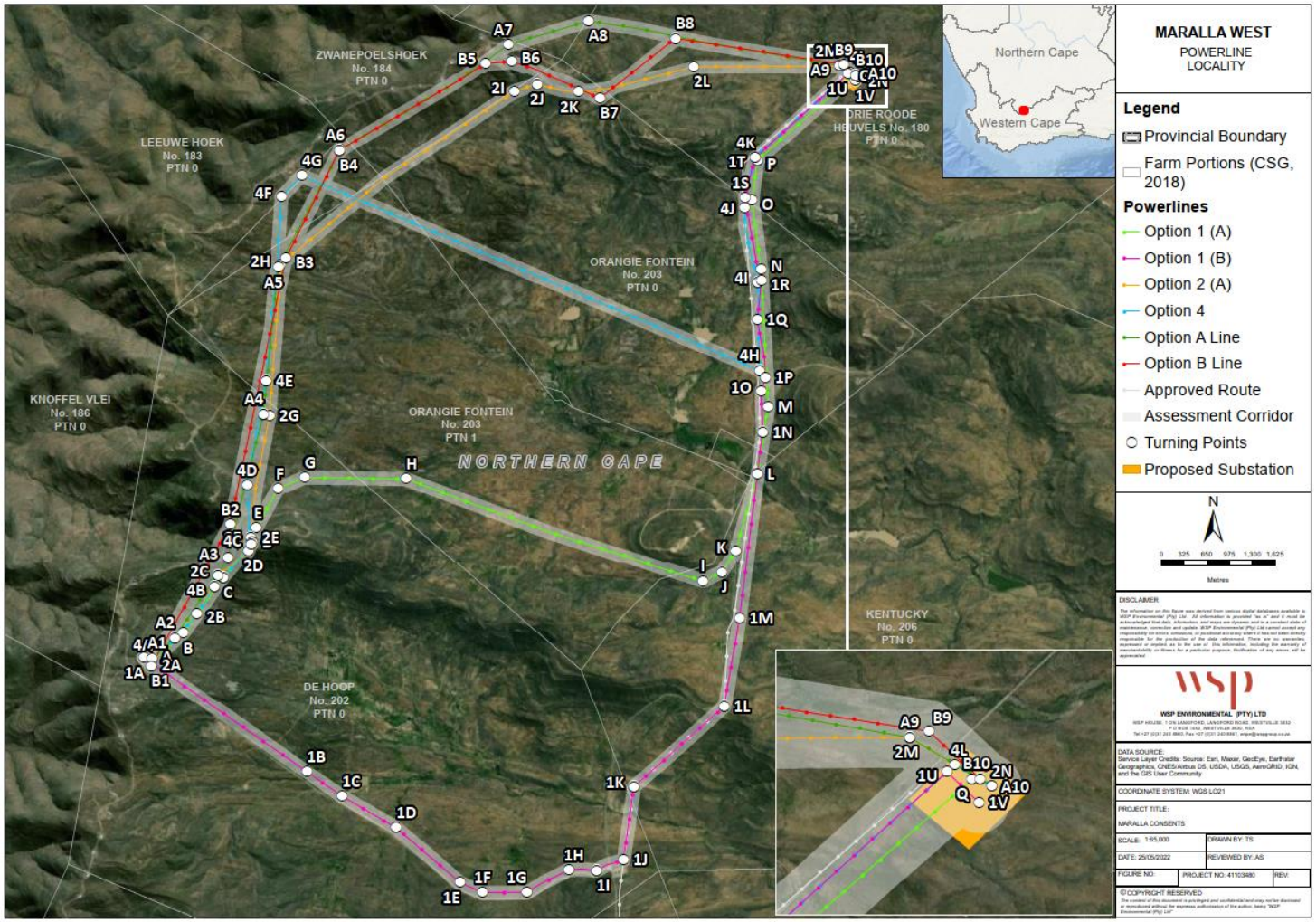


Figure 5-1: Locality Map indicating the bend point co-ordinates of the proposed powerline alternative alignments for the Maralla 132 kV OHPL

5.4 NO-GO ALTERNATIVE

The no-go option will result in defaulting to the development of the 132kV transmission powerline for the Maralla WEF approved by the competent authority on 14 November 2017 (Ref: 14/12/16/3/3/1/1774).

Furthermore, both the potential positive and negative impacts from the proposed OHPL will not occur.

The no-go option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with renewable energy given that energy security benefits associated with the proposed Maralla WEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. Considering South Africa's current energy security challenges and its position as one of the highest per capita producer of carbon emissions in the world, this would represent a significant socio-economic cost. Accordingly, the no-go option is not deemed viable.

6 BASELINE ENVIRONMENT

The following chapter presents an overview of the biophysical and socio-economic environment in which the proposed Project is located. It is important to gain an understanding of the Project area and its surroundings, as it will provide for a better understanding of the receiving environment in which the Project is being considered.

The description of the baseline environment is essential in that it represents the conditions of the environment before the construction of the proposed Project (i.e. the current, or status quo, environment) against which environmental impacts of the proposed Project can be assessed and future changes monitored.

The area has previously been studied to some extent and is recorded in various sources. Consequently, some components of the baseline have been generated based on literature review. However, where appropriate, baseline information has been supplemented or generated by specialists appointed to undertake baseline and impact assessments for the proposed Project.

The following characteristics of the receiving environment for the proposed Project area are described in **Table 6-1** below.

Table 6-1: Characteristics of the receiving environment

RECEIVING ENVIRONMENT	CHARACTERISTICS
Biophysical	— Climate — Air Quality — Noise — Topography and Land Use — Geology and Soils — Groundwater — Surface Water (Hydrology) — Ecologically Important Landscape Features — Vegetation — Fauna — Avifauna — Site Ecological Importance — Protected Areas
Social and Economic	— Socio-Economic — Heritage — Palaeontology — Landscape and Visual

6.1 BIOPHYSICAL ENVIRONMENT

6.1.1 CLIMATE

The following is extracted from the Visual Impact Assessment compiled by Lourens Du Plessis and included as ***Appendix F7****.*

The climate of the region is arid to semi-arid. Rainfall is low and occurs throughout the year but predominantly in the winter months between March and August. Mean annual precipitation is approximately 290mm, ranging from 180 – 410mm rainfall per year. The region experiences dry hot summers and the warmest month of the year is February which averages 23.4ºC. The lowest average

temperatures in the year occur in July, averaging approximately 9.3ºC. The region experiences steady, strong winds between December and April; however, the winds calm between the months of June and October.

6.1.2 AIR QUALITY

No baseline information was available for air quality in the area. However, due to the semi-rural nature of the area, air quality pollution expected to be low. Due to the nature of the area, the most likely pollutants are as a result of dust, veld fires, wood and coal burning for heating, cooking in homes and to a small extent, vehicle emissions.

6.1.3 NOISE

No baseline information was available on the background noise in the area. However, due to the semi-rural nature of the area, noise levels were observed to be low during the site visit with the most noise generated from vehicles travelling on the N1 highway. Furthermore, noise receptors in the proposed OHPL project area are at a good distance away as there is a very low density of occupation around the proposed OHPL servitude.

6.1.4 TOPOGRAPHY

The following is extracted from the Visual Impact Assessment compiled by Lourens Du Plessis and included as ***Appendix F7****.*

The study area is situated on land that ranges in elevation from approximately 845m (in the north-west of the study area) to 1,549m at the top of the Komsberg to the north-east (

Figure 6-1). The proposed project infrastructure will be located on the Klein-Roggeveld *plateau*, which is flanked by the Klein-Roggeveldberge to the west of the *plateau*. These mountains form the western escarpment of the *plateau,* which includes a landscape consisting of three sets of distinct undulating plains separated (and surrounded) by tall hills or ridges. Some of these include:

- Perdeplaas se Berg;
- Ruiter se Kop;
- Langberge; and
- Graskop.

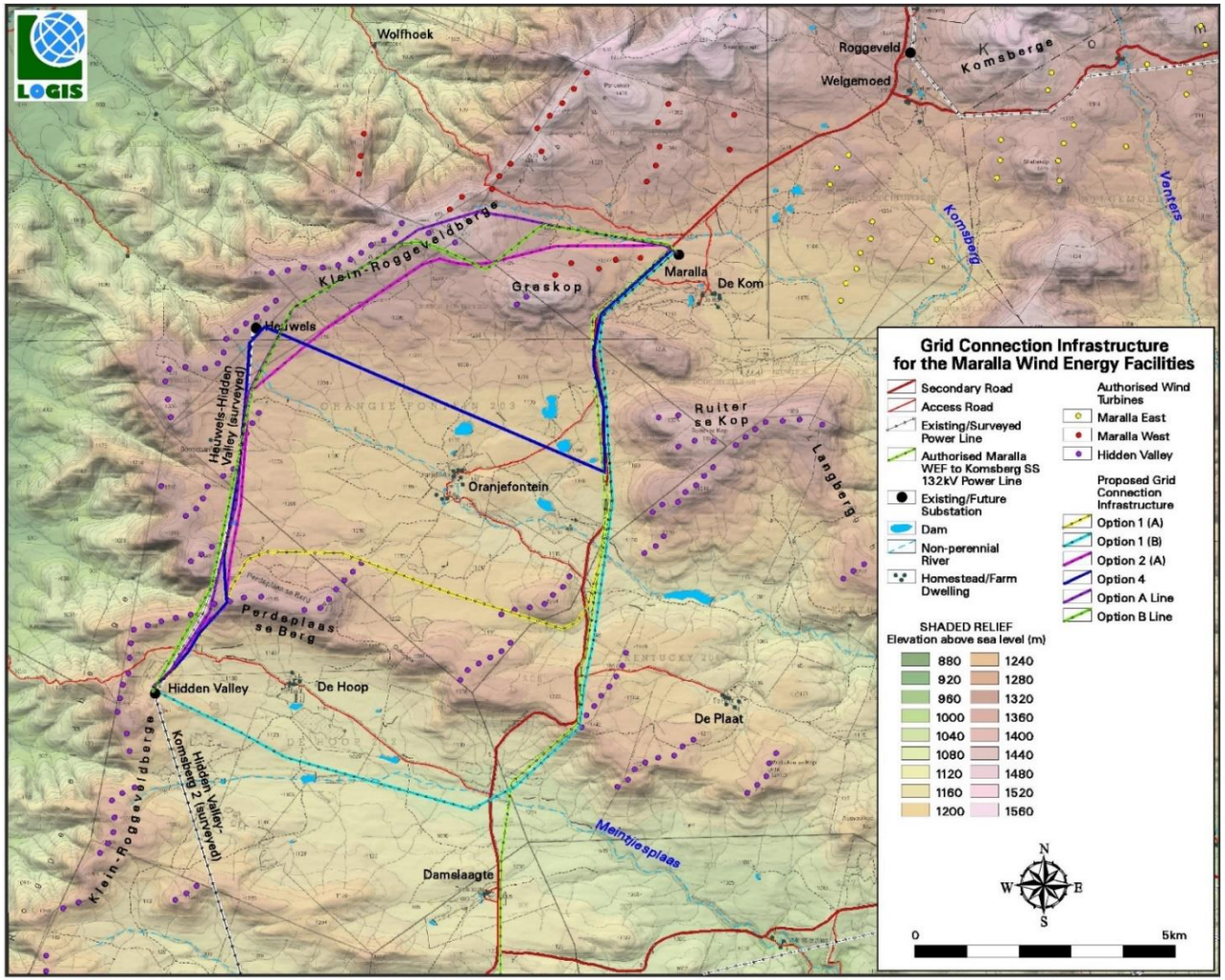


Figure 6-1: Shaded relief map of the study area.

6.1.5 GEOLOGY AND SOILS

The following is extracted from the Freshwater Assessment, compiled by WSP and Palaeontological Assessment, complied by Natura Viva cc and included as ***Appendix F4****.*

GEOLOGY

The geology of the Maralla WEF grid connection project area is outlined on the 1: 250 000 geology sheet 3220 Sutherland (Council for Geoscience, Pretoria; Theron 1983, Cole & Vorster 1999) (Figure 12) and illustrated in Figures 13 to 32 below. Geologically it lies on the gently folded northern margin of the Permo-Triassic Cape Fold Belt (CFB) and is dominated by bedrocks of the Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup) within the Main Karoo Basin (Johnson *et al.* 2006). Gentle folding along west-east trending fold axes of Lower Beaufort Group bedrocks is apparent within the study area. In general bedding dips are not high, however (5 to 12 degrees on geological map), and levels of tectonic deformation are usually low with only local cleavage development. Several WNW-ESE or W-E trending faults cutting the Lower Beaufort Group succession can be picked out on satellite images by bush clumps and sharp bedding discontinuities but many of these are not shown on the geological map. These narrow lines may be locally associated with narrow dolerite dykes but these were not observed during the site visit.

Illustrated descriptions of the Lower Beaufort Group bedrocks as well as various superficial sediments within the Maralla WEF grid connection study area – with the notable exception of the Great Karoo WEF project area - have been given in the PIA reports for the Maralla West WEF, Maralla East WEF, Karusa WEF and Soetwater WEF listed in the References. Further representative exposures of the main rock units represented within the Maralla grid connection project area are illustrated in Figures 13 to 32 in this report, together with short explanatory figure legends.

Only one mappable bedrock unit or formation is represented within the study area, *viz*. fluvial, delta platform and lacustrine mudrocks and sandstones of the **Abrahamskraal Formation** (**Lower Beaufort Group / Adelaide Subgroup**) of Middle Permian age (*cf* Johnson *et al.* 2006, Day and Rubidge 2014, Wilson *et al.* 2014, Cole *et al.* 2016 and references therein). The specific stratigraphic members of Abrahamskraal Formation represented within the study area have not yet been identified with confidence; they *might* belong largely to the Leeuvlei Member - Koornplaats Member stratigraphic interval of Loock *et al*. (1994) and Day and Rubidge (2014) (Fig. 33). The Lower Beaufort Group beds crop out over the great majority of the powerline study area (Pa, pale green in Figure 12). However, exposure levels of these sedimentary bedrocks are generally very low and mainly confined to stream gullies, steeper hillslopes as well as occasional borrow pits.

A delta platform or distal, well-watered floodplain setting with frequent high water tables is suggested for the lowermost Abrahamskraal Formation beds by abundant upward-coarsening sedimentary packages, gradational and loaded tabular sandstone bases without gullying or well-developed channel breccio-conglomerates, possible pipe- or dyke-like dewatering structures, dark grey or grey-green (but not reddish), laminated to massive mudrocks, frequent horizons of large, rusty-brown concretions and lenses of diagenetic ferruginous carbonate (sometimes containing dispersed mud chips) as well as fossil assemblages dominated by equisetalean ferns and lungfish burrows, with no skeletal remain of land-living tetrapods recorded so far (*cf* Almond 2021). Drier climatic conditions on the floodplain of large meandering river systems are also well represented in the present project area. This is suggested by the greater frequency higher in the Abrahamskraal succession of maroon mudrocks with occasional horizons of small, grey pedogenic calcrete (arid climate palaesols) as well as sand-infilled mudcracks and channel sandstone bodies with sharp gullied bases and lenses of well-developed, often ferruginised breccio-conglomerate dominated by reworked calcrete glaebules. Horizons with abundant gypsum pseudomorphs ("desert roses") witness the intermittent evaporation of water bodies. Occasional float blocks of pale yellowish-green tuffite are noted within the project area but the tuffite horizons themselves were not

found *in situ*; these rocks have important potential for dating subunits of the Lower Beaufort Group (*cf* Lanci *et al.* 2013).

Levels of bedrock exposure in the Klein-Roggeveldberge region are generally very low due to the pervasive mantle of **Late Caenozoic superficial deposits** such as alluvium, colluvium (scree, hillwash), eluvium / surface gravels, pedocretes (*e.g.* calcrete) and soils, as well as karroid *bossieveld* vegetation. Most of these deposits are of Late Neogene or Quaternary to Holocene age. They have not been mapped at 1: 250 000 scale within the Maralla WEF substation and powerline project area. The majority of powerline pylon footings are likely to be excavated into relatively unfossiliferous superficial sediments rather than the underlying Lower Beaufort Group bedrocks.

LAND COVER

Based on the Mucina and Rutherford (2006) natural vegetation classification map, the area of the proposed OHPL is mostly Central Mountain Shale Renosterveld, with a minor contribution of Koedoesberge-Moordenaars Karoo. The Department of Agriculture, Forestry and Fisheries (DAFF) define the land use within the Maralla Site, as predominantly Shrubland and Low Fynbos (DAFF, 2012).

During the site visit, the vegetation was identified as mostly shrub-like vegetation and Fynbos which is primarily used for sheep grazing. Indigenous antelope (Springbok) were also present within site boundary.

SOILS

Based on the information included in the land type maps of South Africa (AGIS, 2007) the soils in the region of are mostly classified as the Glenrosa and/or Mispha forms with lime generally present in the landscape" and "miscellaneous land classes, rocky areas with miscellaneous soils".

6.1.6 SURFACE WATER

The following is extracted from the Freshwater Ecological Assessment, compiled by WSP Group Africa and included as ***Appendix F6****.*

The proposed OHPL lie mostly within tertiary catchment J11A and partially in J11D. The J11A and J11D tertiary hydrological characteristics are summarised in **Table 6-2** and illustrated in **Figure 6-2**, including catchment area, Mean Annual Precipitation (MAP), Mean Annual Evaporation (MAE) and Mean Annual Runoff (MAR). The MAE largely exceeds the MAP, reinforcing the arid conditions of the region.

Table 6-2: Quaternary J11A and J11D Hydrological Characteristics

QUATERNARY	CATCHMENT AREA (km^2)	MAP (mm)	MAE (mm)	MAR (mcm)
J11A	438	295	1965	5.86
J11D	801	240	2000	5.58

SOURCE: WRC/DWA, 2012

The hydrology of the area is shown in **Figure 6-2**. There are numerous dry natural channels which drain the area of water from a westerly to easterly direction. The water courses are generally ephemeral in nature which seldom shows evidence of surface water runoff due to the arid conditions of the area. The area within the footprint of the OHPL drains into the Maintjiesplaas and Roggeveld Rivers, which flow into the Buffels River. However, a few of the watercourses that were visited within the area were dry. Given the arid climatic condition of the region, the majority of the watercourses are ephemeral and are likely to only convey water during infrequent high rainfall events.

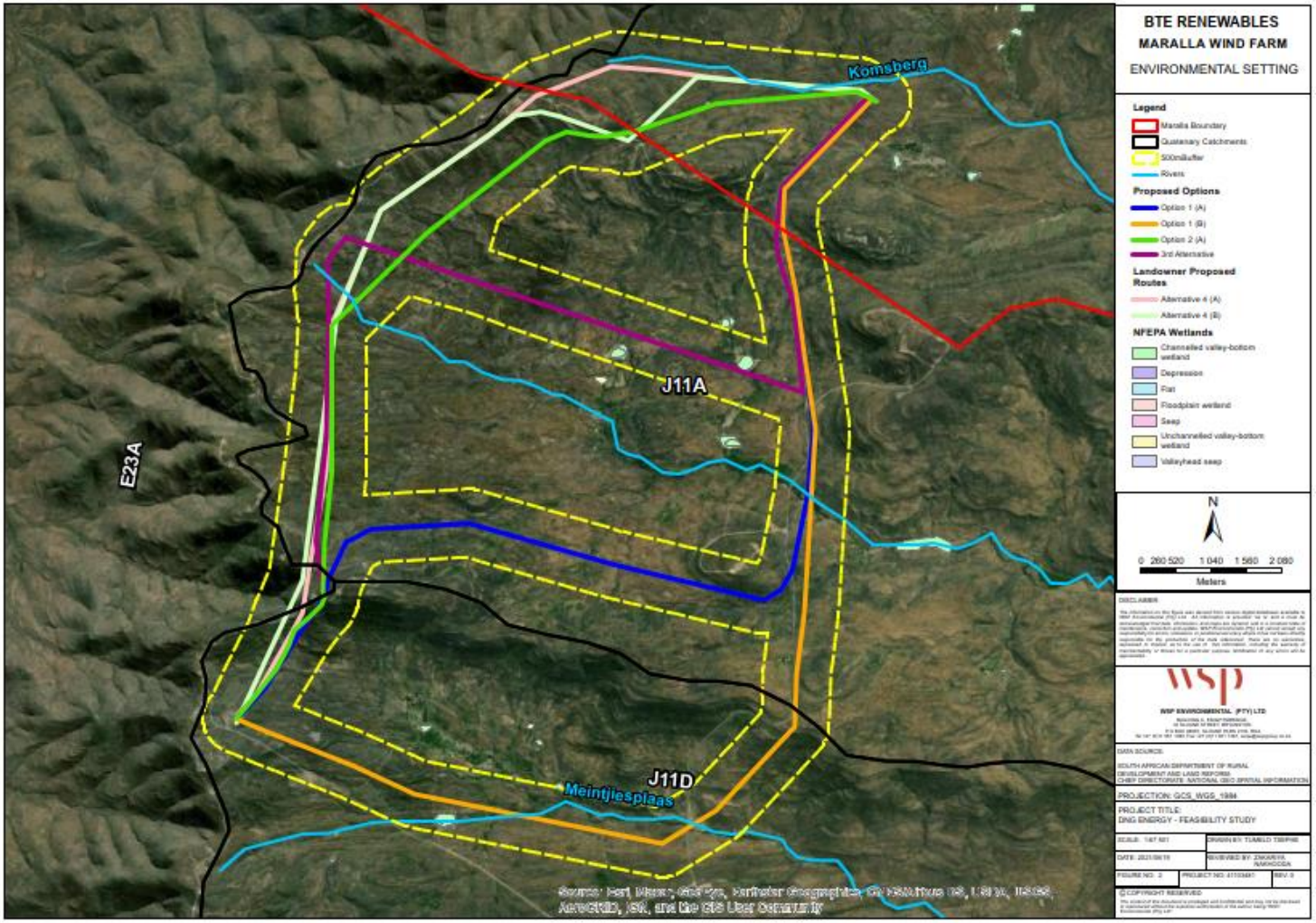


Figure 6-2: Hydrological Setting for the Maralla powerline

6.1.7 WETLANDS

*The following is extracted from the Freshwater Ecological Assessment, compiled by WSP Group Africa and included as **Appendix F6**.*

According to the National Freshwater Ecosystem Priority Areas (NFEPA) database, a total of thirteen wetland systems were identified within 500m of the proposed OHPL as shown in **Table 6-3**

Table 6-3: NFEPA Wetlands Located within 500m buffer

HGM unit	Natural/Artificial	NFEPA Condition	Field Observation
Seep	Artificial	Z3	Portion of a naturally occurring CVB system
Flat	Artificial	Z3	Dam
Seep	Artificial	Z3	These systems form part of a dam constructed on a CVB system
Seep	Artificial	Z3	
Channelled valley-bottom wetland	Artificial	Z3	Dam
Channelled valley-bottom wetland	Artificial	Z3	These systems form part of a dam constructed on a CVB system
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Artificial	Z3	
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Artificial	Z3	
Channelled valley-bottom wetland	Natural	Z3	

6.1.8 ECOLOGICALLY IMPORTANT LANDSCAPE FEATURES

*The following is extracted from the Biodiversity Impact Assessment compiled by The Biodiversity Company and included as **Appendix F2**.*

ECOSYSTEM THREAT STATUS

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU), Near Threatened (NT) or Least Concern (LC), based on the proportion of the original extent of each ecosystem type that remains in good ecological condition. According to the spatial dataset the proposed development overlaps a LC ecosystem (**Figure 6-3).**

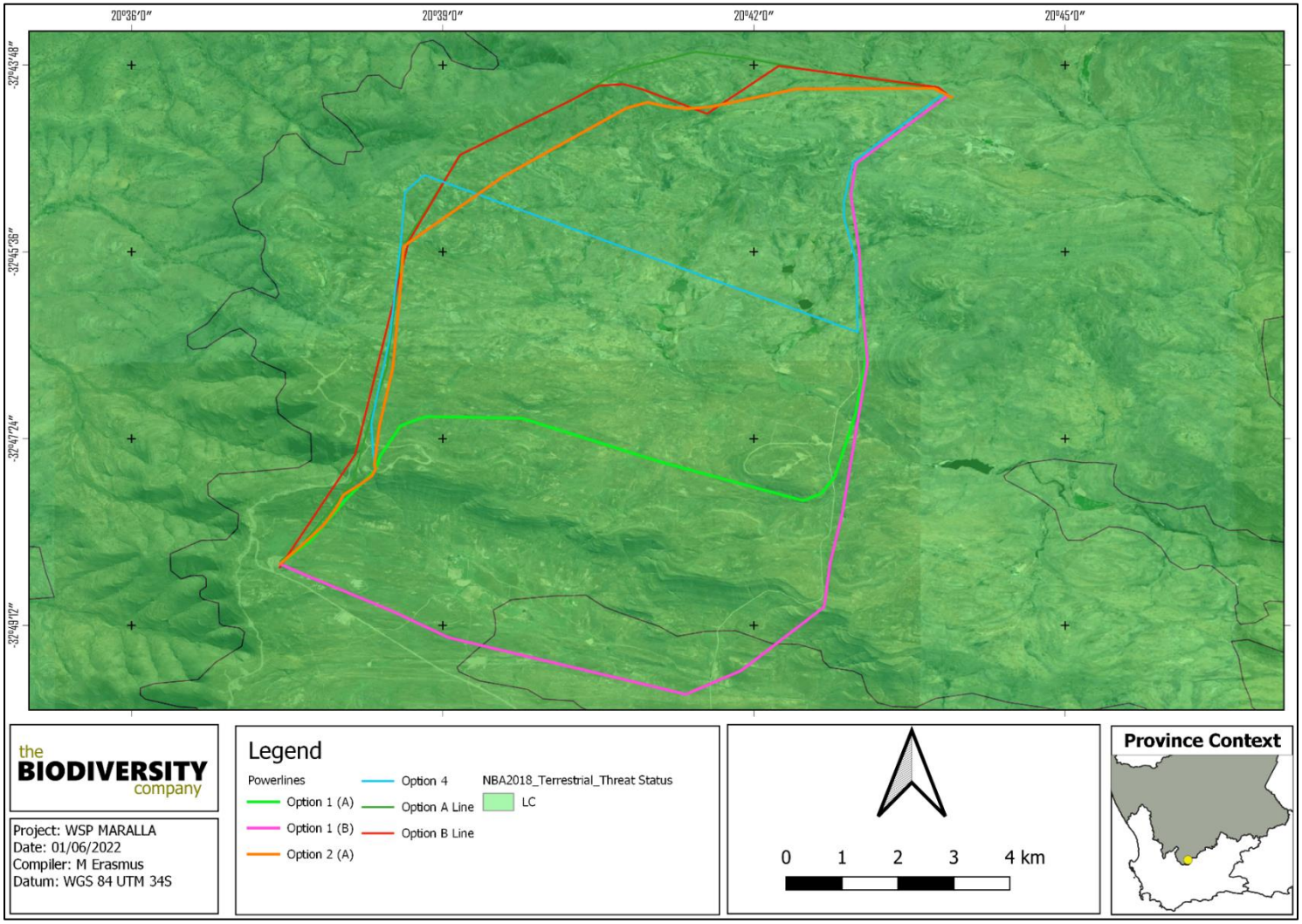


Figure 6-3: Map illustrating the ecosystem threat status associated with the proposed project area.

ECOSYSTEM PROTECTION LEVEL

Indicator of the extent to which ecosystems are adequately protected or under-protected. Ecosystem types are categorised as Well Protected (WP), Moderately Protected (MP), Poorly Protected (PP), or Not Protected (NP), based on the proportion of the biodiversity target for each ecosystem type that is included within one or more protected areas. Not Protected, Poorly Protected or Moderately Protected ecosystem types are collectively referred to as under-protected ecosystems. The proposed development overlaps mainly with a NP ecosystem (**Figure 6-4**).

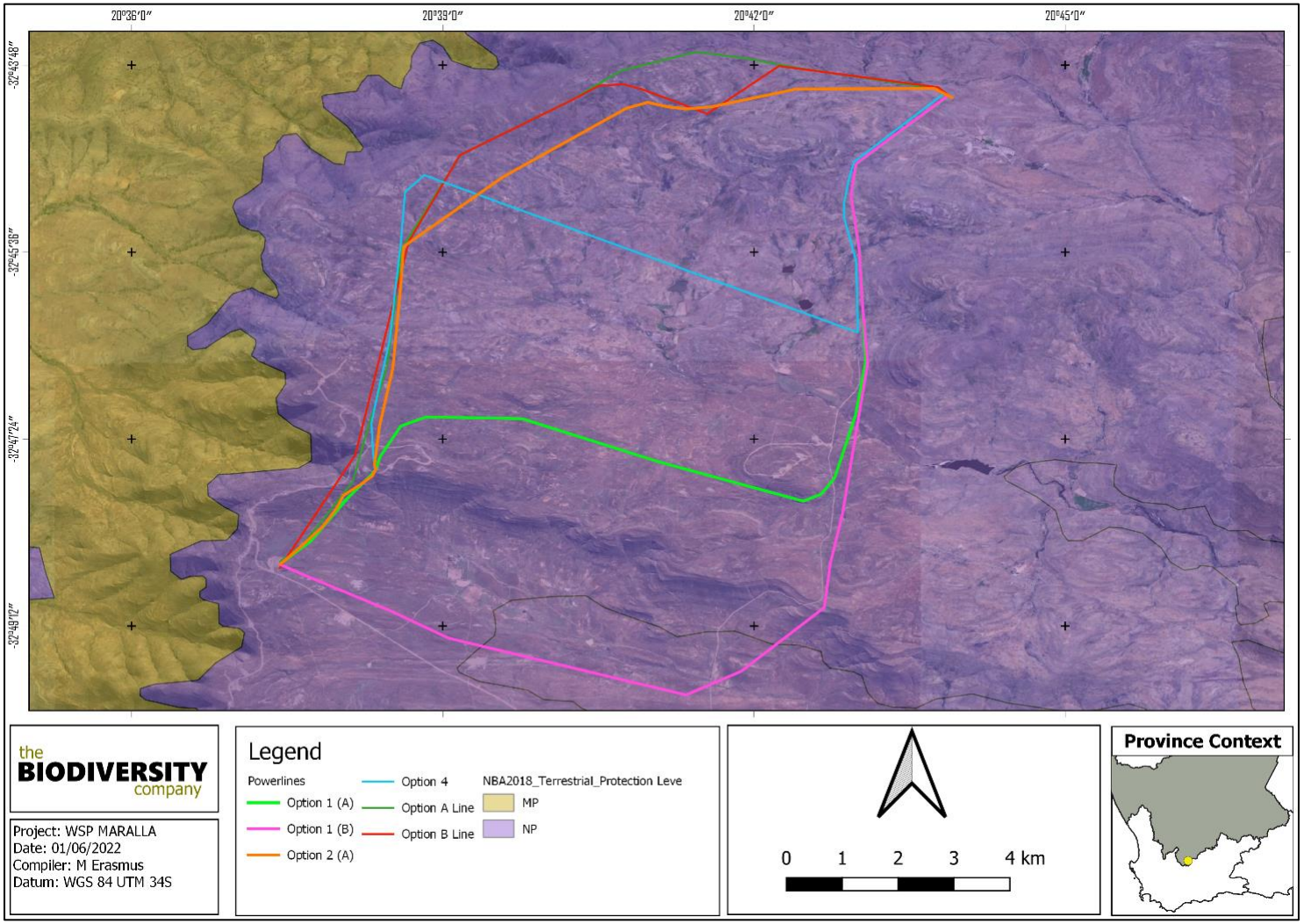


Figure 6-4: Map illustrating the ecosystem protection level associated with the proposed project area (source: The Biodiversity Company)

WETLAND NATIONAL BIODIVERSITY ASSESSMENT

This spatial dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA) 2018. National Wetland Map 5 includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018.

Ecosystem threat status (ETS) of river ecosystem types is based on the extent to which each river ecosystem type had been altered from its natural condition. Ecosystem types are categorised as CR, EN, VU or LT (Least Threatened), with CR, EN and VU ecosystem types collectively referred to as 'threatened' (Van Deventer *et al.*, 2019; Skowno *et al*., 2019). **Figure 6-5** shows that the project area does intersect with two systems that is LT. It is also important to note that these river systems are classified as Freshwater Ecosystem Priority Areas (FEPA) (Upstream Management Area). The proposed activity may lead to a substantial negative impact to these systems, by reducing the water quality through increased pollutants and direct impact to the systems and their embankments.

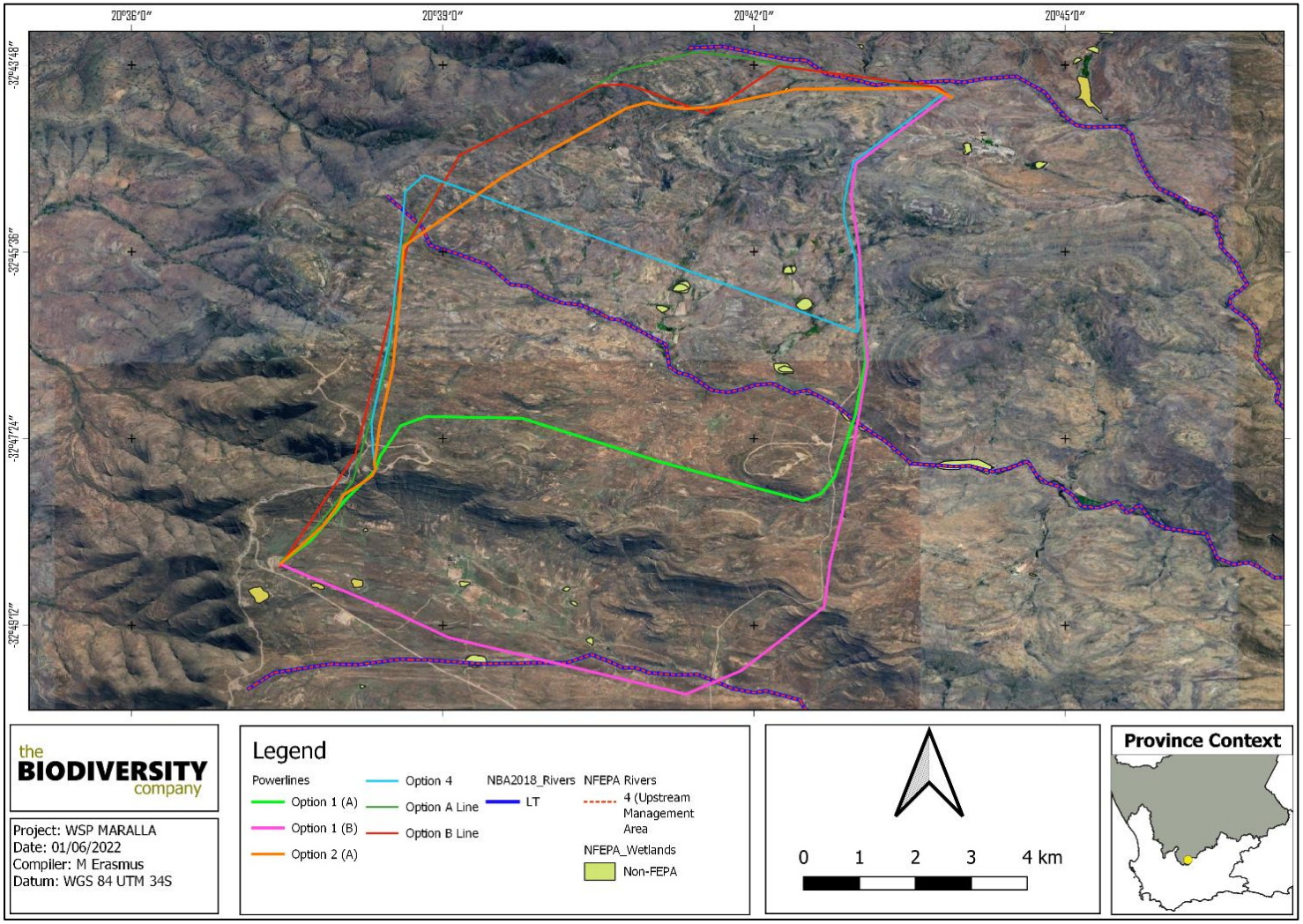


Figure 6-5: Map illustrating the ecosystem threat status associated with the proposed project area.

CRITICAL BIODIVERSITY AREAS AND ECOLOGICAL SUPPORT AREAS

The Northern Cape Department of Environment and Nature Conservation has developed the Northern Cape CBA Map which identifies biodiversity priority areas for the province, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). These biodiversity priority areas, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole.

Figure 6-6 shows that the project area overlaps with areas classified as:

- CBA1 and CBA2;
- ESA1 (Western Cape); and
- ONA (Western Cape).

The Namakwa District Biodiversity Spatial Plan (NDBSP) categorises CBAs into the following types:

- T1 – Critically Endangered (CR) vegetation types and irreplaceable biodiversity areas (areas definitely required to meet conservation targets).
- T2 – Endangered (EN) and Vulnerable (VU) vegetation types and important terrestrial habitats. ESA including corridors.

The proposed development traverses T2 CBAs that have been defined as such because they are slope habitats.

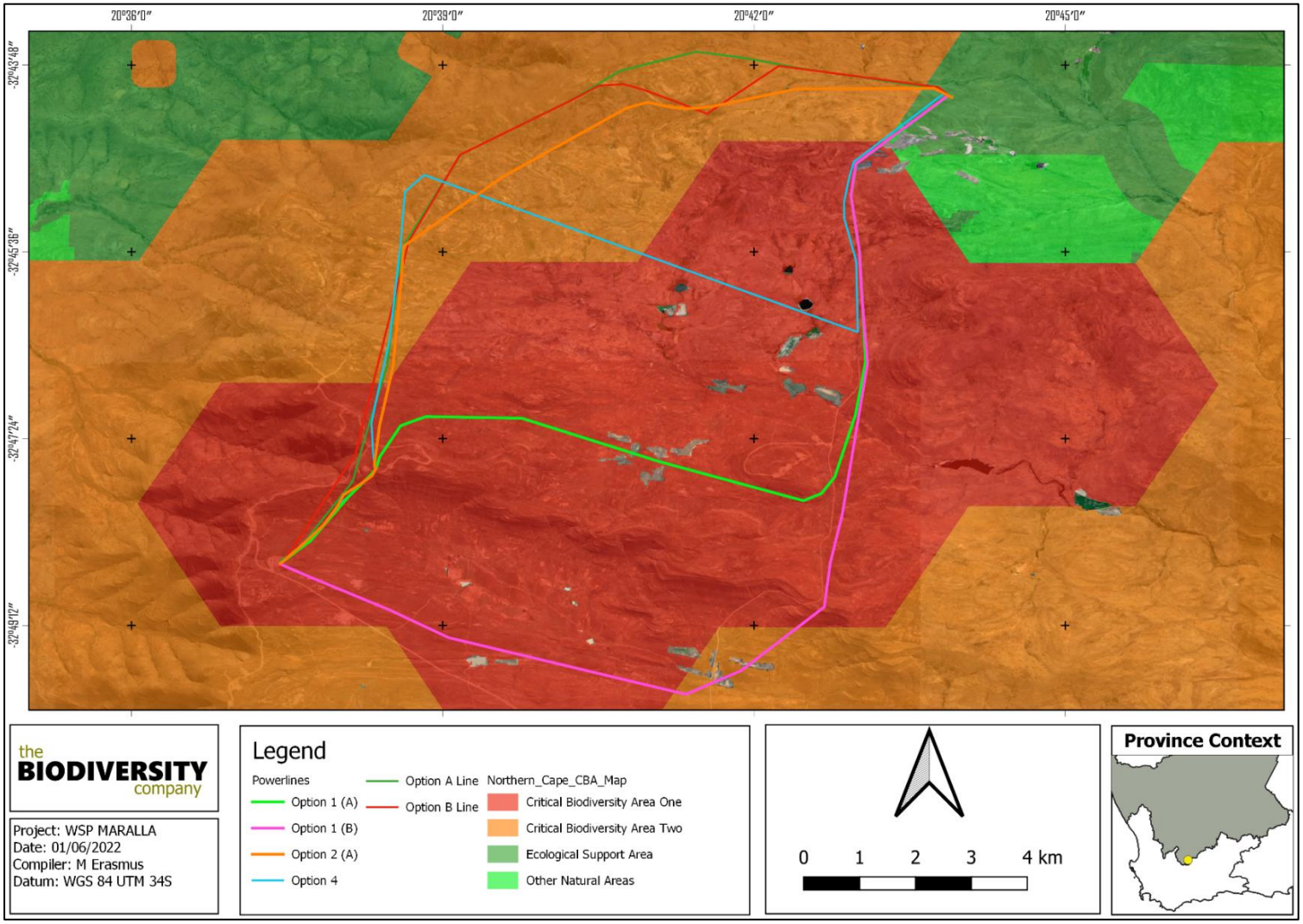


Figure 6-6: Map illustrating the locations of Critical Biodiversity Areas proximal to the proposed project area.

SUCCULENT KAROO ECOSYSTEM PROGRAMME (SKEP)

The Succulent Karoo Ecosystem Programme (SKEP) is a long-term bioregional conservation programme, with the aim to conserve ecosystems and to develop conservation as a land-use rather than instead of land-use (SANBI, 2021). The focal areas are:

- Increasing local, national and international awareness of the unique biodiversity of the Succulent Karoo;
- Expanding protected areas and improving conservation management, particularly through the expansion of public-private-communal-corporate partnerships;
- Support the creation of a matrix of harmonious land uses; and
- Improve institutional co-ordination to generate momentum and focus on priorities, maximise opportunities for partnerships, and ensure sustainability.

The areas of SKEP endemism for mammals, amphibians, reptiles and birds were assessed in relation to the project area, it was found that the project area overlaps with a unique bird habitat and functions as local centre for biodiversity and is area is key for maintaining processes (**Figure 6-7**).

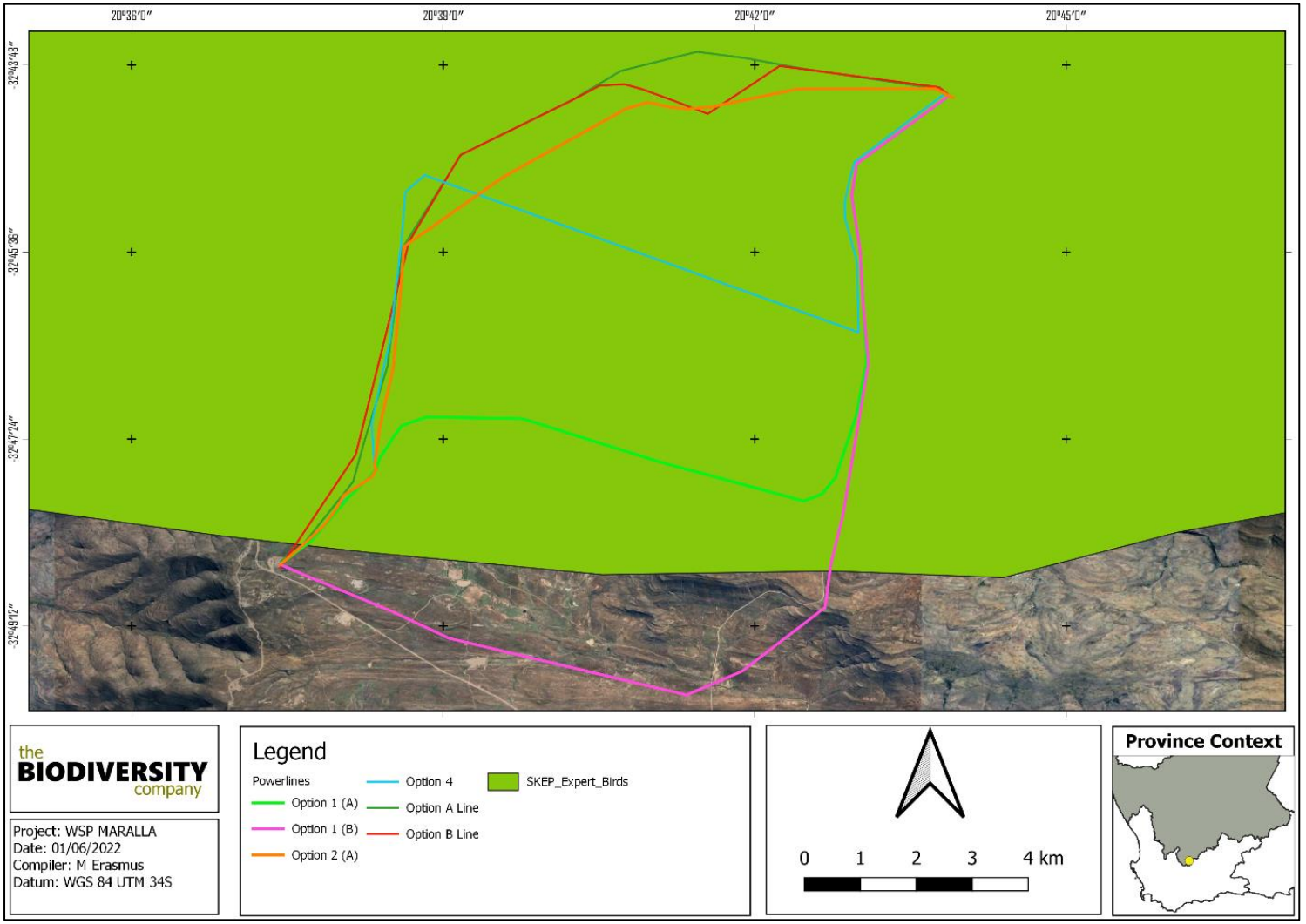


Figure 6-7: The Project area in relation to Succulent Karoo Ecosystem Programme (SKEP) (source: The Biodiversity Company).

6.1.9 VEGETATION

The following is extracted from the Biodiversity Impact Assessment compiled by The Biodiversity Company and included as ***Appendix F2****.*

The Project area is situated within the Renosterveld Biome, as indicated in (**Figure 6-8**), and which are discussed below.

The proposed OHPL is situated Renosterveld, which is an evergreen, fire-prone shrubland dominated by evergreen asteraceous shrubs, principally *Dicerothamnus rhinocerotis*, and possesses a high biomass and diversity of geophytes. The proposed development overlaps with Shale Renosterveld. This broad-scale vegetation type accounts for 86% of the total area of Renosterveld. Rainfall patterns permit a relatively high proportion of grass cover and abundance of non-succulent shrubs, and therefore, the structure of the vegetation is more congruent with proximal karoo types than other Renosterveld types.

A landscape-scale ecosystem process that is important for maintaining the wellbeing of Renosterveld is fire. Fire is a disturbance that creates gaps in plant communities which provides space for plant establishment. Disturbance by fire can contribute to the maintenance of diversity and spatial heterogeneity by impeding competitive exclusion. In addition, the ethylene gas produced from veld fires stimulates flowering and the karrikins within the smoke stimulates seed germination. Regarding the dynamics of Mountain Renosterveld, vegetation cover begins to re-establish within the first nine months following the fire and remains at a relatively high level from years 3 to 10 (van der Merwe & van Rooyen, 2011). There is a distinctive species composition between the first two years (years 1 and 2) following the fire and the remaining years (year 3 to 10).

On a fine-scale vegetation type, the proposed OHPL overlaps mainly with Central Mountain Shale Renosterveld Central Mountain Shale Renosterveld occurs in the Western and Northern Cape on the southern and south-eastern slopes of the Klein Roggeveldberge and Komsberg, below the Komsberg section of the Great Escarpment, as well as farther east below Besemgoedberg and Suurkop and in the west in the Karookop area.

The Renosterveld type is poorly known. This vegetation type is described as follows:

- Topography – Slopes and broad ridges of low mountains and escarpments;
- Geology – Clayey soils overlying Adelaide Subgroup mudstones and subordinate sandstones. Glenrosa and Mispah forms are prominent;
- Climate – Arid to semi-arid climate. MAP 180 – 410 mm, with relatively even rainfall throughout the seasons, albeit minimally elevated during Autumn-Winter. Mean daily maximum and minimum temperatures 29.9˚C and 0.9 ˚C for January and July, respectively; and
- Important Taxa;
    - Low shrubs: Elytropappus rhinocerotis, Diospyros austro-africana, Eriocephalus africanus var. africanus, E. ericoides subsp. ericoides, E. grandifloras, Felicia ovata, Pteronia glauca, P. incana, P. sordida, Zygophyllum spinosum.
    - Succulent shrubs: Delosperma subincanum, Drosanthemum lique, Euphorbia stolonifera, Trichodiadema barbatum, Tylecodon reticulatus subsp. reticulatus, T. wallichi subsp. wallichi.
    - Geophytic herbs: Bulbine asphodeloides, Drimia intricate, Othonna auriculifolia, Oxalis obtusa.
    - Succulent Herbs: Crassula deceptor, C. muscosa, C. tomentosa var. glabrifolia, Senecio radicans.

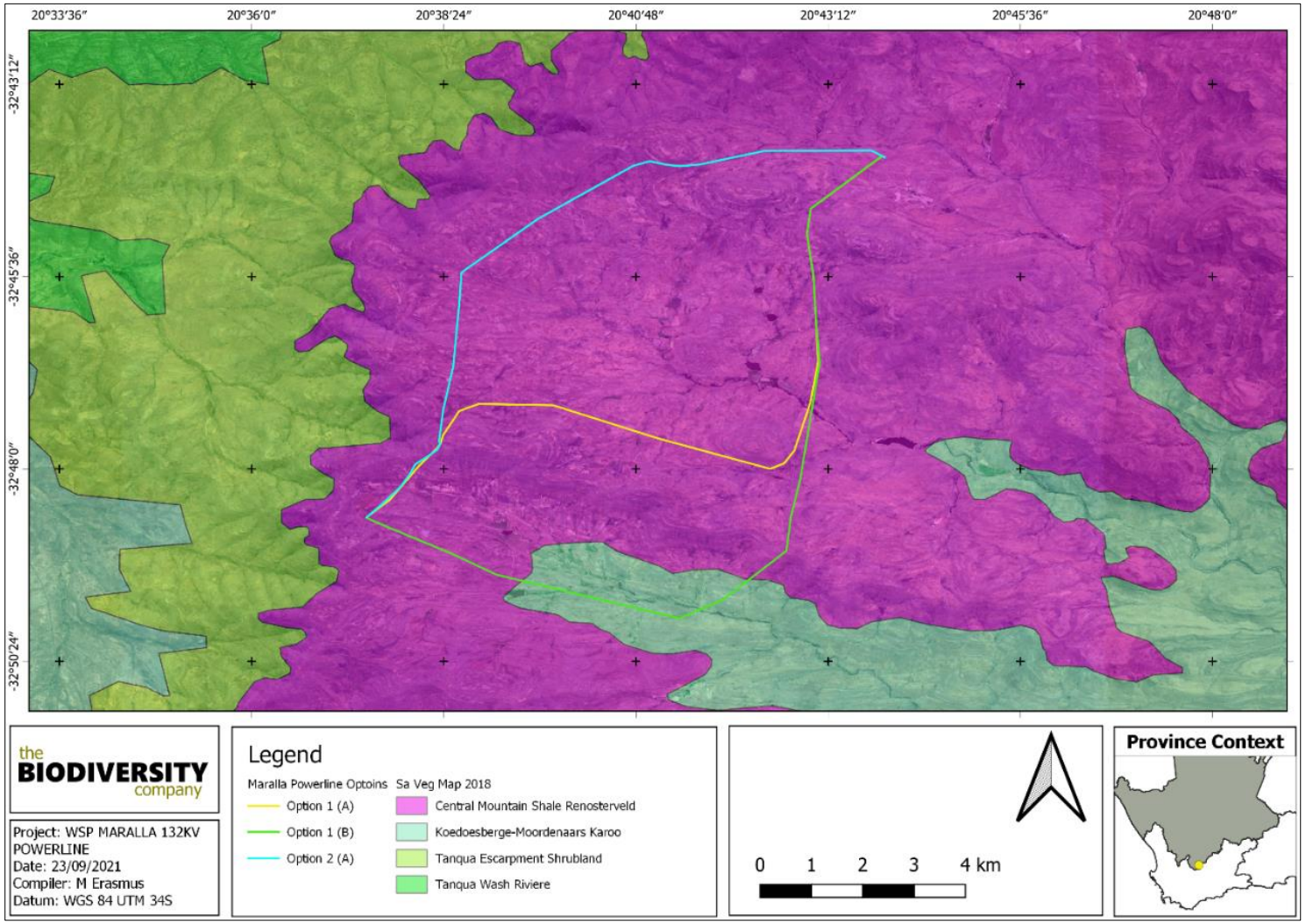


Figure 6-8: Map illustrating the vegetation type associated with the proposed project area (source: The Biodiversity Company)

EXPECTED FLORA SPECIES

The Plants of South Africa (POSA) database indicates that 166 species of indigenous plants are expected to occur within the assessment area and immediate landscape. Six (6) species of conservation concern (SCC) based on their conservation status could be expected to occur within the assessment area and are provided in **Table 6-4**.

Table 6-4: Threatened flora species that may occur within the assessment area associated with proposed project area, DD: Data deficient, VU = Vulnerable, and NT = Near Threatened

FAMILY	SPECIES NAME	CONSERVATION STATUS	ENDEMISM	HABITAT	LIKELIHOOD OF OCCURRENCE
Aizoaceae	*Antimima pumila*	DD	Endemic	Rocky slopes, possibly favouring south-facing slopes.	High
Fabaceae	*Lotononis venosa*	EN	Endemic	Open karroid scrub on sandy clay alluvium. Known only from four locations. Extent of occurrence 84 km² and area of occupancy 16 km².	Moderate
Hyacinthaceae	*Lachenalia longituba*	VU	Endemic	Stony clay in seasonally wet, boggy sites that bake rock hard in summer. Known from five locations. EOO 350 km², AOO <20 km².	Moderate
Iridaceae	*Romulea eburnea*	VU	Endemic	Shale soils in the Klein Roggeveld. Rare and localised as it known from only two locations.	High
Iridaceae	*Ixia mollis*	VU	Endemic	Among rocks on seasonally moist south-facing sandy or clay slopes. Known from only five locations in the Olifants River Valley between Clanwilliam and Citrusdal and the western Cederberg. EOO 74 km²	Low
Iridaceae	*Geissorhiza karooica*	NT	Endemic	Coarse shale slopes. Known from six locations. EOO 497 km²	High

REVIEW OF PREVIOUS STUDIES

The following reports were used in order to substantiate and supplement the findings and general understanding:

- In 2016, Simon Todd conducted fauna & flora specialist study for the Environmental Impact Assessment for the proposed Maralla West Wind Energy Facility.
- Six (6) Flora SCC were found: Boophone disticha (Declining), Brunsvigia josephinae (VU), Eriocephalus grandiflorus (Rare), Adromischus phillipsiae (Rare), Drimia altissima (Declining) and Cliffortia arborea (VU) at base of cliffs along the escarpment. Several provincially protected species also occurred in large scale due to the broad range of species protected on a provincial level.
- From the Faunal study conducted by Todd in 2016, the most notable comment was that the drainage systems within the site do not contain wide floodplains or alluvial terraces which are the known preferred habitat of the Riverine Rabbit (Bunolagus monticularis) (CR). Grey Rhebok (Pelea capreolus) (NT) I was found commonly in the area. The author added that tortoises (Angulate Tortoises, Chersina angulata with occasional observations of Karoo Tent Tortoises, Psammobates tentorius tentorius) may be negatively impacted by the development as they are vulnerable to collisions with motor vehicles and predation by avian predators. The author continued and said that attractive species such as Tent Tortoises are also vulnerable to collection for use as pets or trade, and the increased accessibility resulting from the new roads that will be constructed as part of the development would raise the risk for these species.
- Chris van Rooyen Consulting performed the avifauna assessment for the Biotherm Maralla East and West Wind Projects. This assessment was conducted in April 2016. During their survey, all the SCC in Table 3 5 were recorded, except Roller, European (*Coracias garrulus*).

FIELD ASSESSMENT

The following sections provides the results from the field survey for the proposed OHL that was undertaken during September 2021 and April 2022.

FLORA ASSESSMENT

INDIGENOUS FLORA

The species composition of the assessment area was consistent with typical Central Mountain Shale Renosterveld vegetation Type. Distinctive vegetation communities were observed and can be classified into ridges and rocky slopes, shurbland and drainage lines.

The ridges and rocky slope floral community was typically dominated by *Dicerothamnus rhinocerotis, Euryops lateriflorus, Oedera genistifolia, Montinia caryophyllacea, Pteronia glomerata, P. aspalatha, Wiborgia sericea, Eriocephalus africanus var. paniculatus*,

The shurbland areas on deeper soils generally consisted of species such as *Dicerothamnus rhinocerotis, Euryops lateriflorus, Oedera genistifolia, Ruschia intricata, Ruschia spinosa, Eriocephalus ericoides var. ericoides, Hermannia cuneifolia*, and *Asparagus capensis*. The patches of disturbed grazing areas were dominated by pioneer species comprising of *Gazania rigida, Arctotheca calendula* and *Senecio arenarius*.

The drainage lines of the assessment area were dominated by *Dicerothamnus rhinocerotis, Pseudoschoenus inanis, Berkheya spinosa* and *Euryops lateriflorus*

Geophytes and succulents were ubiquitous throughout the assessment area and occurred within all the communities described above. Geophytes were particularly abundant within the lowland areas. It is important to note that these growth forms, and their non-succulent relatives, are protected under the Northern Cape Legislation and include:

- All species of Amaryllidaceae; All species of Asphodelaceae; All species of Crassulaceae; All Iridaceae;All species of Mesembryanthemaceae: All Colchicum (Colchicaceae); All Euphorbia (Euphorbiaceae);All Lachenalia (Hyacinthaceae); and All Oxalis (Oxalidaceae).

ALIEN AND/OR INVASIVE PLANT SPECIES

Invasive Alien Plants (IAPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

The National Environmental Management: Biodiversity Act (NEMBA) is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (Government Gazette No 78 of 2014). The Alien and Invasive Species Regulations were published in the Government Gazette No. 43726, 18 September 2020. The legislation calls for the removal and / or control of alien invasive plant species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, 1998 (Act No. 36 of 1998), no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three categories in terms of the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA):

- Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the regulations, a person who has under his or her control a category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
    - Section 75 of the Act;

- The relevant invasive species management programme developed in terms of regulation 4; and
- Any directive issued in terms of section 73(3) of the Act.

One species was recorded within the assessment area, *Erodium moschatum*. This species is not listed under the Alien and Invasive Species List 2016, Government Gazette No. 40166.

Considering that IAPs primarily tend to encroach into disturbed areas, the disturbance generated from the activities associated with the proposed development, suggests that these species may invade the corridor. Considering the predominantly natural integrity of the vegetation within the assessment area, IAP species must be controlled by implementing an Invasive Alien Plant Management Programme from the onset of the project which is in compliance of section 75 of the Act as stated above.

SPECIES OF CONSERVATION CONCERN

In addition to the protected flora, one (1) threatened plant species occur within the assessment area (**Table 6-5Error! Reference source not found.**). These species were recorded within the Ridges, Rocky Slopes and Rocky Areas, they are expected to occur ubiquitous throughout these habitats due to the intact state of these habitats still and have thus been considered in the overall habitat sensitivity.

Table 6-5: Flora SCC recorded within the assessment area associated with the project area. NT = Near Threatened.

FAMILY	SPECIES	COMMON NAME	CONSERVATION STATUS	ENDEMISM
Asteraceae	*Eriocephalus grandiflorus*	Shrub	Rare	Endemic

6.1.10 FAUNA

*The following is extracted from the Biodiversity Impact Assessment compiled by The Biodiversity Company and included as **Appendix F2**.*

Most of the project area has been historically occupied by communities and thus many of the expected faunal species has a low likelihood of occurrence due to persecution and lack of habitats arising from anthropogenic impacts.

FAUNAL ASSESSMENT

AMPHIBIANS AND REPTILES

Based on the IUCN Red List Spatial Data and Amphibian Map, 9 amphibian species are expected to occur within the area (Appendix B of the Biodiversity Impact Assessment included in **Appendix F2**). None of these species are threatened.

Based on the IUCN Red List Spatial Data and the Reptile MAP database, 53 reptile species are expected to occur within the area (Appendix C of the Biodiversity Impact Assessment included in **Appendix F2**). One (1) is regarded as threatened (**Table 6-6**).

Table 6-6 Threatened reptile species that are expected to occur within the proposed project area. NT = Near Threatened.

SPECIES	COMMON NAME	CONSERVATION STATUS	ENDEMISM	LIKELIHOOD OF OCCURRENCE
Psammobates tentorius verroxii	Verrox's Tent Tortoise	NT	Near-Endemic	Confirmed

Relatively few species of herpetofauna were recorded within the assessment area, with five of the expected species observed during the survey period (**Table 6-7**; **Figure 6-9**). The species recorded comprised of one amphibian and five (5) reptile species. The lack of species richness may be attributed to a combination of the inherent secretive nature of herpetofauna species, limited time available for fieldwork and no night survey was undertaken.

One of the five species recorded are regarded as NT, and four are protected under NC provincial legislation.

Table 6-7: Herpetofauna species recorded within the assessment area associated with the project area. Species highlighted in bold are of conservation concern as they are either threatened or protected. LC = Least Concern and NT = Near-Threatened

FAMILY	SPECIES	COMMON NAME	CONSERVATION STATUS	ENDEMISM
Reptile				
Agamidae	*Agama atra*	Southern Rock Agama	LC	Near-Endemic
Cordylidae	***Karusasaurus polyzonus***	**Karoo Girdled Lizard**	**LC**	**Near-Endemic**
Lacertidae	***Pedioplanis lineoocellata pulchella***	**Common sand lizard**	**LC**	**Near-Endemic**
Testudinidae	***Chersina angulata***	**Angulate Tortoise**	**LC**	
Testudinidae	***Psammobates tentorius verroxii***	**Verrox's Tent Tortoise**	**NT**	**Near-Endemic**
Amphibian				
Pyxicephalidae	*Amietia fuscigula*	Common River Frog	LC	

Figure 6-9: Photographs illustrating a portion of the herpetofauna observed within the assessment area.; A) Angulate Tortoise (Chersina angulata) B) Southern Rock Agama (Agama atra), C) Verrox's Tent Tortoise (Psammobates tentorius verroxii) and D) Common Sand Lizard (Pedioplanis lineoocellata pulchella).

MAMMALS

The IUCN Red List Spatial Data lists 56 mammal species that could be expected to occur within the area. This list excludes large mammal species that are limited to protected areas. Eight (8) of these expected species are regarded as threatened (**Table 6-8**), five of these have a low likelihood of occurrence based on the lack of suitable habitat in the project area.

Table 6-8: Threatened mammal species that are expected to occur within proposed project area. CR=Critically Endangered, EN=Endangered, VU = Vulnerable, and NT = Near Threatened, LC=Least Concern.

SPECIES	COMMON NAME	CONSERVATION STATUS Regional (SANBI, 2016)	IUCN (2021)	LIKELIHOOD OF OCCURRENCE
Aonyx capensis	Cape Clawless Otter	NT	NT	**Moderate**
Bunolagus monticularis	Riverine Rabbit	EN	CR	**Low**
Felis nigripes	Black-footed Cat	VU	VU	**High**
Graphiurus ocularis	Spectacular Dormouse	NT	LC	**Low**
Leptailurus serval	Serval	NT	LC	**Low**
Panthera pardus	Leopard	VU	VU	**Low**
Pelea capreolus	Grey Rhebok	NT	NT	**Confirmed**
Poecilogale albinucha	African Striped Weasel	NT	LC	**Moderate**

A total of fifteen (15) mammal species were either directly observed or deduced to be present in the project area based on visual cues (tracks, scat etc.) during the surveys (**Table 6-9**). This represents 26.7% of the 56 species expected. As the survey was conducted over a short time frame, it is believed that should a longer study be performed, more species would be identified. A single threatened species, *Palea capreolus* (Grey Rhebok), was recorded.

A selection of photographs of mammal species observed during the survey are provided in **Figure 6-10,** while the full list of species recorded are listed in **Table 6-9.**

Table 6-9: Summary of mammal species observed or deduced to be present in the project area based on visual signs (tracks, scats etc.) within the proposed project area during the survey. Species highlighted in bold are of conservation concern as they are either threatened or protected. LC = Least Concern and NT = Near-Threatened. SLS= South Africa, Lesotho, Swaziland.

FAMILY	SPECIES	COMMON NAME	CONSERVATION STATUS	ENDEMISM
Bathyergidae	***Cryptomys hottentotus***	**African Mole Rat**	**LC**	**Endemic**
Bovidae	***Antidorcas marsupialis***	**Springbok**	**LC**	
Bovidae	***Pelea capreolus***	**Grey Rhebok**	**NT**	**SLS**
Bovidae	***Raphicerus campestris***	**Steenbok**	**LC**	
Bovidae	**Sylvicapra grimmia**	**Common Duiker**	LC	
Canidae	*Canis mesomelas*	Black-backed Jackal	LC	
Cercopithecidae	*Papio ursinus*	Chacma Baboon	LC	
Herpestidae	*Atilax paludinosus*	Water Mongoose	LC	
Herpestidae	***Cynictis penicillata***	**Yellow Mongoose**	**LC**	
Hystricidae	***Hystrix africaeaustralis***	**Cape Porcupine**	**LC**	
Leporidae	***Lepus capensis***	**Cape Hare**	**LC**	**Endemic**
Leporidae	***Pronolagus saundersiae***	**Hewitt's Red Rock Hare**	**LC**	**Endemic**
Muridae	***Aethomys namaquensis***	***Namaqua rock rat***	**LC**	

FAMILY	SPECIES	COMMON NAME	CONSERVATION STATUS	ENDEMISM
Orycteropodidae	***Orycteropus afer***	**Aardvark**	**LC**	
Procaviidae	***Procavia capensis***	**Rock Hyrax**	**LC**	

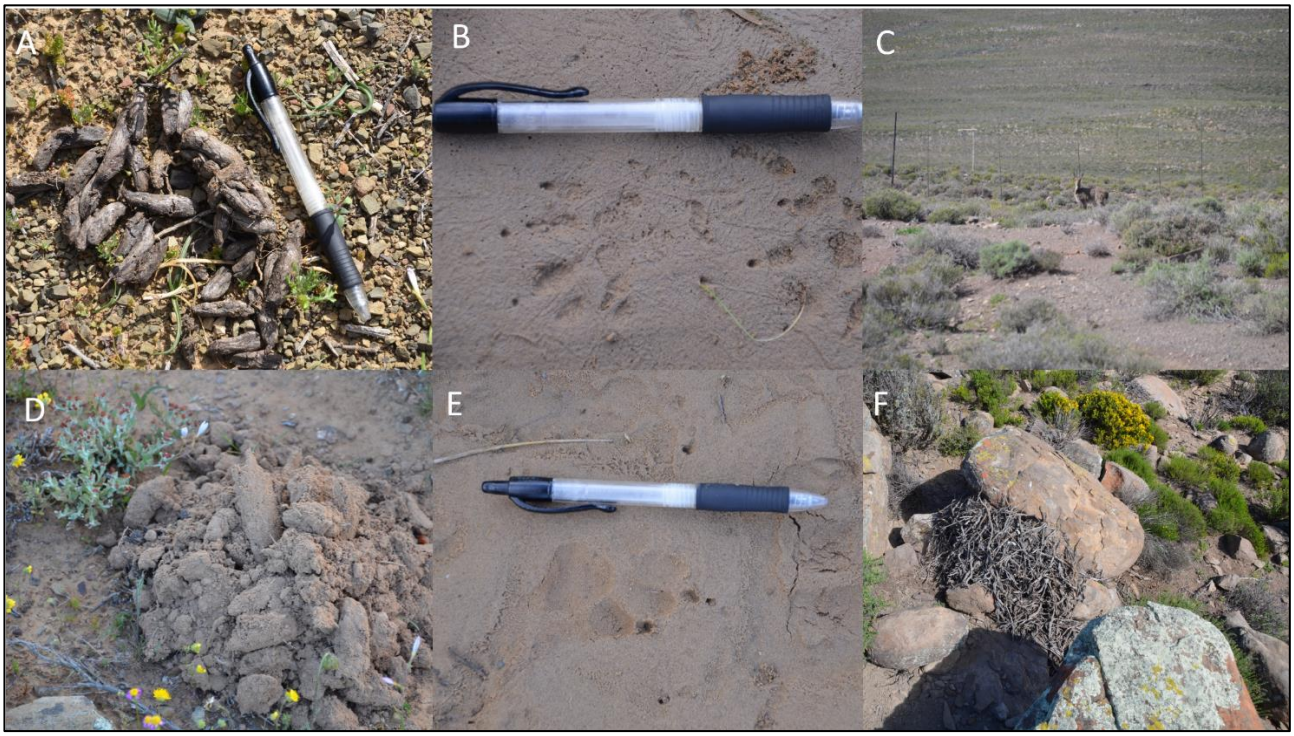


Figure 6-10: A selection of mammal species observed within the proposed project area: A)Cape Porcupine (Hystrix africaeaustralis) scat, B)Water Mpngoose (Atilax paludinosus) track , C) Grey Rhebok (Pelea capreolus), D) African Mole Rat (Cryptomys hottentotus), E) Black Backed Jackal (Canis mesomelas) and F) Namaqua rock rat (Aethomys namaquensis) den.

6.1.11 HABITATS

Four main preliminary habitat types were delineated for the project footprint (**Table 6-10**). These habitats are shown in Error! Reference source not found. and are briefly discussed below.

Table 6-10: Summary of habitat types delineated within the assessment area of the proposed OHPL.

HABITAT TYPE	DESCRIPTION	DOMINANT FLORA	ECOSYSTEM PROCESSES AND SERVICES	APPROXIMATE AREA (HA)	HABITAT SENSITIVITY
Transformed	Areas denuded of vegetation for wind turbine infrastructure and associated infrastructure such as roads.	N/A	None	16	Very Low
Ridges, Rocky Slopes and Rocky Areas	Steep to moderately steep slopes with shallow soils. Outcrops	*Dicerothamnus rhinocerotis* *Oedera genistifolia* *Ixia thomasiae* *Eriocephalus punctulatus* *Pteronia glomerata*	Capture precipitation and run-off from melting snow. Rising air currents are used by raptor species to increase flight efficiency.	127	Very High to High
Shrubland	Low to no slope with deep soils.	*Ruschia intricata* *Euryops lateriflorus* *Pteronia glomerata* *Oxalis obtusa*	Provides grazing for livestock. Aids in filtration of water permeating through the soil into drainage lines.	257	High
Drainage features	Channel through which surface water naturally collates and flows. Perennial or ephemeral systems were both considered for this habitat type.	*Dicerothamnus rhinocerotis* *Pseudoschoenus inanis* *Euryops lateriflorus* *Berkheya spinosa*	Provides surface water within the landscape. Aids in trapping sediment and nutrients derived from land runoff.	42	Very High to High

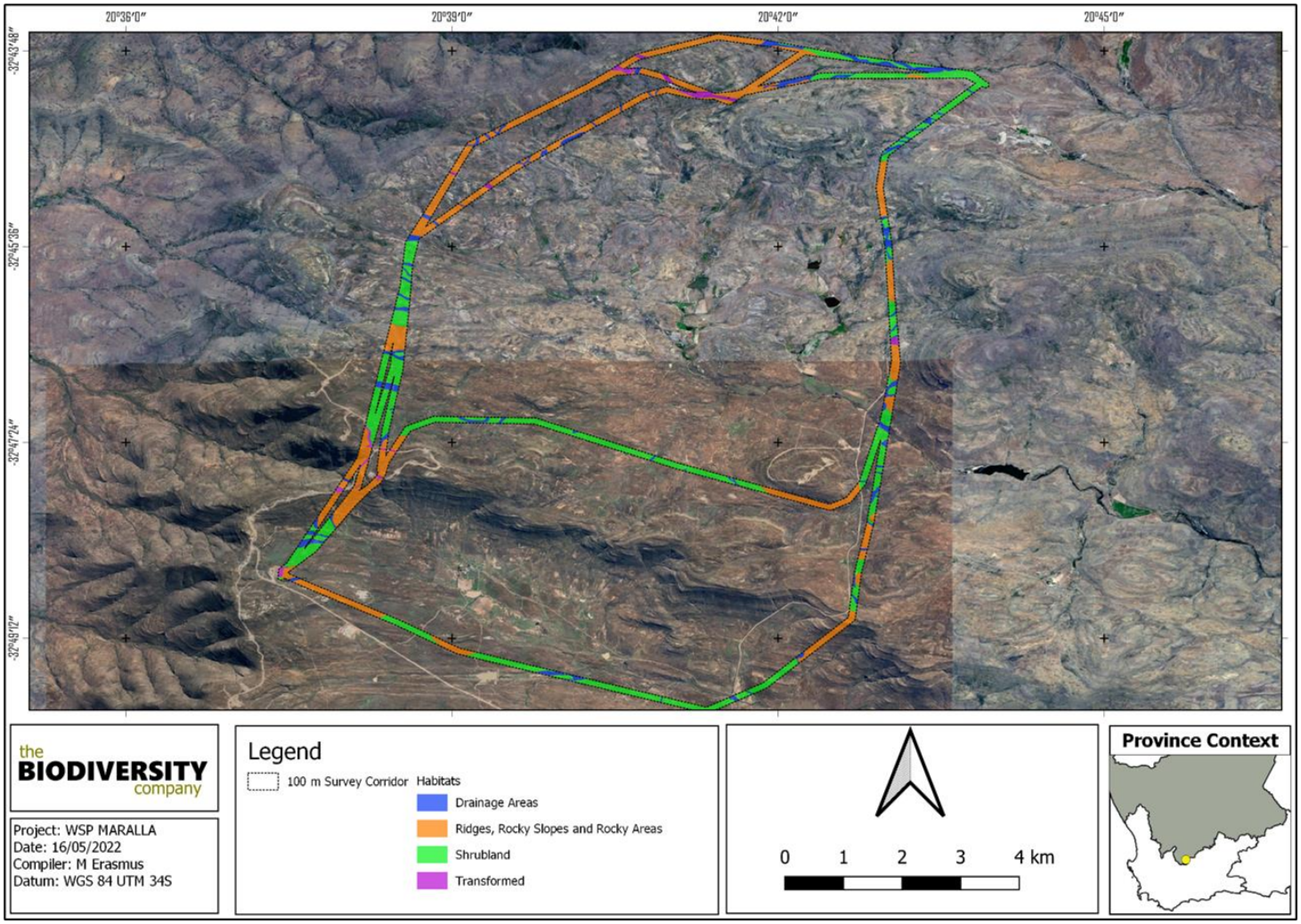


Figure 6-11: Habitats delineated for the project area.

DRAINAGE FEATURES

The drainage lines and larger streams within the project area can be regarded as non-perennial and possess surface flow only briefly during and following a period of rainfall (ephemeral), which is a feature of semi-arid/arid regions. These seasonal streams create an ecological link between the stream and its surrounding terrestrial landscape and has the same function albeit on a smaller scale than a river (**Figure 6-12** and **Figure 6-13**). This habitat is important as a movement corridor as it creates a link between the system and its surrounding terrestrial landscape for several faunal species, especially birds and mammals, and plays a vital role as a water resource not only for the biodiversity but also the local community. This habitat unit can be regarded as highly important, not only within the local landscape, but also regionally.

These habitats are dominated by *Dicerothamnus rhinocerotis* and *Pseudoschoenus inanis*. The smaller drainage lines are however also important and the presence of several species of conservation concern such as *Brunsvigia josephinae* (VU) was confirmed present within these areas by Simon Todd in 2016. The larger streams function as FEPA Upstream Management Areas

Figure 6-12: An example of a drainage feature from the project area

Figure 6-13: An example of a larger drainage feature from the project area

SHRUBLAND

This habitat is the remainder of the shrubland that has been disturbed by the historic and current grazing (**Figure 6-14** and **Figure 6-15**). This habitat type is regarded as semi-natural shrubland, but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement. The current ecological condition of this habitat with regard to the main driving forces, are intact, which is evident in the amount of, and importance of the species recorded in the flora and faunal assessment, and also to the high species diversity and number of plant species recorded. Current human infringement still occurs throughout, especially in areas close to roads.

The unit acts as a greenland which supports viable plant species populations and is also used for foraging by fauna. The unit also serves as a movement corridor for fauna within a landscape fragmented.

Figure 6-14: An example of a shrubland from the project area

Figure 6-15: An example of a shrubland from the project area

RIDGES, ROCKY SLOPES AND ROCKY AREAS

This habitat includes areas that are rocky outcrops, stony and rocky ridges with varying slopes, bedrock protruding from the soil layer with the associated boulders and large rocks that occur within the shrubland habitat (**Figure 6-16** and **Figure 6-17**). The habitat is used by faunal species as fine-scale habitats and is important to consider for mitigation actions when an area is cleared for placement of the infrastructure. These habitats can be considered as ecological hotspots being an important habitat for fauna and flora, especially plants as well as reptiles. The habitat has been infringed upon by livestock, which has had an impact on this habitat, although minor. This habitat type has undergone impacts associated with human activity especially due to the use of the area for grazing. This habitat forms part of a unique landscape within the region and provides refugia, food and a more natural environment.

Figure 6-16: An example of a ridges, rocky slopes habitat from the project area

Figure 6-17: An example of a rocky habitat from the project area

TRANSFORMED

This habitat unit represents all areas recently cleared for the construction of wind turbines and associated infrastructure such as secondary roads (**Figure 6-18** and Error! Reference source not found.). This habitat is regarded as transformed due to the nature of the modification of the area to an extent where it would not be able to return to its previous state. Due to the transformed nature of this habitat, it is regarded as having a very low sensitivity. Due to the lack of high-resolution satellite imagery, only a small extent of this habitat could be accurately delineated.

Figure 6-18: An example transformed habitat from the project area

6.1.12 SITE ECOLOGICAL IMPORTANCE

The different habitat types within the assessment area were delineated and identified based on observations during the field assessment as well as available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes.

The different terrestrial habitat types that were delineated within the project area, can be seen in (**Table 6-11**). The sensitivities of the habitat types delineated are illustrated in **Figure 6-19**. Very High and High Sensitivity' areas are due to the following:

- Habitats within the assessment area were observed to be utilised by threatened species during the field survey. These species comprised of one (1) VU avifauna species, two (2) EN avifauna species, and 1 NT mammal and reptile;
- Unique and low resilience habitats;
- Threatened and Protected flora species were abundant and ubiquitous within; and
- A high richness of protected fauna species was present.

Table 6-11: Summary of habitat types delineated within the field assessment area of the project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Transformed	Low	Very Low	Very Low	Low	Very Low
Drainage features	Medium	High	High	Low	High
Shrubland	Medium	Medium	Medium	Low	High
Ridges, Rocky Slopes and Rocky Areas	Medium	Medium	Medium	Low	High
Ridges and Rocky Slopes with steep slope and some Drainage features	High Slope Habitats FEPA Rivers	High	High	Low	Very High

Interpretation of the SEI in the context of the proposed development activities is provided in **Table 6-12**.

Table 6-12 Guidelines for interpreting Site Ecological Importance) in the context of the proposed development activities

Site Ecological Importance	Interpretation in relation to proposed development activities
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.

Site Ecological Importance	Interpretation in relation to proposed development activities
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

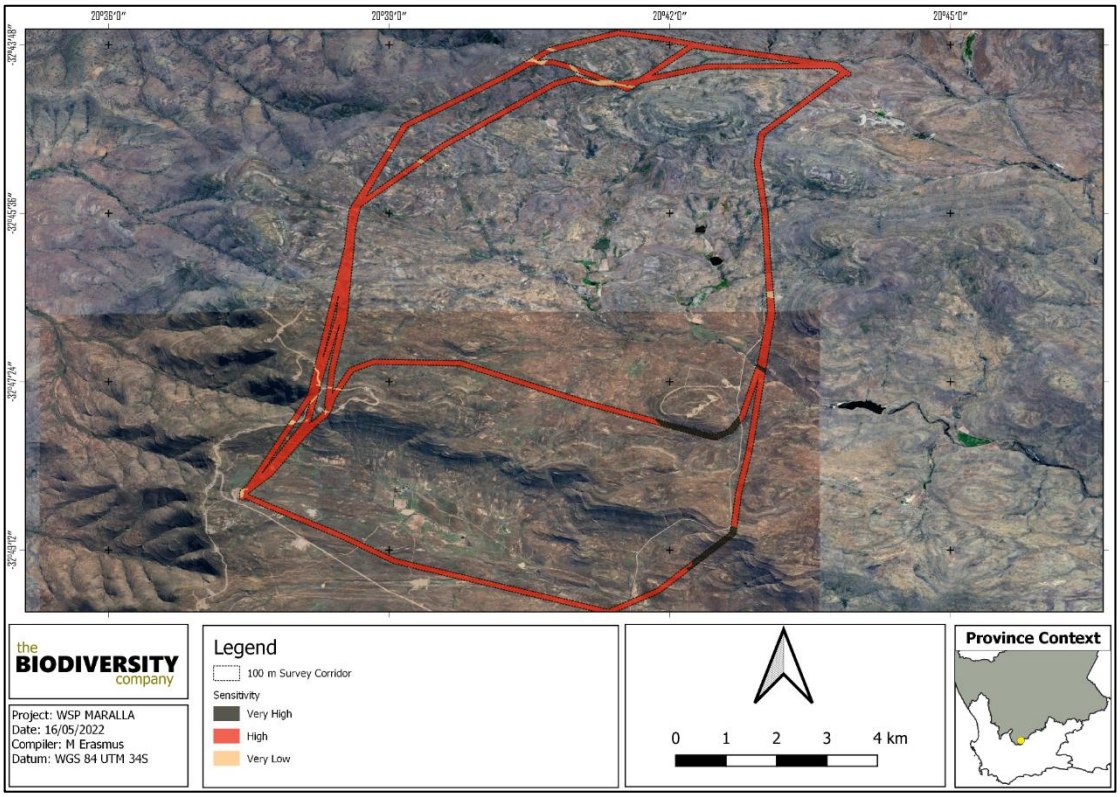


Figure 6-19: Sensitivity of the project area in relation to the 100 m project area

6.1.13 AVIFAUNA

The following is extracted from the Avifauna Impact Assessment compiled by Chris van Rooyen Consulting and included as ***Appendix F1****.*

IMPORTANT BIRD AREAS

There are no Important Bird Areas (IBA) within the confines of the PAOI. The closest IBA (Anysberg Nature Reserve) is located a 50+km south of the proposed Maralla grid connection (**Figure 6-20**). It is therefore highly unlikely that the proposed on-site substation and 132kV overhead power line will have a negative impact on the IBAs within the broader area.

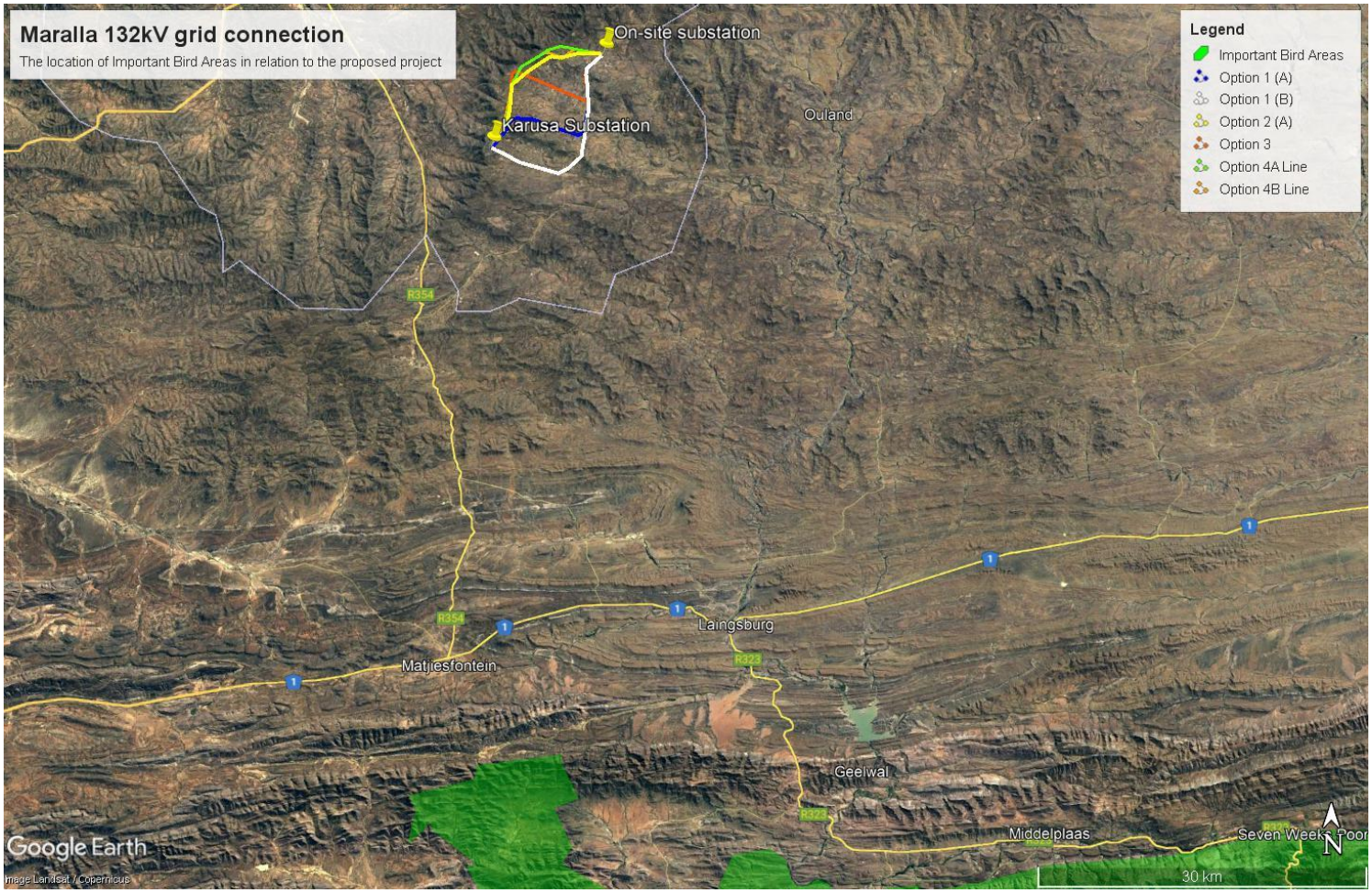


Figure 6-20: Regional map detailing the location of the proposed Maralla on-site substation and 132kV grid overhead power line project in relation to Important Bird Areas (IBAs)

BIOMES AND VEGETATION TYPES

The centre of the PAOI is situated approximately 43km south of the town of Sutherland, in the Karoo Hoogland Local Municipality of the Northern Cape Province. The area is situated in the proposed Komsberg Renewable Energy Zone (REDZ) and the proposed Central Corridor of the national Electricity Grid Infrastructure (EGI) (DEA 2015). The PAOI overlaps with the slopes of the Klein Roggeveld Mountains in the north and west and is bisected by several ephemeral rivers. The habitat in the PAOI is rugged, consisting of rolling hills with boulder-strewn slopes and exposed ridge lines. Prominent high points ("koppe") are Ruiter se Kop (1 391m a.s.l) and Perdeplaas se Berg (1 342m a.s.l). The PAOI contains a number of man-made dams used for the irrigation of a few crops (mostly pastures), which is grown as supplementary fodder for small stock farming. Sheep farming is the main economic activity.

The natural vegetation in the PAOI is dominated by Central Mountain Shale Renosterveld which exists in a transitional zone between the Fynbos and Succulent Karoo Biomes (Mucina & Rutherford 2006). The vegetation type is found on slopes and broad ridges of low mountains and escarpments. It consists of tall shrubland dominated by renosterbos and large suites of mainly non-succulent karoo shrubs with a rich geophytic flora in the undergrowth or in more open, wetter or rocky habitats (Mucina & Rutherford 2006).

The climate is arid to semi-arid with a mean average precipitation of 228mm, with relatively even rainfall with a slight peak in autumn and winter. Mean daily maximum and minimum temperatures in Sutherland range between 27°C and -3°C for January and July.

While the PAOI is large, and the altitude range it encompasses considerable, the habitat in the PAOI from an avian perspective is relatively uniform, dominated by open, rocky, undulating or montane renosterbos, with steep, rocky slopes, ridges and low cliffs, denser, woody vegetation along the bigger drainage lines (and stands of alien trees), and both natural and artificial wetlands - river courses, vleis and dams. The larger artificial impoundments in the area probably support good numbers of waterbirds in wet years.

BIRD HABITATS

RENOSTERVELD

The Fynbos biome is dominated by low shrubs and has two major vegetation divisions: fynbos proper, characterised by restioid, erioid and proteoid components; and renosterveld, dominated by *Asteraceae*, specifically Renosterbos *Elytropappus rhinocerotis*, with geophytes and some grasses. Renosterveld, unlike fynbos, extend into the karoo shales, where rainfall patterns allow a high grass cover and abundance of non-succulent shrubs. Shale renosterveld shows strong affinities with neighbouring succulent Karoo vegetation (Mucina & Rutherford 2006). This biome is characterised by a high level of diversity and endemism in its botanical composition, which is not paralleled in its terrestrial avifauna, which is depauperate relative to other southern African biomes (Harrison *et al*. 1997). Priority species that may occur in renosterveld in the PAOI are Ludwig's Bustard, Common Buzzard *Buteo buteo*, Jackal Buzzard *Buteo rufofuscus*, Cape Crow *Corvus capensis*, Pied Crow *Corvus albus*, Black-chested Snake-Eagle *Circaetus pectoralis*, Booted Eagle *Hieraaetus pennatus*, Black Harrier *Circus maurus*, Martial Eagle *Polemaetus bellicosus*, Verreaux's Eagle, Helmeted Guineafowl *Numida meleagris*, Lesser Kestrel *Falco naumanni*, Rock Kestrel *Falco rupicolus*, Black-winged Kite *Elanus caeruleus*, Karoo Korhaan *Eupodotis vigorsii*, Southern Black Korhaan *Afrotis afra* and Secretarybird *Sagittarius serpentarius* may occur, especially in ecotonal areas between renosterveld and succulent Karoo.

SURFACE WATER

Man-made impoundments, although artificial in nature, can be very important for a variety of birds, particularly water birds. Apart from the water quality, the structure of the dam, and specifically the margins and the associated shoreline and vegetation, plays a big role in determining the species that will be attracted to the dam. The PAOI contains several dams and the larger impoundments probably support good numbers of waterbirds in wet years. Priority species recorded in the broader area by SABAP2 that could be attracted to these dams include Red-knobbed Coot *Fulica cristata*, Reed Cormorant *Microcarbo africanus*, White-breasted Cormorant *Phalacrocorax lucidus*, Yellow-billed Duck *Anas undulata*, African Black Duck *Anas sparsa*, Egyptian Goose *Alopochen aegyptiaca*, Spur-winged Goose

Plectropterus gambensis, Little Grebe *Tachybaptus ruficollis*, Black-headed Heron *Ardea melanocephala*, Grey Heron *Ardea cinerea*, African Sacred Ibis *Threskiornis aethiopicus*, Hadada Ibis *Bostrychia hagedash*, Common Moorhen *Gallinula chloropus*, South African Shelduck *Tadorna cana*, Cape Shoveler *Spatula smithii*, African Spoonbill *Platalea alba*, Black Stork *Ciconia nigra*, Cape Teal *Anas capensis*, Red-billed Teal *Anas erythrorhyncha* and Hamerkop *Scopus umbretta*.

RIDGES, CLIFFS AND ROCKY OUTCROPS

Steep terrain is another identified habitat within the project area. Ridges are potentially important roosting, breeding and foraging habitat for a variety of priority species, e.g., Jackal Buzzard, Booted Eagle, Verreaux's Eagle, Rock Kestrel, White-necked Raven *Corvus albicollis* and Black Stork.

CULTIVATED LANDS

Arable or cultivated land represents a significant feeding area for many bird species in any landscape for the following reasons: through opening up the soil surface, land preparation makes many insects, seeds, bulbs and other food sources suddenly accessible to birds and other predators; the crop or pasture plants cultivated are often eaten by birds or attract insects which are in turn eaten by birds. Relevant to this study, pastures grown as supplementary fodder for small stock farming occur within the study area and are likely draw cards for several priority species e.g. Ludwig's Bustard, Common Buzzard, Egyptian Goose, Spur-winged Goose, Helmeted Guineafowl, Black-headed Heron, Hadeda Ibis, Lesser Kestrel and Black-winged Kite.

EXOTIC TREES

Although stands of Eucalyptus are strictly speaking invader species, they have become important refuges for certain species of raptors. Relevant to this project Common Buzzard, Jackal Buzzard, Cape Crow, Pied Crow, Black-chested Snake-eagle, Booted Eagle, Martial Eagle, Verreaux's Eagle, Spotted Eagle-Owl Bubo africanus, Egyptian Goose, Pale Chanting Goshawk Melierax canorus, Helmeted Guineafowl, Black-headed Heron, Grey Heron, African Sacred Ibis, Hadada Ibis, Lesser Kestrel, Rock Kestrel, Black-winged Kite, White-necked Raven, Rufous-breasted Sparrowhawk Accipiter rufiventris, African Spoonbill and Secretarybird may utilise this habitat type for roosting and in some instances, breeding.

SOUTH AFRICAN BIRD ATLAS PROJECT 2

The SABAP2 data indicates that a total of 151 bird species could potentially occur within the broader area – Appendix 1 provides a comprehensive list of all the species. Of these, 46 species are classified as priority species (see definition of priority species in section 4) and ten of these are South African Red List species. Of the priority species, 26 are likely to occur regularly at the PAOI and immediate surrounding area, and another 20 could occur sporadically.

Table 6-13 below lists all the priority species and the possible impact on the respective species by the 132kV overhead power line. The following abbreviations and acronyms are used:

Table 6-13: Priority species potentially occurring at the site and immediate surroundings.

		STATUS							HABITAT					IMPACTS		
SPECIES	TAXONOMIC NAME	FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	SA STATUS	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE IN THE PAOI	RENOSTERVELD/SUCCULENT KAROO	ALIEN TREES	RIDGES/CLIFFS	SURFACE WATER	AGRICULTURE	MORTALITY: COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION
African Black Duck	*Anas sparsa*	6.4	3				L				x		x		
African Sacred Ibis	*Threskiornis aethiopicus*	14.9	7			x	M		x		x		x		
African Spoonbill	*Platalea alba*	10.6	5			x	L		x		x		x		
Black Harrier	*Circus maurus*	8.5	4	EN	EN	x	M	x			x				
Black Stork	*Ciconia nigra*	2.1	1	LC	VU		L			x	x		x		
Black-chested Snake Eagle	*Circaetus pectoralis*	2.1	1				L	x	x		x				
Black-headed Heron	*Ardea melanocephala*	14.9	7			x	M		x		x	x	x		
Booted Eagle	*Hieraaetus pennatus*	4.3	2				H	x	x	x	x				
Cape Crow	*Corvus capensis*	2.1	1				L	x	x						
Cape Shoveler	*Spatula smithii*	2.1	1				L				x		x		
Cape Teal	*Anas capensis*	10.6	5				L				x		x		
Common Buzzard	*Buteo buteo*	6.4	3			x	M	x	x			x			

		STATUS					HABITAT						IMPACTS		
SPECIES	TAXONOMIC NAME	FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	SA STATUS	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE IN THE PAOI	RENOSTERVELD/SUCCULENT KAROO	ALIEN TREES	RIDGES/CLIFFS	SURFACE WATER	AGRICULTURE	MORTALITY: COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION
Common Moorhen	*Gallinula chloropus*	2.1	1				L				x		x		
Egyptian Goose	*Alopochen aegyptiaca*	53.2	25			x	H		x		x	x	x		
Grey Heron	*Ardea cinerea*	6.4	3			x	M		x		x		x		
Hadada Ibis	*Bostrychia hagedash*	51.1	24			x	H		x		x	x	x		
Hamerkop	*Scopus umbretta*	4.3	2			x	L				x				
Helmeted Guineafowl	*Numida meleagris*	19.1	9				H	x	x		x	x	x	x	x
Jackal Buzzard	*Buteo rufofuscus*	57.4	27			x	H	x	x	x					
Karoo Korhaan	*Eupodotis vigorsii*	8.5	4	LC	NT		H	x					x	x	x
Lesser Kestrel	*Falco naumanni*	2.1	1			x	L	x	x			x			
Little Grebe	*Tachybaptus ruficollis*	4.3	2				M				x		x		
Ludwig's Bustard	*Neotis ludwigii*	8.5	4	EN	EN	x	H	x				x	x	x	x
Martial Eagle	*Polemaetus bellicosus*	23.4	11	VU	EN	x	H	x	x		x				
Pale Chanting Goshawk	*Melierax canorus*	36.2	17			x	H		x		x				

		STATUS				HABITAT							IMPACTS		
SPECIES	TAXONOMIC NAME	FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	SA STATUS	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE IN THE PAOI	RENOSTERVELD/SUCCULENT KAROO	ALIEN TREES	RIDGES/CLIFFS	SURFACE WATER	AGRICULTURE	MORTALITY: COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION
Pied Crow	*Corvus albus*	51.1	24			x	H	x	x						
Red-billed Teal	*Anas erythrorhyncha*	4.3	2				L				x		x		
Red-knobbed Coot	*Fulica cristata*	6.4	3				M				x		x		
Reed Cormorant	*Microcarbo africanus*	2.1	1				M				x		x		
Rock Kestrel	*Falco rupicolus*	46.8	22			x	H	x	x	x					
Rufous-breasted Sparrowhawk	*Accipiter rufiventris*	6.4	3				L		x						
Secretarybird	*Sagittarius serpentarius*	2.1	1	VU	VU		L	x	x				x		
South African Shelduck	*Tadorna cana*	63.8	30			x	H				x		x		
Southern Black Korhaan	*Afrotis afra*	29.8	14	VU	VU	x	M	x					x	x	x
Spotted Eagle-Owl	*Bubo africanus*	21.3	10				H	x	x						
Spur-winged Goose	*Plectropterus gambensis*	17.0	8				M				x	x	x		
Verreaux's Eagle	*Aquila verreauxii*	27.7	13	LC	VU	x	H	x	x	x	x		x		
White-breasted Cormorant	*Phalacrocorax lucidus*	4.3	2				L				x		x		

		STATUS				HABITAT								IMPACTS		
SPECIES	TAXONOMIC NAME	FULL PROTOCOL	AD HOC PROTOCOL	GLOBAL STATUS	SA STATUS	RECORDED DURING SURVEYS	LIKELIHOOD OF REGULAR OCCURRENCE IN THE PAOI	RENOSTERVELD/SUCCULENT KAROO	ALIEN TREES	RIDGES/CLIFFS	SURFACE WATER	AGRICULTURE	MORTALITY: COLLISION	DISPLACEMENT: DISTURBANCE	DISPLACEMENT: HABITAT TRANSFORMATION
White-necked Raven	*Corvus albicollis*	68.1	32			x	H	x	x	x					
Yellow-billed Duck	*Anas undulata*	19.1	9			x	M				x		x		
EN = Endangered VU = Vulnerable NT = Near Threatened H = High M = Medium L = Low															

SENSITIVITIES

Areas that are particularly high risk from a potential bird collision perspective are the following:

- Natural flight paths: Topographical features e.g. ridges and areas where the line crosses a valley, or drainage lines
- Waterbodies: Several priority species are attracted to open water. If a line skirts a waterbody, or run between two waterbodies, it can pose a collision risk to birds which are attracted to the water.

However, the remainder of the PAOI is considered to be of medium to high sensitivity as well, given its suitability for several Red List priority species namely Black Harrier, Black Stork, Karoo Korhaan, Ludwig's Bustard, Martial Eagle, Secretarybird, Southern Black Korhaan and Verreaux's Eagle, and will therefore also require marking of the powerline with bird flight diverters to mitigate the collision impact. In practice this means the entire OHL needs to be marked with bird flight diverters.

6.2 SOCIAL AND ECONOMIC

6.2.1 SOCIO-ECONOMIC

*The following is extracted from the Social Impact Assessment compiled by Tony Barbour and included as **Appendix F5**.*

ADMINISTATIVE CONTEXT

The majority of the proposed Maralla grid connection is located in the Karoo Hoogland (KH), in the Northern Province (**Figure 6-21**). The KH is one of six local municipalities that make up the Namakwa District (ND) Municipality (**Figure 6-22**). The three main towns in Karoo Hoogland are Williston, Fraserburg and Sutherland, with Springbok and Williston being the administrative seats of the ND and KH respectively. The town of Sutherland was founded in 1855 as a church and market town to serve the sheep farming community in the area. The town is located approximately 100 km north of the small village of Matjiesfontein and is accessed via the R 354. The main economic activities include tourism and sheep farming. South African Astronomical Observatory (SAAO) was established outside the town in 1972 and plays a key role in the town's tourism related economy.

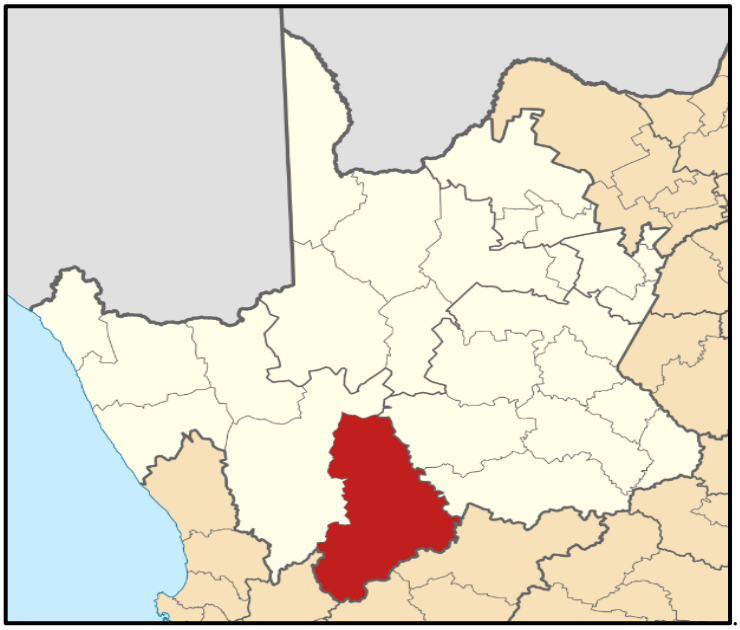


Figure 6-21: Location of Karoo Hoogland within the Northern Cape Province

Figure 6-22: Local municipalities within Namakwa District

DEMOGRAPHIC OVERVIEW KAROO HOOGLAND MUNICIPALITY

POPULATION

Based on the 2016 Community Household Survey the population of the KH was 13 010. In terms of race groups, Coloureds made up 79.3%, followed by Whites (19.7%) and Black Africans (0.7%). The main first language spoken in the KH was Afrikaans (98.5%), followed by IsiXhosa (0.4%) and English (0.3%) (Community Household Survey 2016).

In terms of age, the 2016 Household Community Survey found that 31% of the population were under the age of 18, 58% were between 18 and 64, and the remaining 11% were 65 and older. The KH therefore has a relatively large young population. This creates challenges in terms of creating employment opportunities.

There was a total number of 4621 households in the KH (2016). Of these 97.6 % were formal houses and 0.4% were shacks. The majority of dwellings in the KH are therefore formal structures. In terms of ownership, 63.6% of houses are owned and fully paid off, 4.4% are owned but in the process of being paid off and 8.5% are rented. The high percentage of homeownership reflects an established, stable community.

The high percentage of young people also means that a large percentage of the population is dependent on a smaller productive sector. The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates to reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011 was 52.7%, lower than the figure for the Northern Cape (55.7%). The dependency ratio for the KH in 2011 was 50.9%. The traditional approach is based on people younger than 15 or older than 64. The 2016 information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e. they are still likely to be at school or dependent upon their parents or other family members).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratio for the KHM (2016) was 72%. This figure is significantly higher than the national, provincial, and municipal levels in 2011. The higher

dependency ratio reflects the limited employment opportunities in the area and represent a significant risk to the district and local municipality.

HOUSEHOLDS, HOUSE TYPES AND OWNERSHIP

Based on the information from the 2016 Household Community Survey there were 4621 households in the KH. The overwhelming majority of households resided in formal houses (97.6%). This is higher than the figure for the District (88.4%) and significantly higher than the figure for the Northern Cape (74.4%). Only 0.4% of the households in the KH resided in shacks, compared to 2.3% and 12.8% for the District and Province, respectively. In terms of ownership, 63.6% of houses are owned and fully paid off, 4.4% are owned but in the process of being paid off and 8.5% are rented. The high percentage of formal houses coupled with high level of homeownership reflects a stable, middle-class community. However, as indicated below, household income levels are low.

Based on the information from the 2016 Community Household Survey 32.4% of the households in the KH are headed by females. Although the figures are lower than the ND (37.5%) and Northern Cape (38.8%), the relatively high number of female-headed households at the local municipal level reflects the lack on formal employment and economic opportunities in the KH. As a result, job seekers from the KHM need to seek work in the larger centres, specifically Cape Town and Winelands area. The majority of the job seekers are likely to be males. This is due to traditional rural patriarchal societies where the role of the women is usually linked to maintaining the house and raising the children, while the men tend to be the ones that migrate to other areas in search of employment.

HOUSEHOLD INCOME

Based on the data from the 2011 Census, 6.6% of the population of the KH had no formal income, 2.4% earned less than R 4 800, 5% earned between R 5 000 and R 10 000 per annum, 24.6% between R 10 000 and R 20 000 per annum and 26.2% between R 20 000 and R 40 000 per annum (2016).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 64.8% of the households in the KH live close to or below the poverty line. The figures for the ND and Northern Cape were 58.1% and 62.5% respectively. The low-income levels in the KH reflect the limited employment opportunities and dependence on the agricultural sector. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the KH. This in turn impacts on the ability of the KH to maintain and provide services.

The low household income levels are reflected in the number of indigent households in the KH, which had 944 registered indigent households in 2016. This represents 20% of the total number of households in the KH.

EMPLOYMENT

The official unemployment rate in the KH was 8%. The figures also indicate that the majority of the population are not economically active, namely 40.4%. The unemployment figure is lower than the official unemployment rate for the NDM (11.1%) and Northern Cape (14.5%). While the level of unemployed is low, this needs to be considered within in the context of the low-income levels and the dependence on the agricultural sector

EDUCATION

Education levels in the KH are reflected by the percentage of the population under the age of 20 that have no education, the percentage that have some primary and or have completed primary school, and the percentage that have passed grade 12 (matric). Based on the 2016 Household Community Survey, 13.2% of the population over the age of 20 had no formal education. This is significantly higher than the figures for ND (4.4%) and Northern Cape (7.9%) and reflects the rural nature of large parts of the KH. The percentage with some primary and primary school was 14%, compared to 12.6% and 13.4% for the ND and Northern Cape Province, respectively. The percentage with matric was 29.2%, which was higher than the ND (27.1%) and Northern Cape (29.1%). The higher matric rates are interesting, specifically

given the figure for no formal education. However, despite the higher matric pass rates, the Namakwa IDP notes that the KH has the lowest functional literacy rate in the ND. defines functional literacy as the number of people in a region that are 20 years and older and have completed at least their primary education (i.e. grade 7). Functional literacy describes the reading and writing skills that are adequate for an individual to cope with the demands of everyday life - including the demands posed in the workplace. This is contrasted with illiteracy in the strictest sense, meaning the inability to read or write. Functional literacy enables individuals to enter the labour market and contribute towards economic growth thereby reducing poverty.

MUNICIPAL LEVELS OF KAROO HOOGLAND

ELECTRICITY

Based on the information from the 2016 Community Survey 96.6% of households in the KHM had access to electricity. Of this total 66.7% had in-house prepaid meters, while 6.6% have conventional in-house meters, and 20.3% had solar power. Only 3.4% of households did not have access to electricity, this is marginally higher than the figures for the ND (2.2%), but higher than the figure for the Northern Cape (6.7%). Based on the 2016 Community Survey most of the households in the KHM (74.3%) are supplied with electricity by the KH . The high percentage of households that use solar energy reflects the rural nature of the area.

ACCESS TO WATER

Based on the information from the 2016 Community Survey 69% of households were supplied by a regional or local service provider, while 30.4% relies on their own source of water. The higher percentage of households that rely on their own source of water reflects the rural nature of the area, where large distances make difficult and expensive to provide services to all areas, specifically farms. In terms of access to water, 74.9% of the households in the KH had had piped water inside their houses, while 21.4% relied on piped water inside the yard. The figures piped water supplied inside of homes for the ND and Northern Cape were 72.1% and 45.3% respectively. The figures for the KH are therefore higher than both the district and provincial levels. The figure for water supplied by boreholes (2.4%) is higher than both the ND (0.8%) and Northern Cape (1.3%). This reflects the rural character of large areas of the KH. Based on the 2016 Community Survey most of the households in the KHM (99.4%) have access to potable water, with 69% being supplied by a regional or local service provider.

SANITATION

Based on the information from the 2016 Community Survey, 69.7% of households have access to flush toilets, 17.4% rely on pit toilets, 9.3% use bucket toilets, and 2.7% reported no access to toilet facilities. The access to flush toilets is significantly lower than the ND (82.3%) and marginally lower than the Northern Cape (71.6%). The figures for no access are higher than the ND (1.9%) but lower than the Northern Cape (4%). Based on the 2016 Community Survey most of the households in the KH (69.7%) have access to flush toilet facilities, with only 2.7% reporting having no access to toilet facilities.

REFUSE COLLECTION

Based on the information from the 2016 Community Survey, 67.9% of households have their refuse collected by a local authority of private company on a regular basis, while 30% rely on their own waste disposal dump. The high number of households that dispose of their waste at their own dump reflects the rural nature of the KH. The majority of these households are likely to be associated with farms in the KH. Based on the 2016 Community Survey most of the households in the LM (67.9%) have their waste collected on a regular basis by a service provider. This percentage is likely to represent the majority of households located in the three towns in the KH

In summary, based on the 2016 Community Survey the service levels in the KH can be describe as relatively high. In this regard 74.3% of households are supplied with electricity, while 20.3% have access to solar power, 99.4% have access to potable water, with 69% being supplied by a regional or local service provider, 69.7% have access to flush toilet facilities, with only 2.7% reporting having no access to toilet facilities, and 67.9% have their waste collected on a regular basis by a service provider. The percentages should also be considered within in the context of the rural nature of large parts of the KH. In this regard the service levels in the three towns in the KH are likely to be higher than for the entire KH.

EDUCATION AND HEALTH CARE FACILITIES

EDUCATION FACILITIES

In terms of school facilities, each of the three towns in the KH serviced by a primary and a high school. The high school in Sutherland was damaged by a fire in 2018. The Northern Cape Provincial Health Department Annual Report (2018/19) notes that the ND, which includes the KH, is one of the largest district municipalities in the Northern Cape but at the same time is home to the lowest population. Most schools in this ND are located in remote areas and a large number of them have infrastructure assets which are under-utilised. The ND also has the largest number of school hostels in the Province, due to its geographical size.

There are no Further Education and Training (FET) colleges in Sutherland with the closest one is located in Worcester, which is located in the Breede Valley Municipality in the Western Cape. There is also a training college in Beaufort West, which is located in the Central Karoo District Municipality.

HEALTH CARE FACILITIES

Access to healthcare services is a basic human right and one that is directly affected by the number and spread of facilities within their geographical area. The provision of health care and the associated services is a provincial function provided by the Western Cape Department of Health. The IDP notes that the services provided in the KH are not satisfactory due to shortage of doctors, ambulances as well as inferior conditions of the road infrastructure between the towns. There are 3 clinics in the municipal area, one in each of the three towns, namely Williston, Fraserburg and Sutherland. Due to the distance rural nature of the area and the distances involved, rural communities have requested mobile clinics. There is currently no resident doctor in Sutherland. There are two doctors at the clinic in Calvinia (160 km). Most residents that require a doctor travel to the hospital in Worcester.

6.2.2 ECONOMIC OVERVIEW

The following is extracted from the Social Impact Assessment compiled by Tony Barbour and included as ***Appendix F5****.*

Economic activity in the KH plays a key role in terms of creating employment opportunities and addressing poverty and human development. The ability of households to pay for services such as water, electricity, sanitation, and refuse removal is dependent upon the ability to generate income from economic activities. A slowdown or deterioration in economic activities typically results in job losses and the inability of households to pay for services, which in turn impacts on municipal revenues and the ability to provide and maintain services and municipal infrastructure.

ECONOMIC SECTORS

In terms of key sectors, the local economy in the KH was dominated by the agriculture, forestry and fishing which contributed 34% to Gross Value Added (GVA) in 2017, followed by Community services (21%), trade (17%) and transport (12%). The sectors that contributed the least were the mining (0%), electricity (1%) and manufacturing (1%).

The Gross Domestic Product (GDP) growth in KH has been fairly consistent over the years since 1996 till 2014. The rate ranges from nearly 2, 2% in 2005 to 0.02% in 1998. The periods when droughts or other factors have played a part are reflected by periodic declines in 1998, 2002, 2006, 2015. These effects are due to the dominant role played by the agriculture and community services sector. On average the growth over the period was 0,9% which shows the consistent contribution by the agriculture sector over this time period. The steepest decline was experienced during 2005 and 2015 during drought years. The local economy, like the national economy, will also have been negatively impacted by the COVID-19 pandemic and associated lockdowns during 2020 extending into 2021.

EMPLOYMENT

In terms of employment, the agriculture sector was the most important sector in 2015, making up 33% of all jobs, followed community services (32%), trade (14%), households (11%), and finance (6%). The COVID-19 pandemic is likely to have resulted in job losses during 2020, extending into 2021. The reliance of the KH on the agriculture sector also makes the KH vulnerable to droughts and fluctuations

in commodity prices. Added to this the community services sector which accounts for 32% of all jobs is associated with reliance on municipal and government aid and functions.

6.2.3 HERITAGE

The following is extracted from the Heritage Impact Assessment compiled by ACO Associates and included as ***Appendix F3****.*

ARCHAEOLOGY

The two original Maralla WEF OHL routes, of which one was subsequently authorised, were not field tested and Webley and Halkett's (2017a) assumptions in the HIA about the likely archaeology of the area were based on the field assessments undertaken for the Esizayo WEF and the Maralla East and West WEFs (Webley and Halkett 2017b, 2017c), for the Sutherland WEF (Halkett & Webley 2011) and for the Hidden Valley (now Soetwater) WEF, immediately south of the Maralla WEFs (Booth (2012).

Generally these studies found that there is very little evidence for ESA or MSA material in the area. Scatters of LSA stone artefacts do occur and are often found on the talus slopes, below shelters some of which contain rock art. They are of medium significance.

Three rock art sites were reported from the Maralla WEF study area and these sites are of high significance.

A few "pastoralist settlements" were identified along dry river beds in the bottom of valleys and contain LSA artefacts, ceramics and grindstones. They are of medium significance. There are, potentially, graves/cairns within the study area and these are of high significance. There are numerous roughly-packed, circular enclosures of dry stone walling, which may represent both pre-colonial and colonial era stone kraals, distributed along the lower slopes of small koppies, and close to streams or fountains across the study area. They are of low to medium significance. Booth (2012) reports examples of stone walling in the Hidden Valley WEF.

The field surveys referred to above identified a handful of archaeological stone scatters and isolated artefacts within the Maralla West WEF in the vicinity of the original OHL options where they converge on the onsite WEF substation. The stone scatters were graded as being of medium significance (3B) while the isolated artefacts were not deemed to be conservation-worthy (NCW) (Halkett & Webley 2011; Webley & Halkett 2017c).

The closest of these sites (H021) is approximately 180 m from the proposed alignment of the current, preferred landowner route options and none of the known heritage resources will be directly affected by any of the proposed route alignments.

The fieldwork conducted by ACO Associates in August 2021 identified very little archaeological material along the portions of the OHL alignment Options 1(A), (B) and 2(A) that were accessed. This material was graded as NCW.

One site of note was a widespread scatter of LSA lithics eroding out of thin coversand on a flat, outcropping rocky platform (J052 & J053) adjacent to the small stream valley (**Figure 6-23**). The lithics include a number of formal tools. This, and the relative scarcity of LSA material in this area adds to the significance of the site which was given a grading of IIIB. This site is directly on the Option 2(A) OHL alignment, but Option 4 and the Option A Line and Option B Line routes both avoid it.

Figure 6-23: View across site of LSA scatter (J052 & J053) towards the south. OHL Option 2(A), Option 4 and the Option A Line and Option B Lines run towards and converge the centre of the hills in the distance (Photo: J Gribble).

HISTORICAL BUILT ENVIRONMENT

Schoeman (1986) has described the early colonial era settlement of the Roggeveld and Sutherland area which commenced around 1750. The first recorded loan farms in the Roggeveld date to 1743, and by 1750 there were 31 registrations (Penn 2005).

The early farmers found the escarpment, which enjoys the highest rainfall, particularly suitable for small stock farming during the summer months but they moved down into the valleys and plains of the Karoo to escape the extreme winters. Each Trekboer usually had in addition to a loan farm on the plateaux, a farm in the Karoo known as a legplaats or leenplaas (outpost or loan farm).

Initially, the population of the area remained small, because many of the early loan farms were merely "stock posts" and the owners lived elsewhere. Drought, poor grazing and attacks by the San caused many farms to be abandoned. According to Penn (2005), in the 18th century there were numerous independent Khoekhoen kraals located amongst the Trekboer farms in the Roggeveld.

Resistance to the Trekboers in the Roggeveld came initially from the San who resisted fiercely throughout the great Karoo, at times beating back the vanguard of Trekboer farmers. In 1754, attacks from the Khoisan are reported to have increased and flocks of sheep and herds of cattle belonging to the Trekboers were driven out of the area. This increased to the extent that it is described by Schoeman (1986) as a type of guerrilla warfare. Livestock was stolen, Khoisan herders and slaves killed, and Trekboer farms attacked. The colonists fought back by establishing the Kommando system.

There was apparently a massacre of 186 San in the Roggeveld in 1765 and both Penn (2005) and Schoeman (1986) refer to mass grave on the farm Gunsfontein (to the west of Schietfontein (Scholtzenhof) - and now part of a private nature reserve), possibly dating to the rebellion of the 1770's. The Khoisan were gradually driven from the Roggeveld northward to the extent that by 1809 there is reported to have been only one settled "Bushmen" kraal left in the area.

Schoeman (1986) notes that during the early years of settlement in the Roggeveld, many of the Trekboers lived in grass huts or *matjieshuise (*mat covered houses), and in tents and some travellers found farmers

living in such dwellings as late as 1839. Attempts at constructing more permanent structures were inhibited by the lack of suitable wood for roofs.

The 2021 survey conducted by ACO Associates in August 2021 did, however, identify a number of stone-built structures of various forms. Two small kraals with associated structures (walls and cairns) were recorded at J0461-J050 (**Figure 6-24**) approximately 35 m east of OHL Option 2(A).

Figure 6-24: Views of stone kraal J047 on OHLOption 2(A) looking south (left) and north (right). Note the proximity of infrastructure for the Karusa WEF (Photo: J Gribble).

A substantial stone-built farm werf complex was recorded about 650 m south of OHL Option 1(B), comprising a ruined house and barn, a large kraal and two smaller kraals, a possible sheep dip and a stone lined well. Associated with this site was a rich kitchen midden containing mid-19th century artefacts, but also LSA lithics and some fragments of Khoi pottery.

All of the historical structures recorded by ACO Associates in 2021 were graded IIIB (**Figure 6-25**).

Figure 6-25: Stone built farm complex south of south of OHL Option 1(B). Ruined house, kraal and barn (top left); barn (top right); stone lined well (middle left); selection of artefacts from the midden around the house (middle right); cobbled kraal (bottom left); and sheep dip (bottom right) (Photos: J Gribble / G Euston-Brown).

CEMETERIES AND GRAVES

The 2016 survey for the Maralla West WEF identified a stone cairn on the site of the onsite substation which could be a grave (D008), although Webley & Halkett (2017c) believed this was unlikely.

No cemeteries or graves were found on the proposed OHPL route during the 2021 ACO survey.

6.2.4 PALAEONTOLOGY

The following is extracted from the Palaeontolgy Impact Assessment compiled by Natura Viva and included as ***Appendix F4****.*

The Maralla West and Maralla East WEF 132 kV grid connection project area is situated in semi-arid, hilly to mountainous terrain of the Klein-Roggeveldberge region in the south-western part of the Great Karoo. It runs on both sides of the unpaved road between the R354 and the Komsberg Pass and falls entirely within the Northern Cape Province. The area is traversed by several WNW-ESE trending uplands

(*e.g.* Smoushoogte – Perdeplaas se Berg, Graskop) and is drained by SE-flowing tributaries of the Buffelsrivier such as the Oshoke, Komsbergrivier and Meintjiesplaasrivier as well as a number of smaller, unnamed drainage courses. The level of bedrock exposure in the study region is highly constrained by extensive superficial deposits, especially in areas of low relief, as well as pervasive Karoo *bossieveld* vegetation (Central Mountain Shale Renosterveld, Koedoesberg – Moordenaars Karoo, Tanqua Wash Riviere).

The Great Karoo is world-famous for its rich record of terrestrial vertebrates and other fossils from the Permian, Triassic and Early Jurassic Periods in Gondwana (Rubidge 1995, MacRae 1999, Rubidge 2005, McCarthy & Rubidge 2005, Smith *et al.* 2012). The fossil record of the Klein-Roggeveldberge region is very poorly known by Karoo standards but our knowledge has been improved in recent years through several palaeontological impact assessments in the area.

Some of the principal fossil sites recorded during recent field studies for various WEF projects in the vicinity of the Maralla 132 kV grid connection corridors under consideration, together with additional new sites recorded during the recent 3-day palaeontological survey, are indicated on the satellite image of the project area. Sparse, newly recorded fossil material from the 2021 site visit belongs to the same taxa as previously reported in the area. The fossil database has been abstracted from the relevant PIA reports by the author where the fossil material is illustrated and briefly described, while detailed locality data is tabulated in the report Appendices. Please note that these are *not* distribution maps of *all* fossil occurrences within the project area – most of which are not exposed at the surface – but only a representative sample of the better-preserved fossils encountered during the field assessments. Further, unrecorded fossil occurrences are to be expected elsewhere at the ground surface or in the subsurface (the majority), where they may be impacted during the construction phase of the powerline. Areas on the map that do not contain known fossil sites are therefore not necessarily fossil-free or paleontologically-insensitive. The great majority of the fossils observed are of widely occurring forms and are not considered to be of exceptional scientific or conservation value.

The Abrahamskraal Formation beds represented within the present powerline and substation study area broadly young towards the northeast and are *provisionally* assigned to the Leuuvlei and Koornplaats Members of Middle Permian age. These successions are characterised by vertebrate and other fossils of the *Tapinocephalus* Assemblage Zone (Loock *et al.* 2009, Smith *et al.* 2012, Day & Rubidge 2014, Day & Rubidge 2020) (Fig. 33). Sparse fossil remains recorded from the Abrahamskraal Formation in the vicinity of the Maralla 132 kV powerline corridors are dominated by low-diversity trace fossil assemblages (invertebrate burrows such as *Scoyenia*, casts of reedy plant stems) and plant compressions, casts and moulds that are probably attributable to horsetail ferns (sphenophytes). There are also a few recorded occurrences of petrified wood (mainly poorly preserved, perhaps due to partial microbial decomposition before silicification) that are found as float blocks or associated with channel sandstone basal breccio-conglomerates, particularly within the (inferred) Koornplaats Member. Vertebrate fossils are very rare, comprising several, often equivocal tetrapod and lungfish burrow casts (*Dipnoichnus*) as well as occasional fragmentary remains of unidentified tetrapod bones (probable amphibians). The fairly common horizons of horsetail fern debris, *Scoyenia* invertebrate burrows associated with wave-rippled sandstone bed tops as well as occasional lungfish burrow casts suggests that lacustrine and swampy wetland settings were well represented on the floodplain or in abandoned river channels in the Middle Permian Karoo Basin.

No fossil remains are recorded from the pervasive Late Caenozoic superficial sediments mantling the majority of the Lower Beaufort Group outcrop area within the broader study region, including the Maralla West, Maralla East, Soetwater and Karusa WEF project areas. It is concluded that the overall palaeontological sensitivity of the 132 kV grid connection corridors for the Maralla WEFs is low.

It is noted that the great majority of the fossils observed so far within the Maralla grid connection project area are of widely-occurring forms that are not considered to be of exceptional scientific or conservation value. None of the known fossil sites recorded during the 2021 and previous palaeontological site visits

lies within the footprints (or buffer zones) of the 132 kV powerline route options under consideration. Direct impacts on these known fossil sites are therefore not anticipated and no mitigation is recommended in regard to them.

6.2.5 LAND USE AND VISUAL

The following is extracted from the Visual Impact Assessment compiled by Lourens Du Plessis and included as **Appendix F7**.

LAND USE AND SETTLEMENT PATTERNS

The majority of the study area is sparsely populated with a population density of less than 1 person per km^2. The study area consists of a landscape that can be described as remote due to its considerable distance from any major metropolitan centres or populated areas. The scarcity of water and other natural resources has influenced settlement within this region, keeping numbers low, and distribution limited to the availability of water. Settlements, where they occur, are usually rural homesteads and farmsteads.

Very few homesteads and settlements are present within the study area. These include:

- Damslaagte
- De Hoop
- De Plaat
- Oranjefontein
- De Kom
- Welgemoed

It is uncertain whether all of these farmsteads are inhabited or not. It stands to reason that farmsteads that are not currently inhabited will not be visually impacted upon at present. These farmsteads do, however retain the potential to be affected visually should they ever become inhabited again in the future. For this reason, the author of this document operates under the assumption that they are all inhabited.

The predominant land use in the area is stock farming (predominantly sheep, game or goat farming). Since rainfall is low and water is scarce, crop farming accounts for only a small portion of the land use and is largely confined to the more fertile valleys. Due to the low carrying capacity, farms are large and usually at least about 5km apart.

The R354 arterial road provides motorised access to the region from the N1 national road near Matjiesfontein, the quaint historical town closest to the site (approximately 36km by road to the Komsberg/Kareedoringkraal secondary road). This road (the R354) is a local tourism route ultimately leading to Sutherland, the home of the Southern African Large Telescope (SALT). This town and Matjiesfontein are considered to be local tourist attractions/destinations within the region.

Besides the two towns mentioned above, there are no other identified tourist attractions of designated protected areas within the study area.

In spite of the rural and natural character of the study area, there are a number existing overhead power lines in the study area. These include:

- Droërivier-Kappa (Komsberg) 1 x 400kV
- Droërivier-Kappa (Komsberg) 2 x 400kV
- Gamma-Kappa 1 x 765kV
- Laingsburg-Roggeveld 1 x 66kV

The former three power lines cross the study area to the south-east and the latter to the north-east (at the Roggeveld Substation).

There are also a number of future power lines and substations that have been authorised and surveyed, but not yet constructed. Of relevance to this study are the Heuwels-Hidden Valley and Hidden Valley-Komsberg power lines and substations.

Figure 6-26 illustrates the land cover and broad land use patterns for the study area.

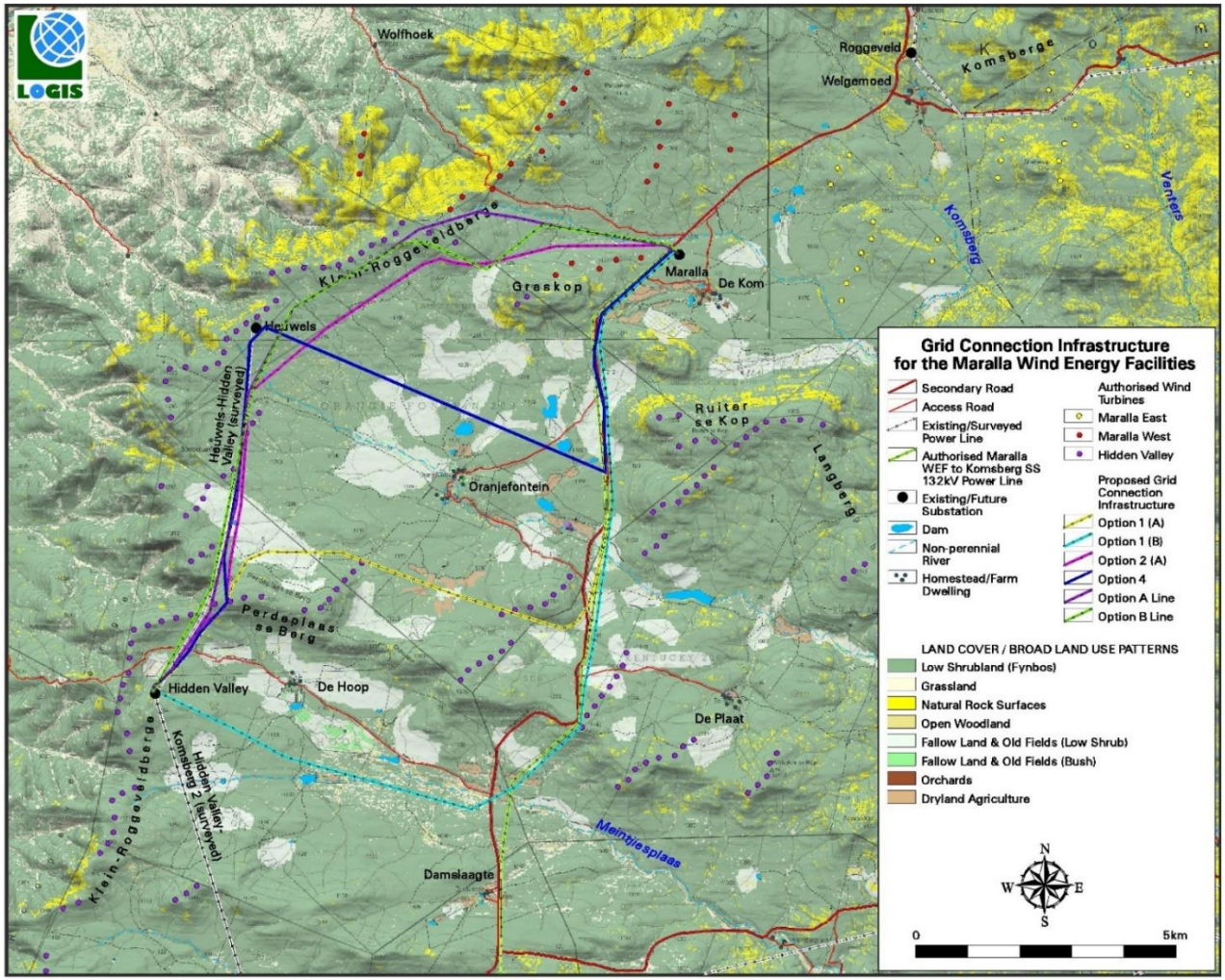


Figure 6-26: Land cover and broad land use patterns.

Further to this, the proposed Maralla WEF grid connection infrastructure is located within the Komsberg Renewable Energy Development Zone (REDZ) and Central Strategic Transmission Corridor. Applications that have been approved (additional to the Maralla East and West WEFs) in the study area include:

- Rietrug WEF
- Hidden Valley WEF (Karusa, Great Karoo & Soetwater)
- Roggeveld WEF
- Gunstfontein WEF
- Komsberg WEF
- Esizayo WEF
- Karreebosch WEF
- Sutherland WEF

Figure 6-27 further indicates the status of Renewable Energy Environmental Applications (REEA) within the Komsberg REDZ (dated 2021 1st quarter). It is clear that the region will come under increasing development pressure, and visual intrusion from WEF infrastructure, should all (or most) of the proposed WEFs be constructed.

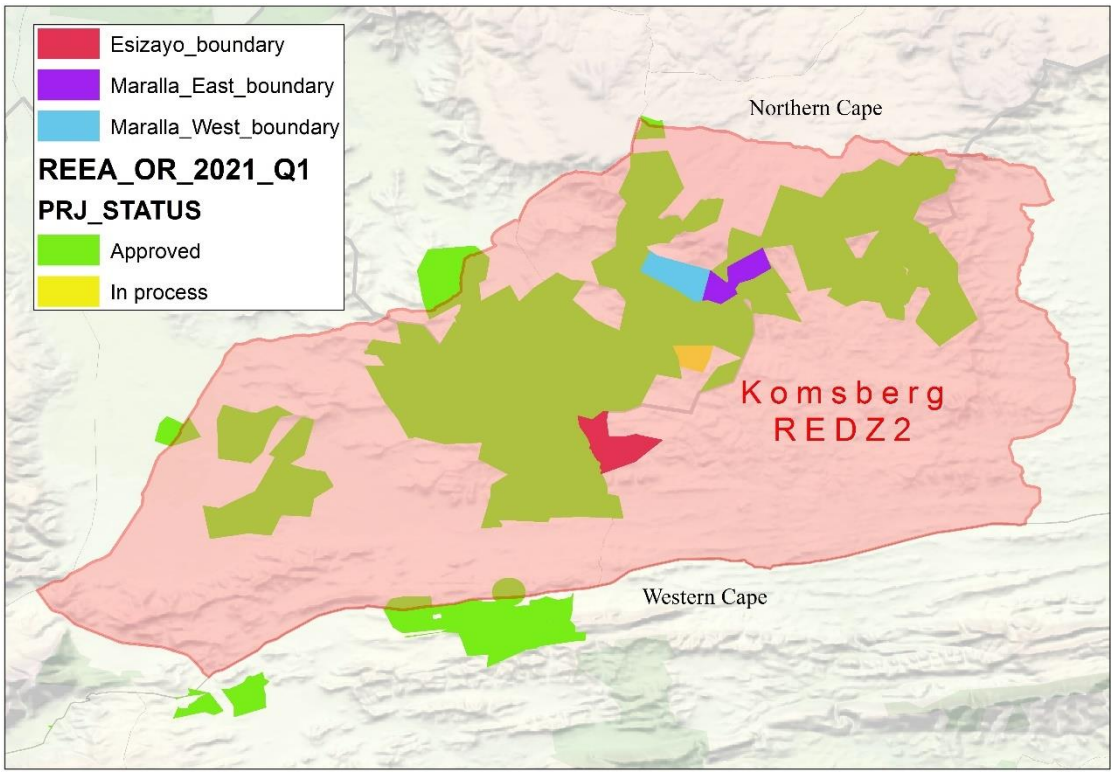


Figure 6-27: Regional locality of the Maralla WEFs in relation to the Komsberg Renewable Energy Development Zone (REDZ).

POTENTIAL VISUAL EXPOSURE

The potential visual exposure (visibility) of the grid connection infrastructure is shown on **Figure 6-28** to **Figure 6-33**. The visibility analyses were undertaken from the proposed Maralla WEF collector substation, along each of the power line alternatives (up to the Hidden Valley substation site) at an offset of 36m above average ground level (i.e. the approximate height of the grid connection infrastructure), for a distance of 3km from the infrastructure. The viewshed analyses were restricted to a 3km radius due to the fact that visibility beyond this distance is expected to be negligible/highly unlikely for the relatively constrained vertical dimensions of this type of power line (i.e. a 132kV power line).

It is expected that the grid connection infrastructure may theoretically be visible within their respective 3km visual corridors and potentially highly visible within a 500 – 1,500m radius of the structures due to the generally flat terrain it traverses. Beyond 1,500m the visibility becomes more scattered due to the undulating nature of the topography as well as the presence of hills and ridges. The grid connection structures are unlikely to be visible beyond a 3km radius of the structures.

Although the majority of the exposed areas fall within vacant open space, generally devoid of observers or potential sensitive visual receptors, specific receptors sites are discussed per alternative below.

Alternative 1A (17.5km)

This alternative is expected to be highly visible from the Komsberg/-Kareedoringkraal secondary road for 7.5km. It may be visible from the De Kom homestead from a distance of 1km and from the Oranjefontein homestead from approximately 2km. South of the Perdekraal se Berg and closer to the Hidden Valley substation it may be visible from the De Hoop homestead.

Alternative 1B (19km)

This alternative is expected to be highly visible from the Komsberg/-Kareedoringkraal secondary road for approximately 10km. It may be visible from the De Kom homestead from a distance of 1km and from the De Plaat homestead from almost 3km. South of the Perdekraal se Berg ridge it may be visible from the Damslaagte homestead from just over 1.5km and the De Hoop homestead from approximately 1.3km.

Alternative 2A (15.4km)

Alternative 2A may briefly be visible from the Komsberg/Kareedoringkraal secondary road where the line crosses the road near the Maralla WEF substation. It may similarly be visible from the De Kom homestead at a distance of 1km but would unlikely be visible from any additional dwellings until it traverses over Perdekraal se Berg, where it may be visible from the De Hoop homestead from almost 2km.

Alternative 4 (20km)

This alternative is expected to be highly visible from the Komsberg/-Kareedoringkraal secondary road for 5km. It may be visible from the De Kom homestead from a distance of 1km and from the Oranjefontein homestead from approximately 1km. South of the Perdekraal se Berg and closer to the Hidden Valley substation it may be visible from the De Hoop homestead.

Alternative Option A (16km)

Option A may briefly be visible from the Komsberg/Kareedoringkraal secondary road where the line crosses the road near the Maralla WEF substation. It may similarly be visible from the De Kom homestead at a distance of 1km, but would unlikely be visible from any additional dwellings until it traverses over Perdekraal se Berg, where it may be visible from the De Hoop homestead from almost 2km

Alternative Option B (16km)

Option B may briefly be visible from the Komsberg/Kareedoringkraal secondary road where the line crosses the road near the Maralla WEF substation. It may similarly be visible from the De Kom homestead at a distance of 1km, but would unlikely be visible from any additional dwellings until it traverses over Perdekraal se Berg, where it may be visible from the De Hoop homestead from almost 2km.

Conclusion

In general terms it is envisaged that the grid connection infrastructure, where visible from shorter distances (e.g. less than 1.5km), and where sensitive visual receptors may find themselves within this zone, may constitute a high visual prominence, potentially resulting in a visual impact. The incidence rate of sensitive visual receptors is however expected to be quite low, due to the generally remote location of the proposed infrastructure and the low number of potential observers.

Additional to the statement above, all of the receptor sites (homesteads) mentioned above is associated with either the Hidden Valley or Maralla WEFs; potentially negating the receptor's sensitivity to the grid line infrastructure (i.e. they are assumed to be supportive of the projects).

The **Alternatives 2A, Option A** and **Option B** alignments have the greatest opportunity to remove the potential visual exposure away from the Komsberg/Kareedoringkraal secondary road, as well as to consolidate the linear infrastructure within the region e.g. it will traverse adjacent to the authorised (surveyed) Heuwels-Hidden Valley power line for 6km. Alternative 2A is the shortest alignment and is therefore the preferred alternative, although any of these three alternatives could be selected as preferred.

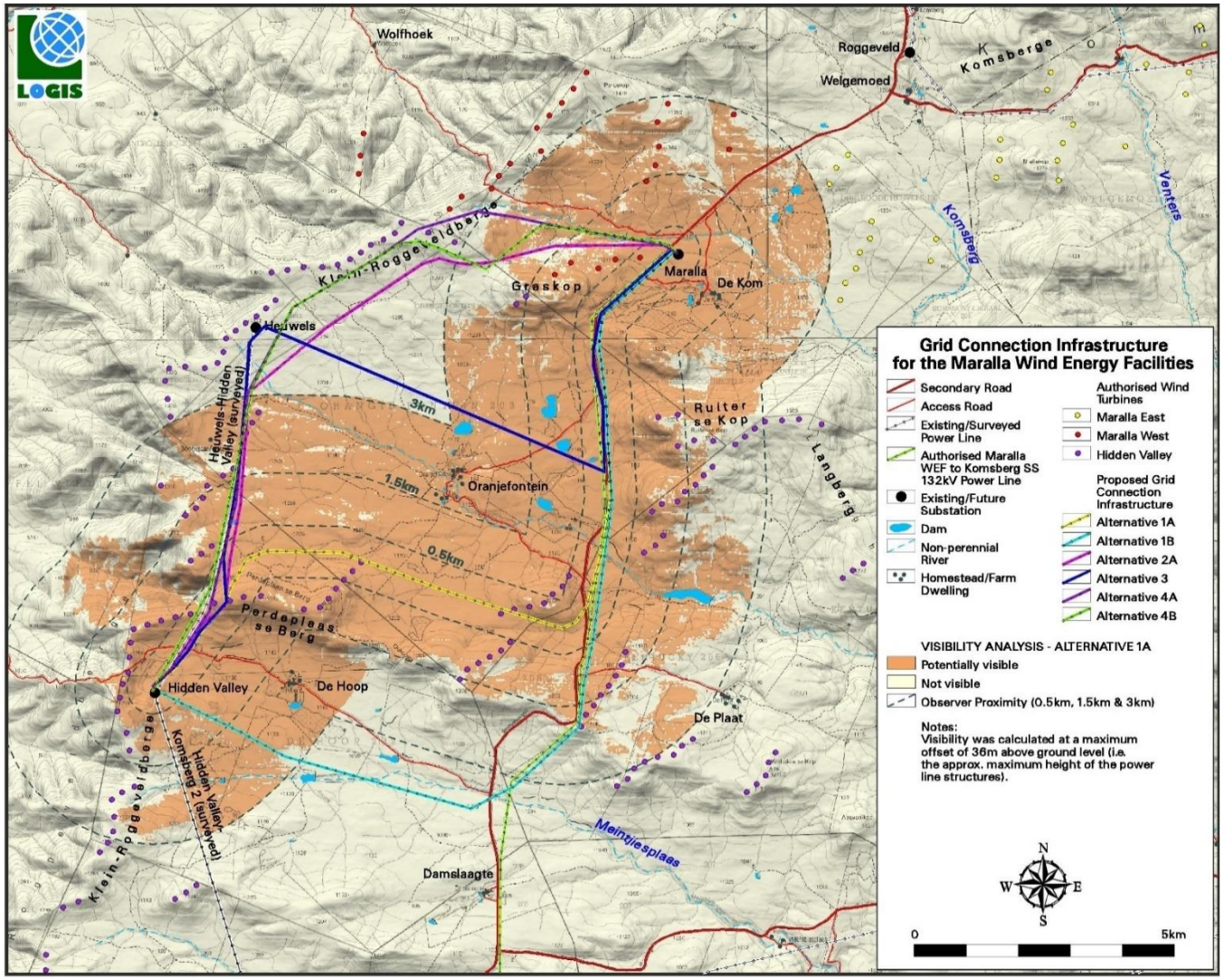


Figure 6-28: Viewshed analysis: Alternative 1A.

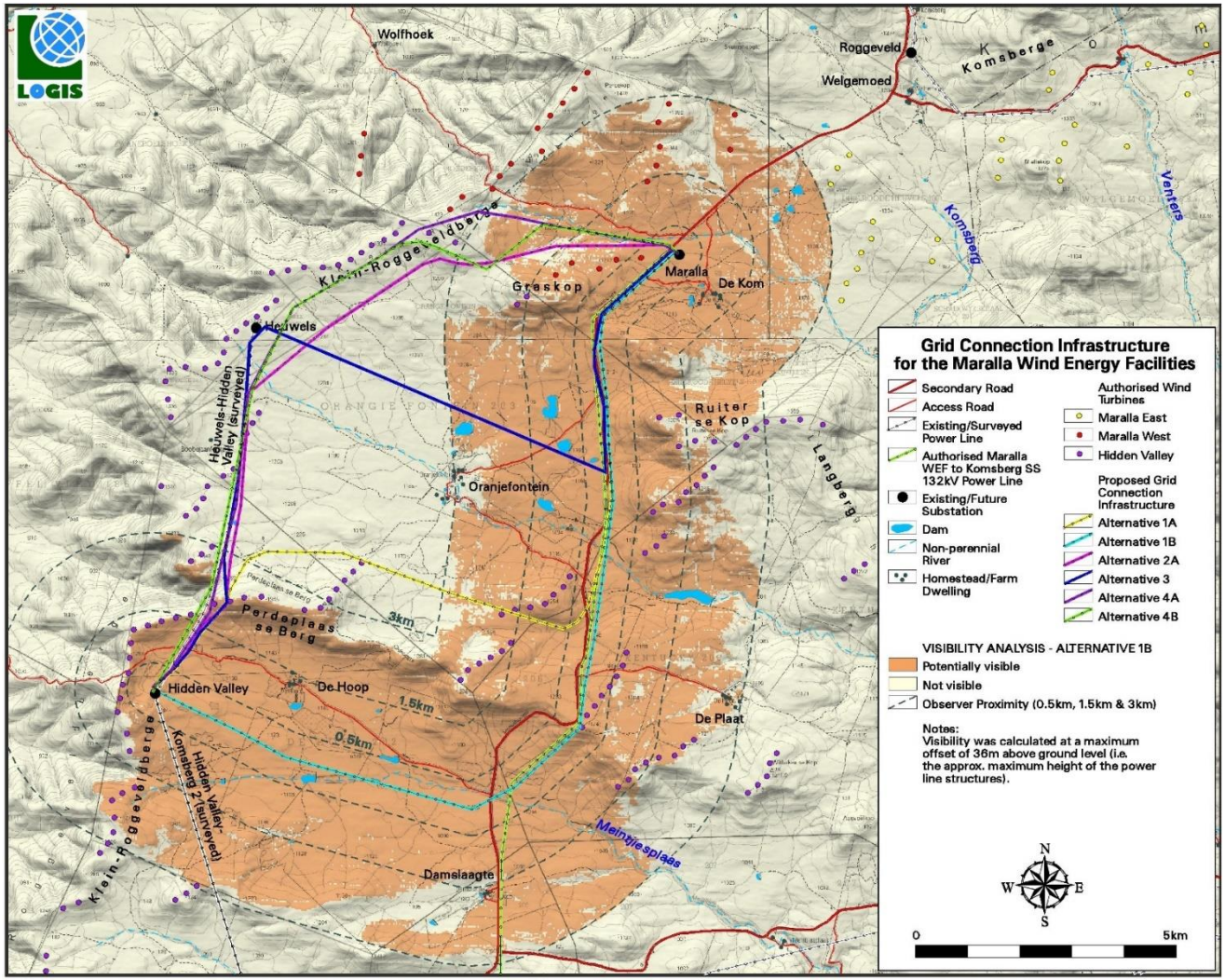


Figure 6-29: Viewshed analysis: Alternative 1B

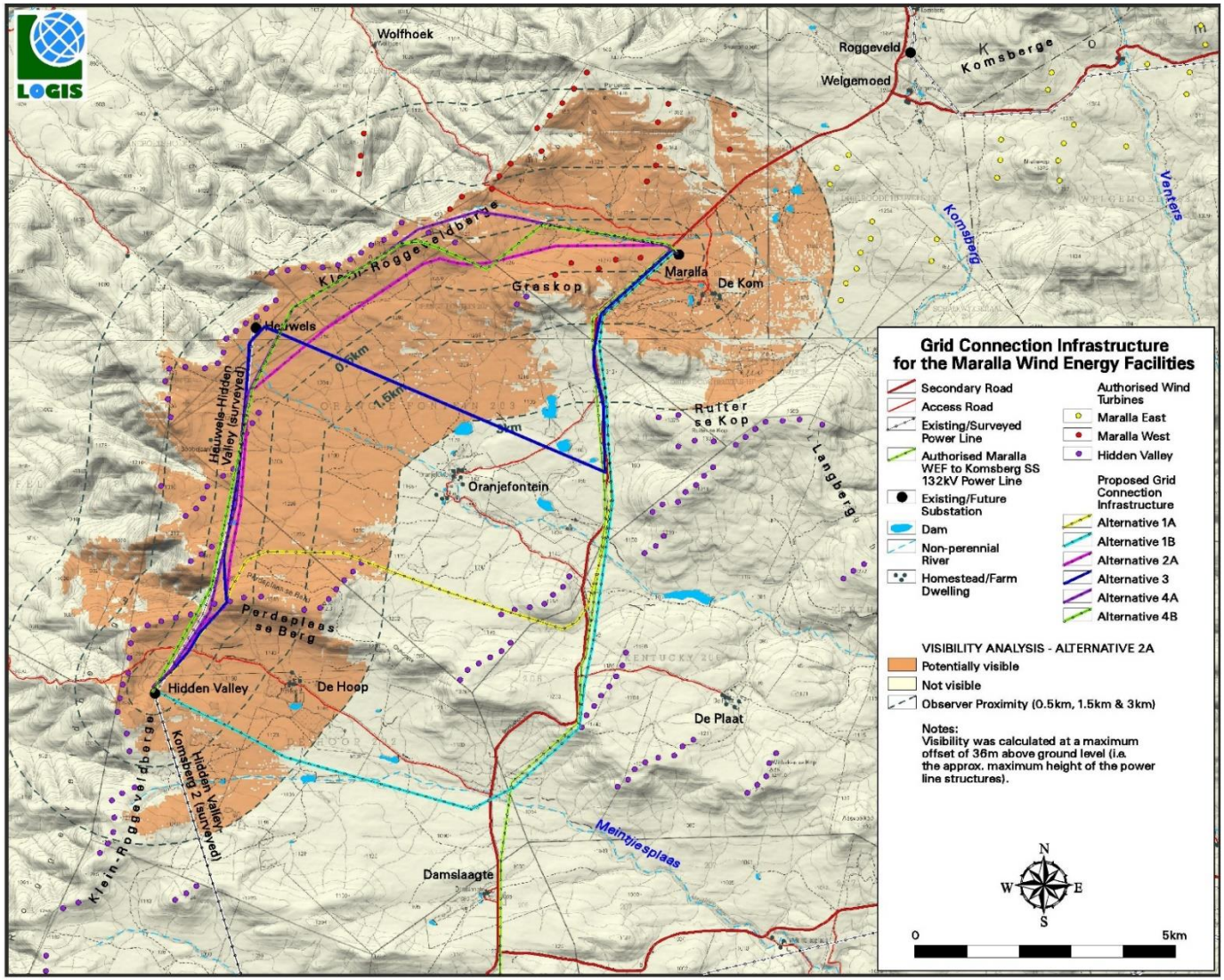


Figure 6-30: Viewshed analysis: Alternative 2A

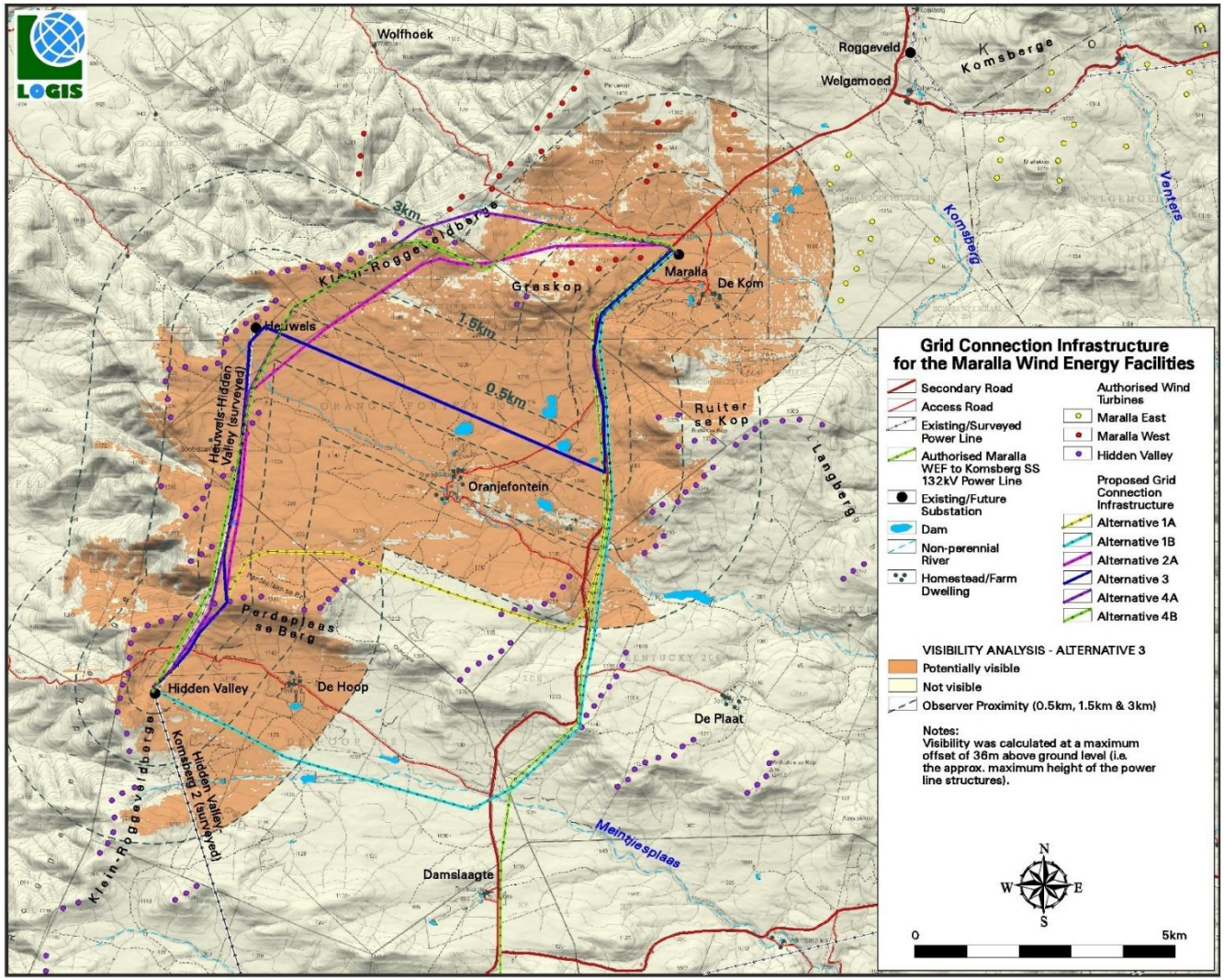


Figure 6-31: Viewshed analysis: Alternative 4

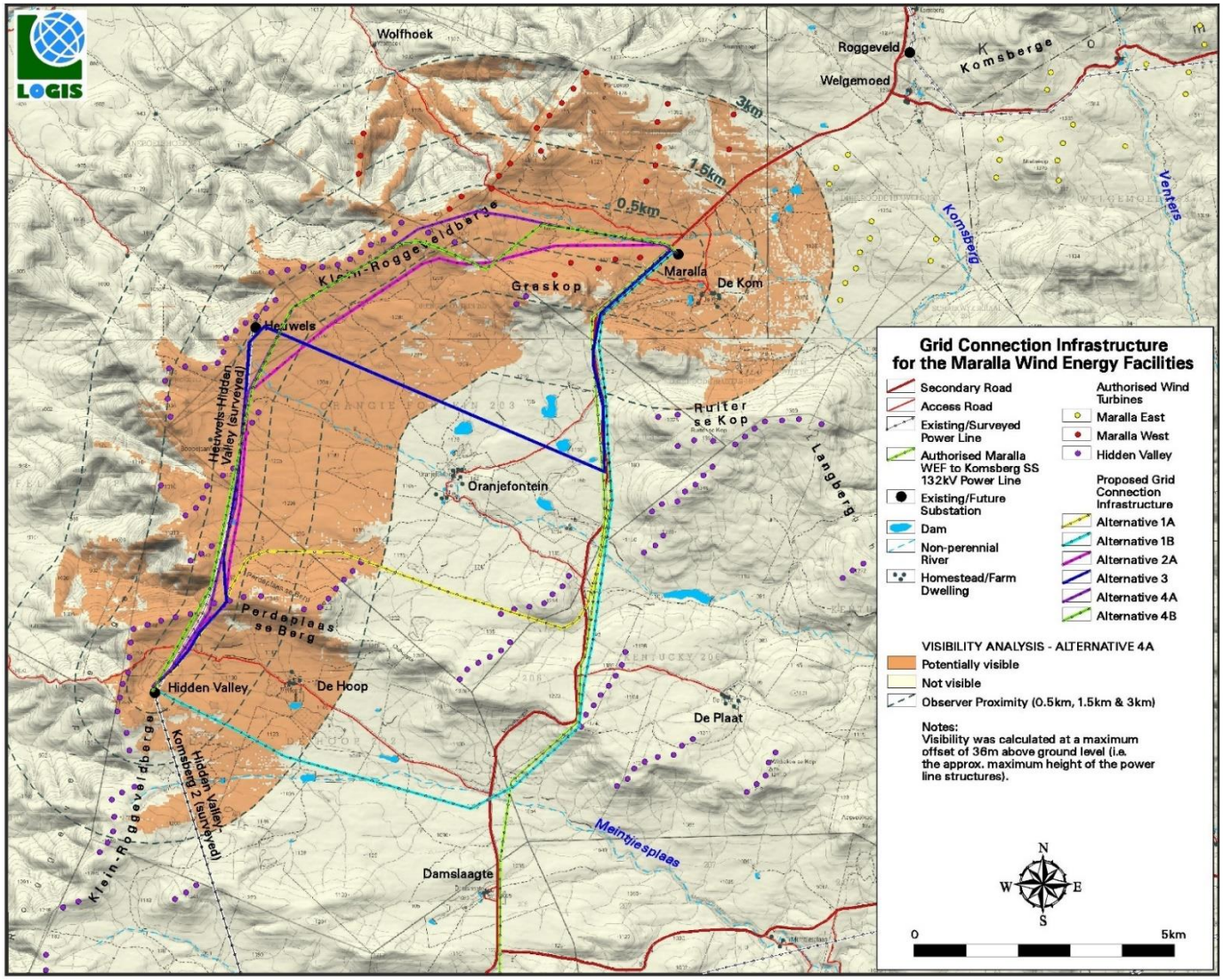


Figure 6-32: Viewshed analysis: Alternative Option A

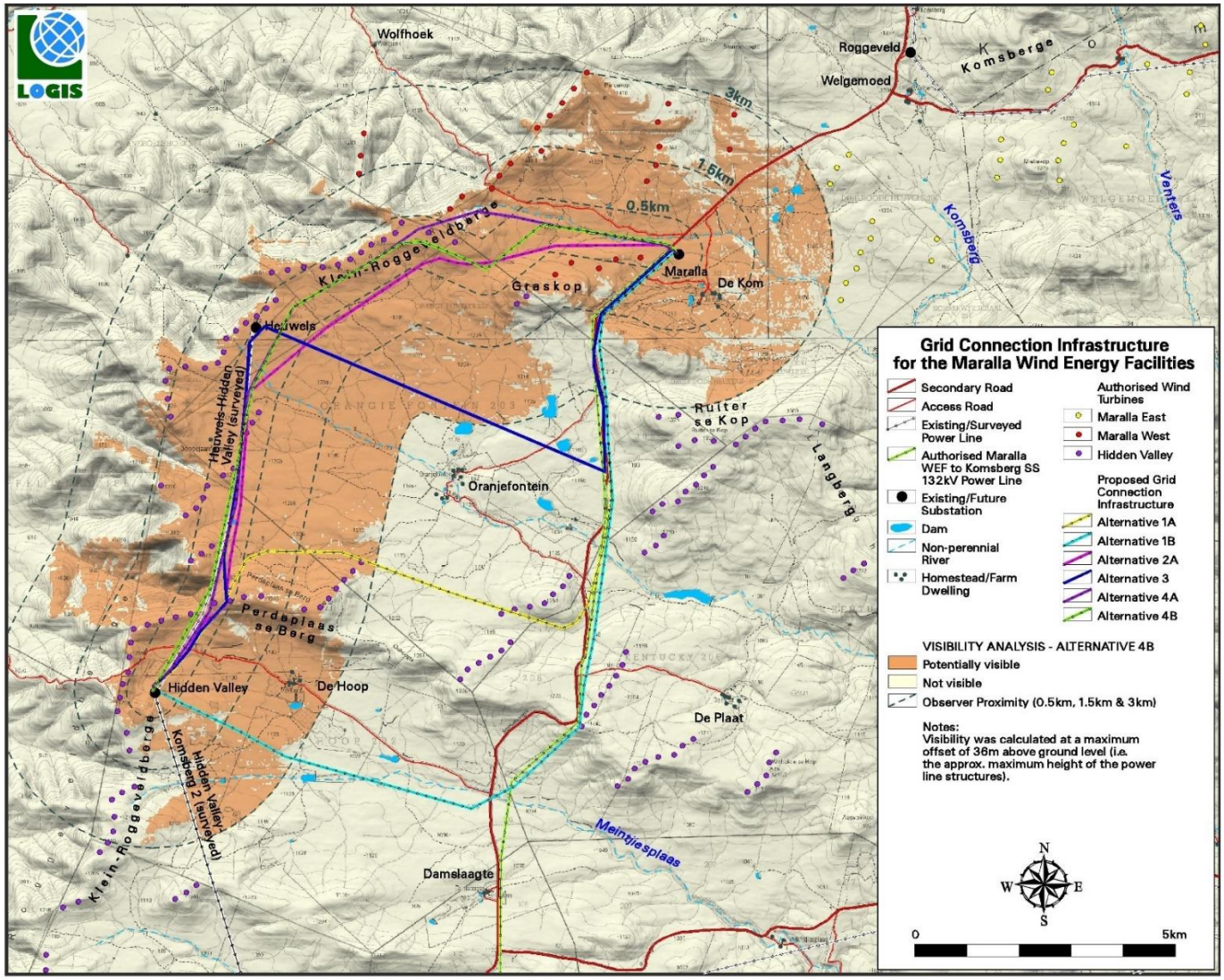


Figure 6-33: Viewshed analysis: Alternative Option B

VISUAL DISTANCE / OBSERVER PROXIMITY TO THE GRID CONNECTION INFRASTRUCTURE

The proximity radii are based on the anticipated visual experience of the observer over varying distances. The distances are adjusted upwards for larger grid connection infrastructure (e.g. 400kV) and downwards for smaller structures (e.g. 132kV) due to variations in height. This methodology was developed in the absence of any known and/or accepted standards for South African power line infrastructure.

The proximity radii (calculated from the grid connection infrastructure) are indicated on **Figure 6-34** , and include the following:

- 0 – 0.5km - Short distance view where the structures would dominate the frame of vision and constitute a very high visual prominence.
- 0.5 – 1.5km - Medium distance views where the structures would be easily and comfortably visible and constitute a high visual prominence.
- 1.5 - 3km - Medium to longer distance view where the structures would become part of the visual environment but would still be visible and recognisable. This zone constitutes a medium visual prominence.
- Greater than 3km - Long distance view where the structures may still be visible though not as easily recognisable. This zone constitutes a low visual prominence for the power lines.

The visual distance theory and the observer's proximity to the 132kV power line and substation extension are closely related, and especially relevant, when considered from areas with a higher viewer incidence and a potentially negative visual perception of the proposed infrastructure.

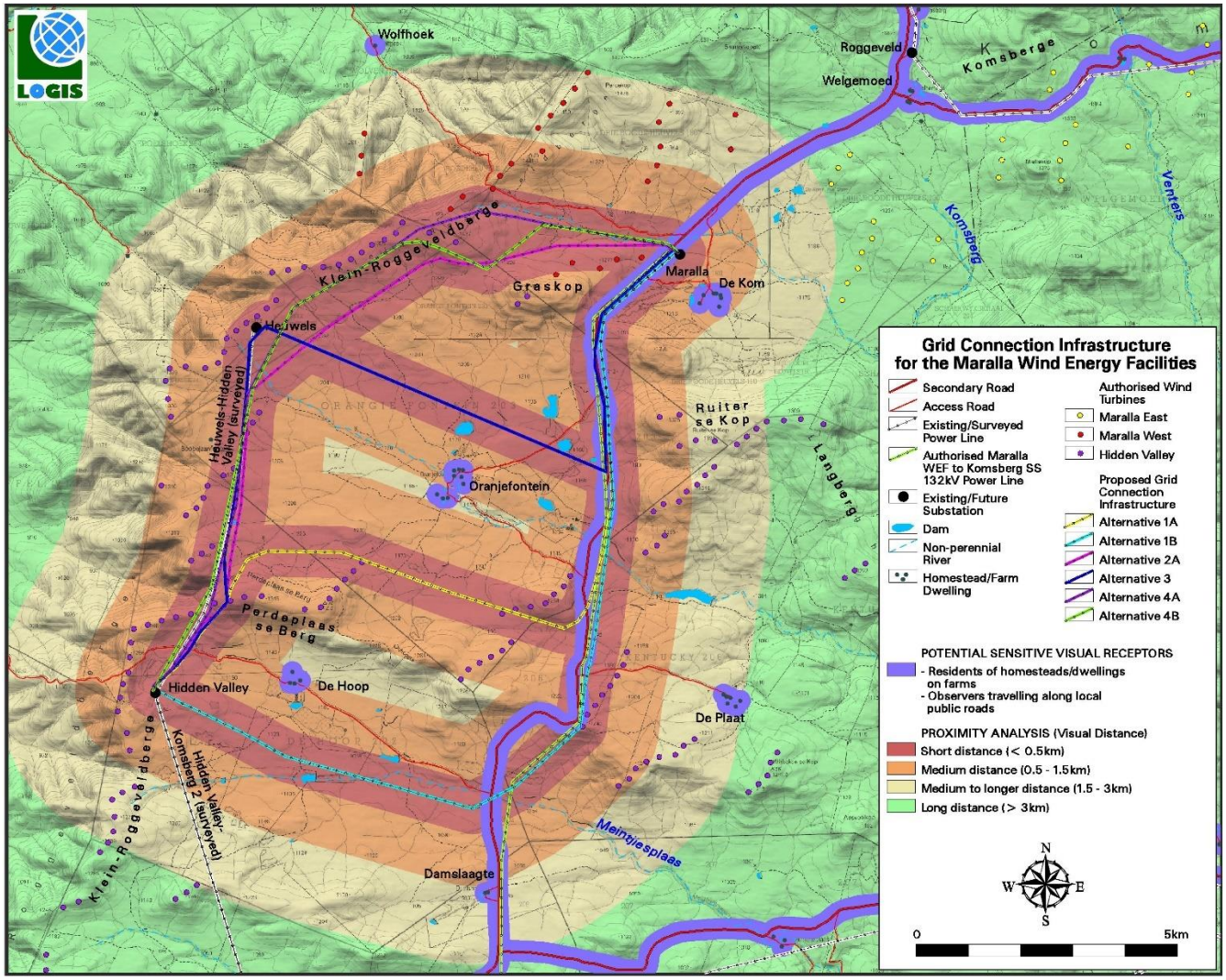


Figure 6-34: Proximity analysis and potential sensitive visual receptors.

VIEWER INCIDENCE / VIEWER PERCEPTION

The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers or if the visual perception of the structure is favourable to all the observers, there would be no visual impact.

It is necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed grid connection infrastructure. It would be impossible not to generalise the viewer incidence and sensitivity to some degree, as there are many variables when trying to determine the perception of the observer: regularity of sighting, cultural background, state of mind, purpose of sighting, etc. which would create a myriad of options.

The proposed project infrastructure will not be visible from main roads (i.e. the R354 arterial road). The only public road with a potentially higher viewer incidence is the Komsberg/Kareedoringkraal secondary road. Travellers using this road may be negatively impacted upon by visual exposure to the grid connection infrastructure.

Additional sensitive visual receptors are located at the farm residences (homesteads) throughout the study area. It is expected that the viewer's perception, unless the observer is associated with (or supportive of) the grid connection infrastructure, would generally be negative.

Due to the very remote location of the proposed power line and the ill populated nature of the receiving environment, there are only seven potential sensitive visual receptor sites located within the study area. These are the residents of, or visitors to:

- Damslaagte
- De Hoop
- De Plaat
- Oranjefontein
- De Kom
- Wolfhoek
- Welgemoed

The latter two homesteads are however beyond the zone of visual influence of the power line structures. It should also be noted that the rest of the dwellings are located on farms earmarked for the Maralla or Hidden Valley WEFs, potentially implying that they may be supportive of the infrastructure associated with these wind farms. Refer to **Figure 6-34**.

VISUAL ABSORPTION CAPACITY

The vegetation cover on the *plateau* is predominantly *Central Mountain Shale Renosterveld* and *Koedoesberge-Moordenaars Karoo*, with *Tanqua Escarpment Shrubland* along the western slopes of the Klein-Roggeveldberge. The land cover types are low shrubland (Fynbos) for most of the study area, with bare sand and rock surfaces in places.

Overall, the Visual Absorption Capacity (VAC) of the receiving environment is low by virtue of the limited height (or absence) of the vegetation, the relatively homogenous landform on the *plateau* and the overall low occurrence of buildings, structures and infrastructure. In addition, the scale and form of the proposed structures mean that it is unlikely that the environment will visually absorb them in terms of texture, colour, form and light/shade characteristics. Within this area the VAC of vegetation will not be taken into account, thus assuming a worst case scenario in the impact assessment.

Where homesteads and settlements occur, some more significant vegetation and trees may have been planted, which would contribute to the visual absorption capacity (i.e. shielding the observers from the infrastructure). As this is not a consistent occurrence, however, VAC will not be taken into account for any of the homesteads or settlements, thus assuming a worst case scenario in the impact assessment.

VISUAL IMPACT INDEX

The combined results of the visual exposure, viewer incidence/perception and visual distance of the proposed grid connection infrastructure culminate in a visual impact index. Here the weighted impact and the likely areas of impact have been indicated as a visual impact index. Values have been assigned

for each potential visual impact per data category and merged in order to calculate the visual impact index.

The criteria (previously discussed in this report) which inform the visual impact index are:

- Visibility or visual exposure of the structures
- Observer proximity or visual distance from the structures
- The presence of sensitive visual receptors
- The perceived negative perception or objections to the structures (if applicable)
- The visual absorption capacity of the vegetation cover or built structures (if applicable)

An area with short distance visual exposure to the proposed grid connection infrastructure, a high viewer incidence and a potentially negative perception would therefore have a higher value (greater impact) on the index. This helps in focussing the attention to the critical areas of potential impact and determining the potential magnitude of the visual impact.

The index indicates that potentially sensitive visual receptors within a 500m radius of the project infrastructure may experience a high visual impact. The magnitude of visual impact on sensitive visual receptors subsequently subsides with distance to; moderate within a 0.5 – 1.5km radius (where/if sensitive receptors are present) and low within a 1.5 – 3km radius (where/if sensitive receptors are present). Receptors beyond 3km are expected to have a very low or insignificant potential visual impact.

MAGNITUDE OF THE POTENTIAL VISUAL IMPACT

The visual impact index and potentially affected sensitive visual receptors are indicated on **Figure 6-35-Figure 6-40**. In general, there are only a few receptor sites within closer proximity (3km) to the proposed project infrastructure, namely:

- A section of the Komsberg/Kareedoringkraal secondary road
- Damslaagte
- De Hoop
- De Plaat
- Oranjefontein
- De Kom

The magnitude of the potential visual impact on sensitive receptors is discussed per alternative below.

Alternative 1A

The magnitude of visual impact on a 7.5km stretch of the Komsberg/-Kareedoringkraal secondary road may be high.

Potentially affected dwellings/homesteads include De Kom, where the magnitude of impact may be moderate, and Oranjefontein and De Hoop where the magnitude of impact may be low.

Alternative 1B

The magnitude of visual impact on a 10km stretch of the Komsberg/-Kareedoringkraal secondary road may be high.

Potentially affected dwellings/homesteads include De Kom and De Hoop, where the magnitude of impact may be moderate, and De Plaat and Damslaagte where the magnitude of impact may be low.

Alternative 2A

The magnitude of visual impact on a 1km stretch of the Komsberg/-Kareedoringkraal secondary road may be high.

Potentially affected dwellings/homesteads include De Kom, where the magnitude of impact may be moderate, and De Hoop where the magnitude of impact may be low.

Alternative 4

The magnitude of visual impact on a 5km stretch of the Komsberg/-Kareedoringkraal secondary road may be high.

Potentially affected dwellings/homesteads include De Kom, and Oranjefontein, where the magnitude of impact may be moderate, and De Hoop where the magnitude of impact may be low.

Alternative Option A

The magnitude of visual impact on a 1km stretch of the Komsberg/-Kareedoringkraal secondary road may be high.

Potentially affected dwellings/homesteads include De Kom, where the magnitude of impact may be moderate, and De Hoop where the magnitude of impact may be low.

Alternative Option B

The magnitude of visual impact on a 1km stretch of the Komsberg/-Kareedoringkraal secondary road may be high.

Potentially affected dwellings/homesteads include De Kom, where the magnitude of impact may be moderate, and De Hoop where the magnitude of impact may be low.

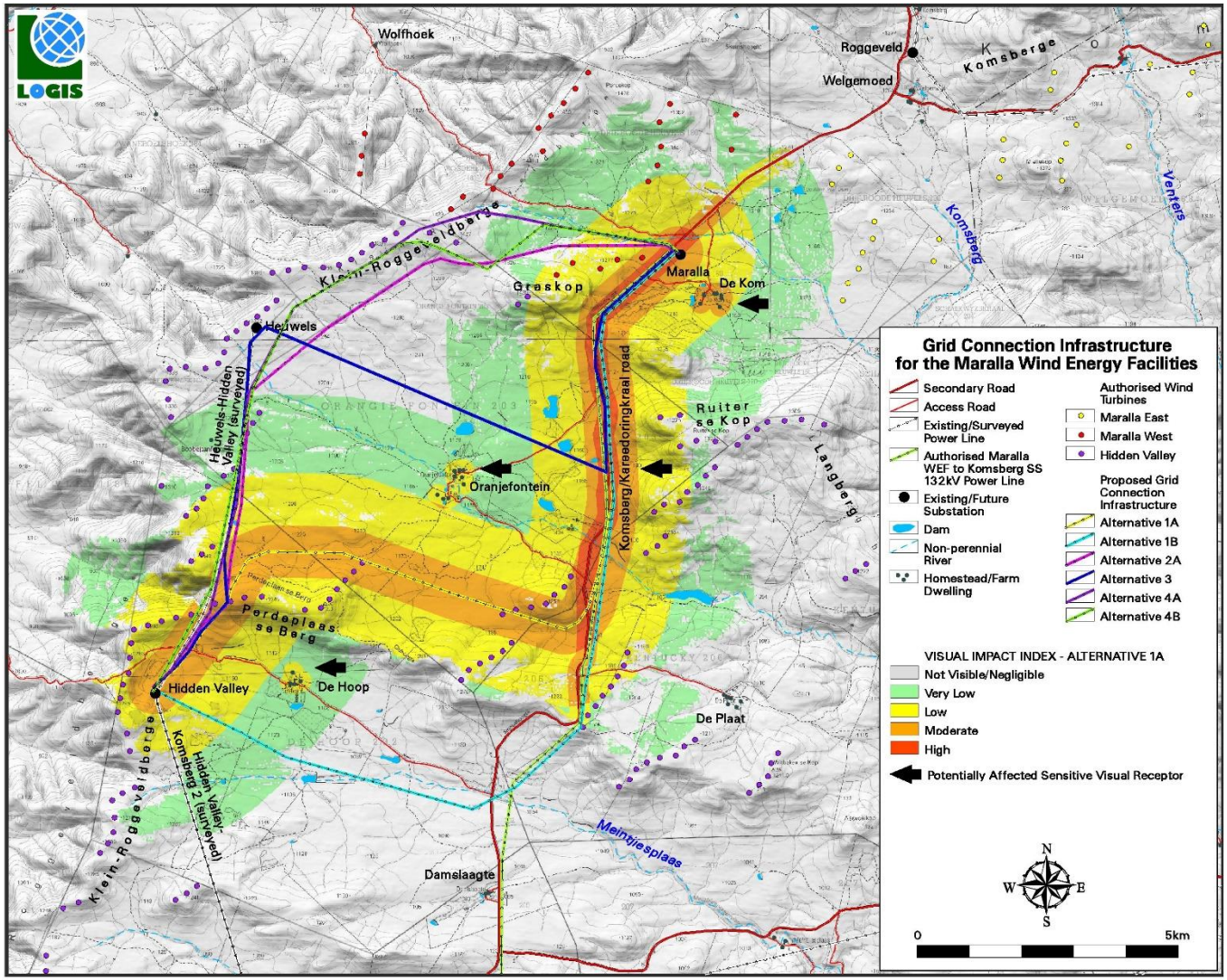


Figure 6-35: Visual impact index and potentially affected sensitive visual receptors: Alternative 1A.

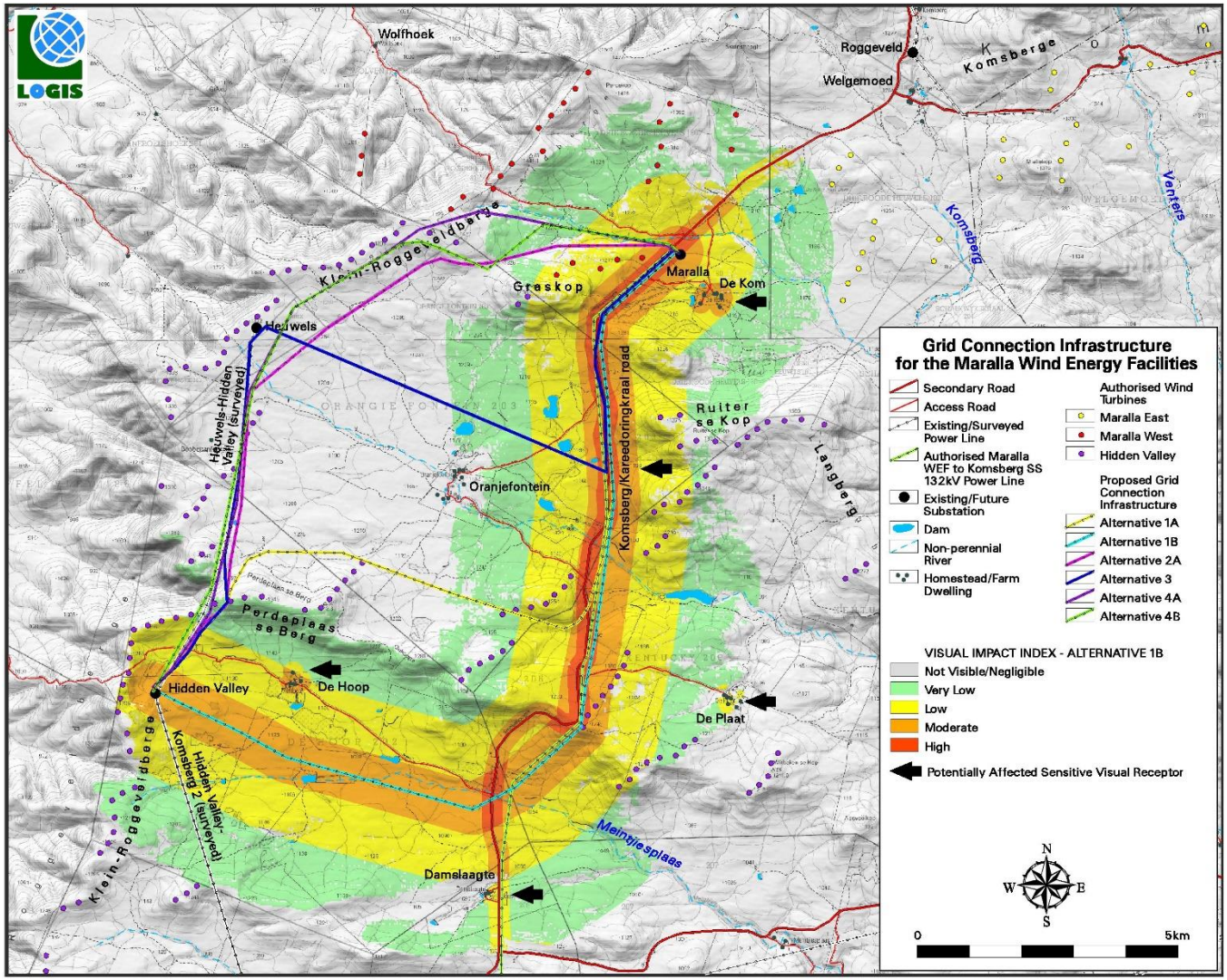


Figure 6-36: Visual impact index and potentially affected sensitive visual receptors: Alternative 1B

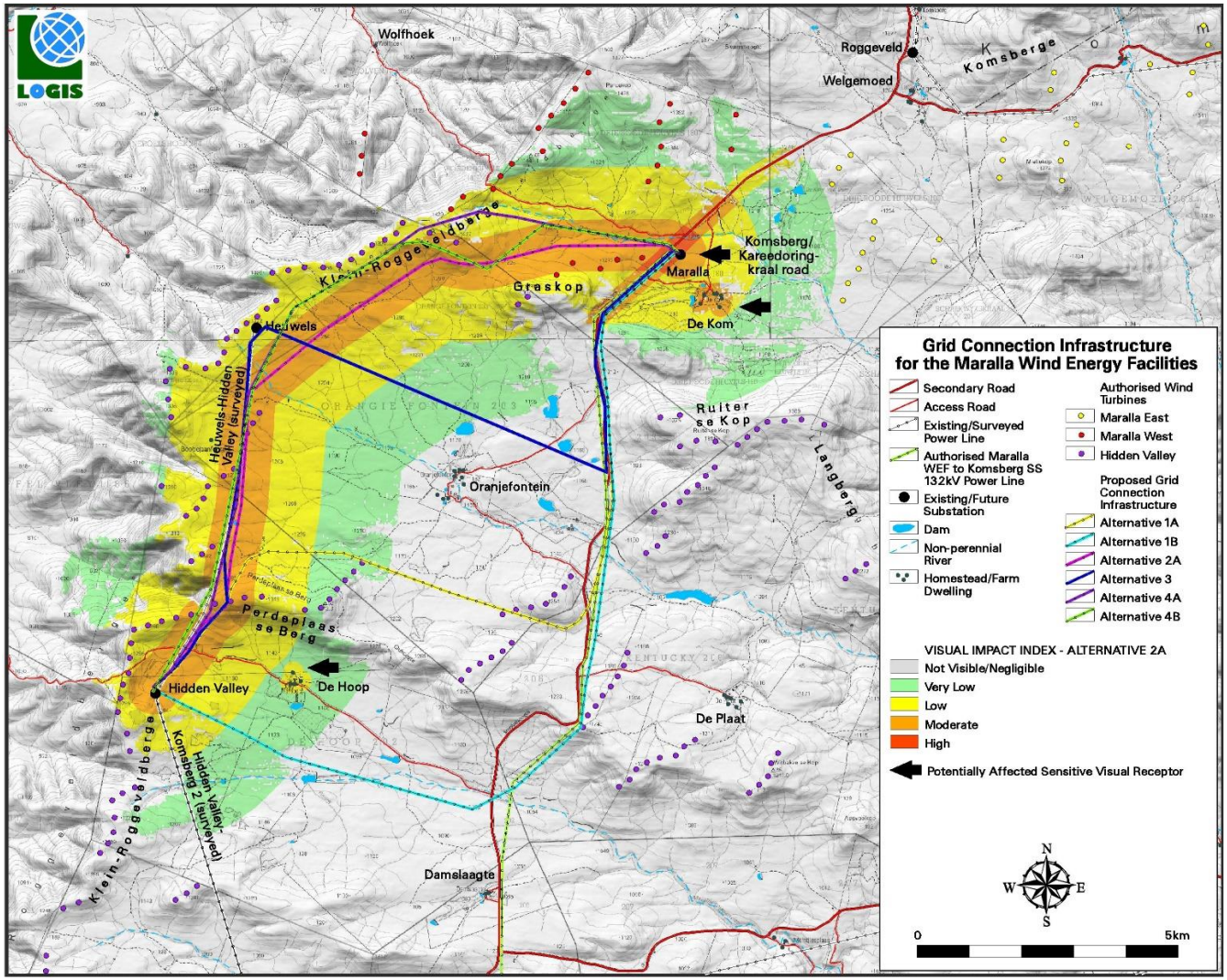


Figure 6-37: Visual impact index and potentially affected sensitive visual receptors: Alternative 2A.

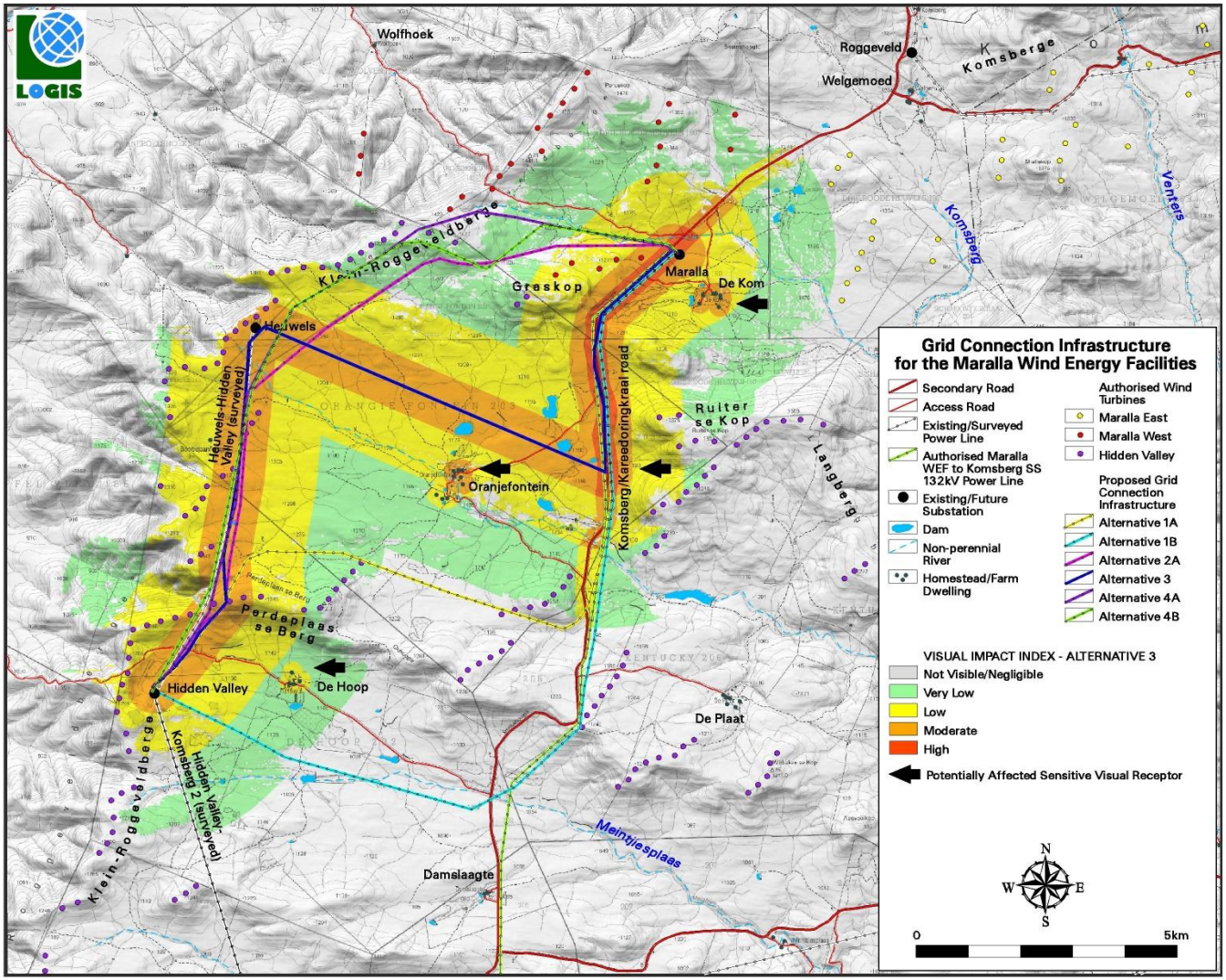


Figure 6-38: Visual impact index and potentially affected sensitive visual receptors: Alternative 4.

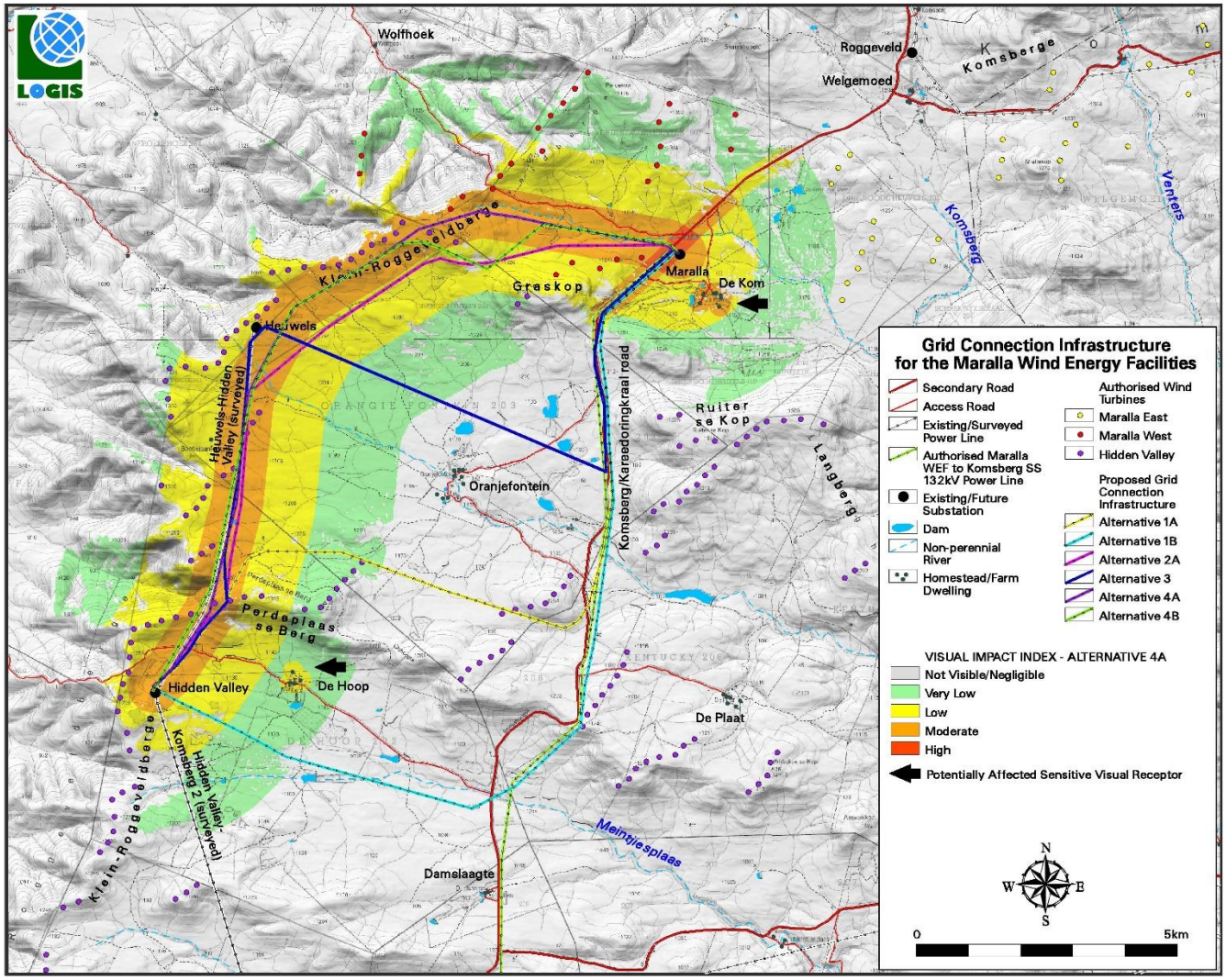


Figure 6-39: Visual impact index and potentially affected sensitive visual receptors: Alternative Option A.

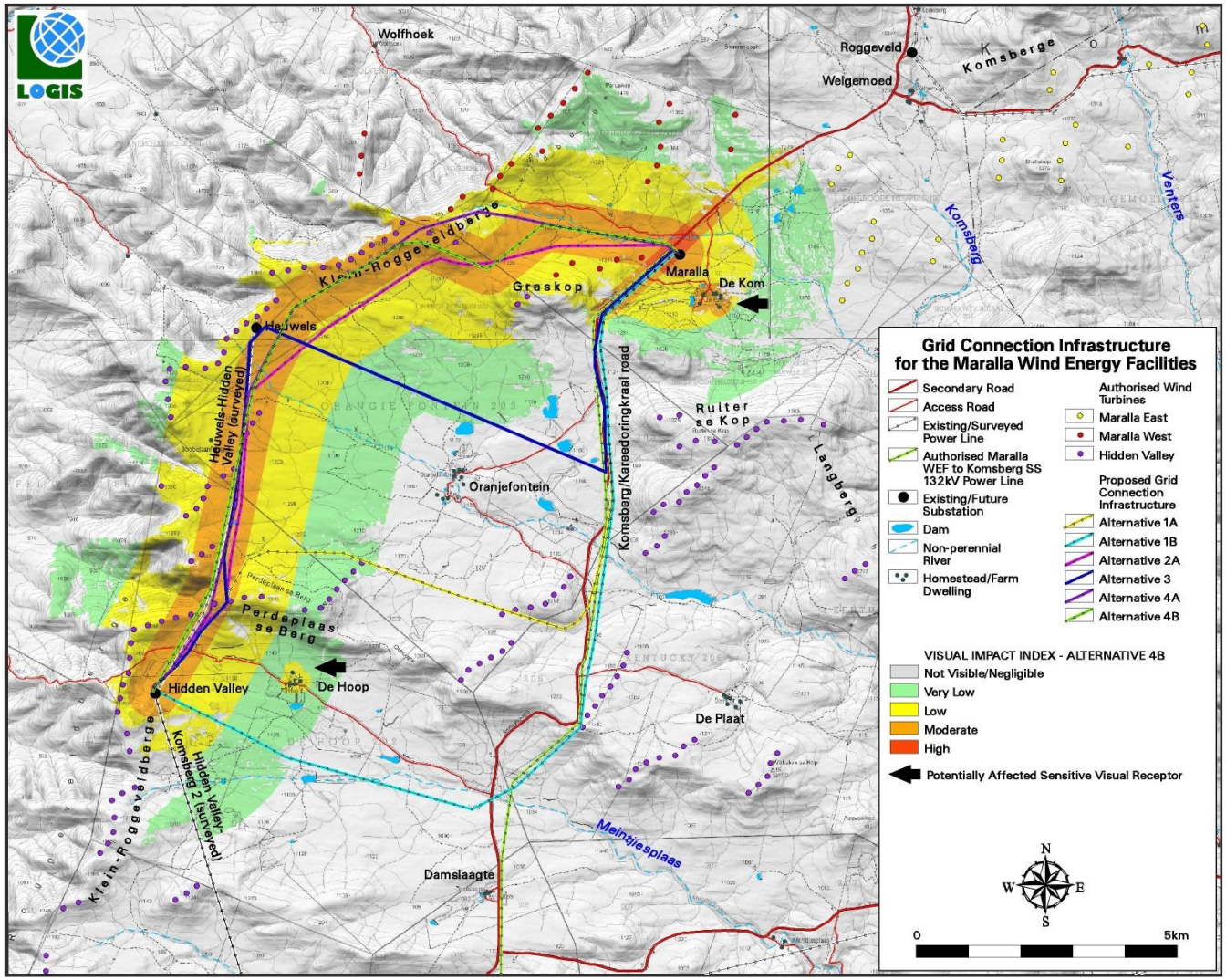


Figure 6-40: Visual impact index and potentially affected sensitive visual receptors: Alternative Option B.

7 ENVIRONMENTAL IMPACT ASSESSMENT

This Chapter identifies the perceived environmental and social effects associated with the proposed Project. The assessment methodology is outlined in **Section 3.5**. The issues identified stem from those aspects presented in **Chapter 6** of this document as well as the Project description provided in **Chapter 4**. The impact assessment is based on the preferred alternative at all Project phases. This section only assesses the preferred option along with the no-go alternative. The impact mitigation hierarchy criteria, as per **Section 3.5.2**, for each mitigation measure are indicated in brackets after each measure indicated.

Furthermore, a decommissioning assessment will be considered as part of the decommissioning process that will be subject to a separate authorisation and impact assessment process. Any decommissioning impacts will be assessed at this stage. The impact assessment in this section encompasses the geographical, physical, biological, social, economic, heritage and cultural aspects in accordance with Appendix 1 of GNR 326.

7.1 AIR QUALITY

This is impact assessment is applicable to all alternatives.

7.1.1 CONSTRUCTION PHASE

DUST AND PARTICULATE MATTER

The National Dust Control Regulations (GNR 827) prescribe general measures for the control of dust in both residential and non-residential areas and will be applicable during construction of the OHPL. **Table 7-1** provides the acceptable dust fall rates as prescribed by GNR 827.

Table 7-1: Acceptable dust fall rates (GNR 827)

RESTRICTION AREAS	DUST FALL RATE (D) (mg/m^2/day – 30 DAYS AVERAGE)	PERMITTED FREQUENCY OF EXCEEDING DUST FALL RATE
Residential area	D < 600	Two within a year, not sequential months
Non-residential area	600 < D < 1200	Two within a year, not sequential months

During the construction phase, dust and vehicular emissions (carbon monoxide (CO), hydrocarbons, particulate matter (PM) and nitrogen oxides (NO_x) will be released as a result of vegetation clearing activities, transportation of equipment and materials to site, and the installation thereof, all of which involves the movement of large plant and trucks along unpaved roads and exposing of soils. The emissions will, however, have short-term impacts on the immediate surrounding areas that can be easily mitigated and thus the authorisation of such emissions will not be required. All construction phase air quality impacts will be minimised with the implementation of dust control measures contained within the EMPr (**Appendix G**).

The impact of the construction phase on the generation of dust and particulate matter (PM) is shown in **Table 7-2** below.

Table 7-2: Construction Impact on Generation of Dust and PM

Potential Impact	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
GENERATION OF DUST AND PM									
Without Mitigation	2	2	3	1	4	**32**	**Moderate**	(-)	High
With Mitigation	1	1	3	1	3	**18**	**Low**	(-)	High
Mitigation and Management Measures	– Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and soil/material stockpiles especially.								

Potential Impact GENERATION OF DUST AND PM	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	This includes wetting of exposed soft soil surfaces and not conducting activities during high wind periods which will increase the likelihood of dust being generated; — All stockpiles (if any) must be restricted to designated areas and may not exceed a height of two (2) metres; — Ensure that all vehicles, machines and equipment are adequately maintained to minimise emissions; — It is recommended that the clearing of vegetation from the site should be selective, be kept to the minimum feasible area, and be undertaken just before construction so as to minimise erosion and dust potential; — All materials transported to, or from, site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering or wetting friable materials. — Enforcing of speed limits. Reducing the dust generated by the listed activities above, putting up signs to enforce speed limit in access roads. — No burning of waste, such as plastic bags, cement bags and litter is permitted; and — All issues/complaints must be recorded in the complaints register.							

7.1.2 OPERATIONAL PHASE

There are no anticipated air quality impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short term.

7.2 NOISE EMISSIONS

This is impact assessment is applicable to all alternatives.

7.2.1 CONSTRUCTION PHASE

Elevated noise levels are likely to be generated by the construction activities (machinery and vehicles) and the workforce. It is important to note that noise impacts (nuisance factor) may vary in the different areas as a result of the surrounding land uses and will be temporary in nature. Due to the temporary and limited nature of the Project activities, coupled with the fact that there are a limited number of noise receptors around the Project area, the impact is regarded as low. The construction impact on noise is indicated in **Table 7-3** below.

Table 7-3: Construction Impact on Noise

Potential Impact: NOISE	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	1	4	**28**	**Low**	(-)	High
With Mitigation	2	1	1	1	3	**15**	**Low**	(-)	High
Mitigation and Management Measures	— The equipment must be in maintained in good working order, within service dates, and inspected before use; — Align working times with the substation related operational times; and — Install noise reducing fittings on machinery (if required).								

7.2.2 OPERATIONAL PHASE

There are no anticipated noise impacts during the operational phase as maintenance activities will occur as and when required and will be extremely short-term.

7.3 SOIL EROSION AND CONTAMINATION

This is impact assessment is applicable to all alternatives.

7.3.1 CONSTRUCTION PHASE

SOIL EROSION

During the construction phase, measures should be implemented to manage stormwater and water flow on the site. If the stormwater and water flow is not regulated and managed on site, it could cause significant erosion of soil around the cleared areas.

During the construction phase, the Project activities could leave soils exposed and susceptible to erosion. The construction impact on soil erosion is indicated in **Table 7-4** below.

Table 7-4: Construction Impact on Soil Erosion

Potential Impact: SOIL EROSION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	2	4	**32**	**Moderate**	(-)	High
With Mitigation	1	1	3	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	— Only the proposed monopole foundation footprint areas should be cleared of vegetation. This should be done in stages as construction works progress, if possible; — Implement stormwater management measures that will help to reduce the speed of the water. These measures must also assist with the prevention of water pollution, erosion and siltation; — Any exposed earth should be rehabilitated promptly, and this could include planting suitable vegetation (vigorous indigenous grasses) that mimics the surrounding environment to protect the exposed soil; — If excavations or foundations fill up with stormwater, these areas should immediately be drained and measures to prevent access to these areas should be implemented; — Erosion control measures should be implemented during the construction phase on large, exposed areas and where stormwater is temporarily channelled; — Stormwater channels and preferential flow paths should be delineated, filled with aggregate and/or logs (branches included) to dissipate and slow flows, limiting erosion; and — Rehabilitate the area to manage erosion as soon as practicably possible.								

SOIL CONTAMINATION

During construction activities, construction vehicles/trucks/machinery as well as hazardous substances stored on the site might spill and contaminate the soil. The impact of the construction phase on soil pollution is indicated in **Table 7-5** below.

Table 7-5: Construction Impact on Soil Contamination

Potential Impact: / SOIL CONTAMINATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	3	4	**36**	**Moderate**	(-)	High
With Mitigation	1	1	3	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	— All construction vehicles, plant, machinery and equipment must be properly maintained to prevent leaks; — Plant and vehicles are to be repaired immediately upon developing leaks; — Drip trays shall be supplied for all idle vehicles and machinery; — No repair work may be undertaken on machinery onsite or within the site camp area; — Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants; — Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow; — Ensure appropriate handling of hazardous substances; — Keep adequate spill kits onsite and train personnel to use them appropriately; — Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded; and — Implement stormwater management measures that will help to reduce the speed of the water flows.								

7.3.2 OPERATIONAL PHASE

SOIL EROSION

There are no anticipated soil erosion impacts expected during the operational phase as maintenance activities will occur as and when required and will be extremely short-term. However, erosion and stormwater controls should be set up around the monopoles during construction to protect them during the operational phase.

SOIL CONTAMINATION

Soil contamination is expected to be limited during the operational phase as maintenance activities will occur as and when required and will be extremely short-term. The operational impact on soil contamination is indicated in **Table 7-6** below.

Table 7-6: Operation Impact on Soil Contamination

Potential Impact: / SOIL CONTAMINATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	1	3	3	3	**27**	**Low**	(-)	High
With Mitigation	1	1	3	2	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— All vehicles, plant, machinery and equipment must be properly maintained to prevent leaks; — Vehicles and machinery are to be repaired immediately upon developing leaks; — Drip trays shall be supplied for all idle vehicles and machinery; — No repair work may be undertaken on machinery on site;								

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
SOIL CONTAMINATION								
	— Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants; — Drip trays are to be inspected daily for leaks and effectiveness and emptied when necessary. This is to be closely monitored during rain events to prevent overflow; — Ensure appropriate handling of hazardous substances; — Keep a spill kit on site and train personnel to use it appropriately; and — Fuels and chemicals must be stored in adequate storage facilities that are secure, enclosed and bunded.							

7.4 GROUNDWATER

This is impact assessment is applicable to all alternatives.

7.4.1 CONSTRUCTION PHASE

DETERIORATION IN GROUNDWATER QUALITY

There is a potential to affect the groundwater quality in the area. This is influenced by spills and leaks and the storage of chemicals and fuels. Any contaminants that are not cleaned from the ground will seep into underground water resources. The impact of construction on change in water quality is shown in **Table 7-7** below.

Table 7-7: Construction Impact on Deterioration in Groundwater Quality

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
DETERIORATION IN GROUNDWATER QUALITY									
Without Mitigation	3	2	3	2	3	**30**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Construction areas should be demarcated, and wetland areas marked as “restricted” in order to prevent the unnecessary impact to and loss of these systems; — Laydown yards, camps and storage areas must be beyond the wetland areas where applicable; — During construction, contractors used for the Project must have spill kits available to ensure that any fuel or oil spills are cleaned-up and disposed of correctly; — A suitable stormwater management plan must be generated for the project to control the movement of water on the substation site; — The stormwater management plan should incorporate “soft” engineering measures as much as possible, limiting the use of artificial materials; — As much material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site; — All chemicals and toxicants during the construction and operation phase must be stored in bunded areas; — All machinery and equipment should be inspected regularly for faults and possible leaks; these should be serviced off-site; — All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to								

Potential Impact: DETERIORATION IN GROUNDWATER QUALITY	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping"; — Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the Project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation); and — Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the aquatic systems.							

7.4.2 OPERATIONAL PHASE

There are no anticipated groundwater quality impacts expected during the operational phase as maintenance activities will occur as and when required and will be extremely short-term.

7.5 FRESHWATER

This is impact assessment is applicable to all alternatives.

7.5.1 CONSTRUCTION PHASE

The following activities will be carried out during the construction of the 132kV powerline.

— Drilling of holes (typically 2-3m in depth);
— Planting of poles;
— Stringing of conductors, and
— Possible excavations and stabilized backfill.

ALTERATION OF THE NATURAL FLOW REGIME

The construction of access roads and laydown areas may result in alterations to the natural flow regimes through increased runoff, water abstractions or flow diversions. The construction phase impact due to the alteration of the natural flow regime on freshwater is shown in **Table 7-8** below.

Table 7-8: Alteration of the Natural Flow Regime Impact on Freshwater Ecology and Surface Water

Potential Impacts: ALTERATION OF THE NATURAL FLOW REGIME	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	2	4	**48**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— No water should be abstracted from the wetland area. Ideally water required during the construction phase must be sourced from an external source (i.e. outside of the wetland contributing area). — Existing access routes should be utilised. Should access roads need to traverse watercourse, these should be perpendicular to the watercourse with appropriately designed culverts. — It is recommended that, where possible, laydown areas and construction camps are to be developed outside the riparian zone or 100m from a watercourse, whichever is greatest. — The pole sites should be contoured to allow for surface water to readily drain away (as it would under natural conditions) and to prevent ponding of water within areas where it would not have ponded before the construction activities.								

Potential Impacts:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
ALTERATION OF THE NATURAL FLOW REGIME								
	— Vegetation clearing, soil stripping and major earthmoving activities must be phased to minimise the extent of bare soils surfaces exposed at any one time. Ideally, this should be undertaken during the dry season. — If possible, construction activities should be undertaken during the dry season.							

WATER QUALITY

Potential spillage of hazardous substances such as oils, fuel, grease from maintenance vehicles, and sewage from on-site sanitation systems. The construction phase impact on water quality is shown in **Table 7-9** below.

Table 7-9: Construction Impact on Water Quality

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
WATER QUALITY									
Without Mitigation	4	2	1	2	4	**36**	**Moderate**	(-)	High
With Mitigation	2	2	1	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	— Areas for waste disposal should be clearly demarcated and should be bunded and on hard standing. These areas should be located outside the riparian zone or 100m from a watercourse, whichever is greatest. — Ensure that no equipment is washed in the streams and wetlands of the area, and if washing facilities are provided, that these are located outside the riparian zone or 100m from a watercourse, whichever is greatest. — Procedures for containment of leaks/spills as well as associated emergency response plans should be developed. — Machinery and equipment must be inspected regularly for faults and possible leaks. If required, servicing of these should occur off outside the riparian zone or 100m from a watercourse, whichever is greatest. — Potential contaminants used and stored at the proposed project site should be stored and prepared on bunded surfaces to contain spills and leaks. — Adequate ablution facilities should be developed and located outside the riparian zone or 100m from a watercourse, whichever is greatest.								

LOSS OF WETLAND AND RIPARIAN FUNCTIONALITY

POWERLINE TOWER STRUCTURES

Degradation of wetland/riparian habitat due to the positioning of the powerline stand poles. The construction phase impact due to the loss of wetland and riparian functionality on freshwater is shown in **Table 7-10** below.

Table 7-10: Construction Impact on Loss of wetland and riparian functionality

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
LOSS OF WETLAND AND RIPARIAN FUNCTIONALITY									
Without Mitigation	4	3	3	2	4	**48**	**Moderate**	(-)	High
With Mitigation	3	2	3	2	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— A layout plan must be compiled indicating the limits of disturbance associated with the proposed infrastructure in relation to the identified sensitive areas (i.e. wetlands). No-go areas and any stormwater infrastructure must be indicated on this plan together with erosion and sediment, controls and measures. — Stringing should make use of a running block and span, limiting intrusion into the freshwater habitat systems.								

Potential Impact: LOSS OF WETLAND AND RIPARIAN FUNCTIONALITY	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
	– The pole sites should be contoured to allow for surface water to readily drain away (as it would under natural conditions) and to prevent ponding of water within areas where it would not have ponded before the construction activities. – The identified wetlands and riparian areas are to be designated as "highly sensitive". – Planning the location of poles should factor in the wetlands and riparian areas, with pole placement taking place outside these systems. – In the event that poles need to be placed within the wetland or riparian systems, an application for a Water Use Licence (WUL) in terms of Section 21 of the National Water Act (NWA) (Act 36 of 1998) must be undertaken								

ACCESS ROADS

Degradation of wetland/riparian habitat due to the need for access roads. The construction phase impact due to the loss of wetland and riparian functionality on freshwater is shown in **Table 7-11** below.

Table 7-11: Construction Impact on Loss of wetland and riparian functionality

Potential Impact: LOSS OF WETLAND AND RIPARIAN FUNCTIONALITY	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	5	3	3	2	4	**52**	**Moderate**	(-)	High
With Mitigation	3	2	3	2	3	**30**	**Low**	(-)	High
Mitigation and Management Measures	– A layout plan must be compiled indicating the limits of disturbance associated with the proposed infrastructure in relation to the identified sensitive areas (i.e. wetlands). No-go areas and any stormwater infrastructure must be indicated on this plan together with erosion and sediment, controls and measures. – The identified wetlands and riparian areas are to be designated as "highly sensitive". – Existing access routes must be utilised. – Should the need for additional access routes arise, these should be perpendicular to the watercourse and developed with appropriately sized culvers. – In the event that access roads need to be constructed, an application for a Water Use Licence (WUL) in terms of Section 21 of the National Water Act (NWA) (Act 36 of 1998) must be undertaken								

INCREASED SOIL EROSION AND SEDIMENTATION

Increased soil erosion due to vegetation clearance, soil disturbance and high traffic movement on site. Subsequent potential sedimentation of watercourses. The construction phase impact due to increased soil erosion and sedimentation freshwater is shown in **Table 7-12** below.

Table 7-12: Construction Impact on Increased soil erosion and sedimentation

Potential Impact: INCREASED SOIL EROSION AND SEDIMENTATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	3	**27**	**Low**	(-)	High

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
INCREASED SOIL EROSION AND SEDIMENTATION								
Mitigation and Management Measures	— During the construction phase sediment control measures must be adopted in order to prevent sediment entering the wetland. — Vegetation clearing, soil stripping and major earthmoving activities must be phased to minimise the extent of bare soils surfaces exposed at any one time. Ideally, this should be undertaken during the dry season. — Traffic of construction vehicles should be kept to a minimum to reduce soil compaction and limited to existing or proposed roadways where practical. — Soils excavated during construction of the infrastructure should be appropriately stored in stockpiles which are protected from erosion (i.e. through use of vegetation cover in the case of long-term stockpiles). — Upon completion of construction, the laydown areas and construction camp sites are to be rehabilitated. — Gabions or Reno Mattresses should be used where evidence of erosion is present.							

ALIEN VEGETATION ESTABLISHMENT

Potential for alien vegetation to colonise impacted areas. The construction phase impact due to alien vegetation establishment on freshwater is shown in **Table 7-13** below.

Table 7-13: Construction Impact on Alien vegetation establishment

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
ALIEN VEGETATION ESTABLISHMENT									
Without Mitigation	4	2	3	2	3	**44**	**Moderate**	(-)	High
With Mitigation	2	2	1	2	2	**14**	**Very Low**	(-)	High
Mitigation and Management Measures	— It is essential that all alien invasive species be removed from the site. — As part of the rehabilitation initiatives, an alien removal and monitoring plan should be established that addresses alien vegetation in the wetland areas. The programme is to include regular clearing of alien vegetation and monitoring thereof to assess the success of activities and recommend additional measures if required. Alien vegetation removal and monitoring is to be implemented based on the plan.								

7.5.2 OPERATIONAL PHASE

WATER QUALITY

Potential spillage of hazardous substances such as oils, fuel, grease from maintenance vehicles, and sewage from on-site sanitation systems. The operation phase impact on water quality is shown in **Table 7-14** below.

Table 7-14: Operation Impact on Water Quality

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
WATER QUALITY									
Without Mitigation	3	3	3	2	3	**33**	**Moderate**	(-)	High

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
WATER QUALITY									
With Mitigation	2	2	1	2	2	**14**	**Very Low**	(-)	High
Mitigation and Management Measures	— Areas for waste disposal should be clearly demarcated and should be bunded and on hard standing. These areas should be located outside the riparian zone or 100m from a watercourse, whichever is greatest. — Ensure that no equipment is washed in the streams and wetlands of the area, and if washing facilities are provided, that these are located outside the riparian zone or 100m from a watercourse, whichever is greatest. — Procedures for containment of leaks/spills as well as associated emergency response plans should be developed. — Machinery and equipment must be inspected regularly for faults and possible leaks. If required, servicing of these should occur off outside the riparian zone or 100m from a watercourse, whichever is greatest. — Potential contaminants used and stored at the proposed project site should be stored and prepared on bunded surfaces to contain spills and leaks. — Adequate ablution facilities should be developed and located outside the riparian zone or 100m from a watercourse, whichever is greatest.								

LOSS OF WETLAND AND RIPARIAN HABITAT

Degradation of wetland/riparian habitat when undertaking maintenance activities. The operation phase impact due to the loss of wetland and riparian habitat is shown in **Table 7-15** below.

Table 7-15: Operation Impact on Loss of wetland and riparian habitat

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
LOSS OF WETLAND AND RIPARIAN HABITAT									
Without Mitigation	4	3	3	2	3	**36**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— A layout plan must be compiled indicating the limits of disturbance associated with the proposed infrastructure in relation to the identified sensitive areas (i.e. wetlands). No-go areas and any stormwater infrastructure must be indicated on this plan together with erosion and sediment, controls and measures. — The identified wetlands and riparian areas are to be designated as "highly sensitive". — Existing access routes should be utilised to access the powerline infrastructure.								

INCREASED SOIL EROSION AND SEDIMENTATION

Increased soil erosion due to vegetation clearance, soil disturbance and high traffic movement on site. Subsequent potential sedimentation of watercourses. The operation phase impact due to increased soil erosion and sedimentation on freshwater shown in **Table 7-16** below.

Table 7-16: Operation Impact on Increased soil erosion and sedimentation

Potential Impact: INCREASED SOIL EROSION AND SEDIMENTATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	**4**	**2**	**3**	**2**	**3**	**33**	**Moderate**	(-)	High
With Mitigation	**2**	**2**	**3**	**2**	**2**	**14**	**Low**	(-)	High
Mitigation and Management Measures	— During maintenance, sediment control measures must be adopted in order to prevent sediment entering the wetland. — Vegetation clearing, soil stripping and major earthmoving activities must be phased to minimise the extent of bare soils surfaces exposed at any one time. Ideally, this should be undertaken during the dry season. — Traffic of maintenance vehicles should be kept to a minimum to reduce soil compaction and limited to existing or proposed roadways where practical. — Soils excavated during maintenance of the infrastructure should be appropriately stored in stockpiles which are protected from erosion (i.e. through use of vegetation cover in the case of long-term stockpiles). — Upon completion of maintenance, the laydown areas and construction camp sites are to be rehabilitated. — Gabions or Reno Mattresses should be used where evidence of erosion is present.								

7.5.3 DECOMMISSIONING PHASE

WATER QUALITY

Potential spillage of hazardous substances such as oils, fuel, grease from vehicles, and sewage from on-site sanitation systems. The decommission phase impact on water quality is shown in **Table 7-17** below.

Table 7-17: Decommissioning Impact on Water Quality

Potential Impact: WATER QUALITY	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	2	3	36	**Moderate**	(-)	High
With Mitigation	2	2	1	2	2	14	**Very Low**	(-)	High
Mitigation and Management Measures	— Areas for waste disposal should be clearly demarcated and should be bunded and on hard standing. These areas should be located outside the riparian zone or 100m from a watercourse, whichever is greatest. — Ensure that no equipment is washed in the streams and wetlands of the area, and if washing facilities are provided, that these are located outside the riparian zone or 100m from a watercourse, whichever is greatest. — Procedures for containment of leaks/spills as well as associated emergency response plans should be developed. — Machinery and equipment must be inspected regularly for faults and possible leaks. If required, servicing of these should occur off outside the riparian zone or 100m from a watercourse, whichever is greatest. — Potential contaminants used and stored at the proposed project site should be stored and prepared on bunded surfaces to contain spills and leaks. — Adequate ablution facilities should be developed and located outside the riparian zone or 100m from a watercourse, whichever is greatest.								

LOSS OF WETLAND AND RIPARIAN HABITAT

Degradation of wetland/riparian habitat when undertaking decommissioning activities. The decommission phase impact due to the loss of wetland and riparian habitat is shown in **Table 7-18** below.

Table 7-18: Decommissioning Impact on Loss of wetland and riparian habitat

Potential Impact: **LOSS OF WETLAND AND RIPARIAN HABITAT**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	4	3	3	2	2	**36**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— A layout plan must be compiled indicating the limits of disturbance associated with the proposed infrastructure in relation to the identified sensitive areas (i.e. wetlands). No-go areas and any stormwater infrastructure must be indicated on this plan together with erosion and sediment, controls and measures. — The identified wetlands and riparian areas are to be designated as "highly sensitive". — Existing access routes should be utilised to access the powerline infrastructure.								

INCREASED SOIL EROSION AND SEDIMENTATION

Increased soil erosion due to vegetation clearance, soil disturbance and high traffic movement on site. Subsequent potential sedimentation of watercourses. The impact on increased soil erosion and sedimentation is shown in **Table 7-19** below.

Table 7-19: Decommissioning Impact on Increased soil erosion and sedimentation

Potential Impact: **INCREASED SOIL EROSION AND SEDIMENTATION**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	4	3	3	2	3	**36**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Sediment control measures must be adopted in order to prevent sediment entering the wetland. — Vegetation clearing, soil stripping and major earthmoving activities must be phased to minimise the extent of bare soils surfaces exposed at any one time. Ideally, this should be undertaken during the dry season. — Traffic should be kept to a minimum to reduce soil compaction and limited to existing or proposed roadways where practical. — Soils excavated during decommissioning of the infrastructure should be appropriately stored in stockpiles which are protected from erosion (i.e. through use of vegetation cover in the case of long-term stockpiles). — Upon completion of decommissioning, the work area, laydown areas and construction camp sites are to be rehabilitated. — Gabions or Reno Mattresses should be used where evidence of erosion is present.								

ALIEN VEGETATION ESTABLISHMENT

Potential for alien vegetation to colonise impacted areas. The impact on alien vegetation establishment is shown in **Table 7-20** below.

Table 7-20: Decommissioning Impact on Alien vegetation establishment

Potential Impact: ALIEN VEGETATION ESTABLISHMENT	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	3	**33**	**Moderate**	(-)	High
With Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— It is essential that all alien invasive species be removed from the site. — As part of the rehabilitation initiatives, an alien removal and monitoring plan should be established that addresses alien vegetation in the wetland areas. The programme is to include regular clearing of alien vegetation and monitoring thereof to assess the success of activities and recommend additional measures if required. Alien vegetation removal and monitoring is to be implemented based on the plan.								

7.6 HYDROLOGY

This is impact assessment is applicable to all alternatives.

7.6.1 CONSTRUCTION PHASE

The following activities will be carried out during the construction of the 132kV powerline.

— Drilling of holes (typically 2-3m in depth);

— Planting of poles;

— Stringing of conductors, and

— Possible excavations and stabilized backfill

DRAINAGE ALTERATION

Construction activities will result in alterations of flow regimes of watercourses. The drainage alteration impact on hydrology is shown in **Table 7-21**.

Table 7-21: Construction phase impact assessment due to drainage alteration

Potential Impacts: DRAINAGE ALTERATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	2	1	1	2	3	**21**	**Low**	(-)	High
Mitigation and Management Measures	— Construction of the powerlines should, where feasibly possible, occur during the dry season and the site rehabilitated before major rainfall events occur. Cables must only cross perpendicular to a watercourse and the chosen alignment must endeavour that the span across the watercourse is minimalised.								

SOIL EROSION AND SEDIMENTATION

Construction activities will result in soil disturbance, resulting in a higher potential for soil erosion and sedimentation. The soil erosion and sedimentation impact on hydrology is shown in **Table 7-22**.

Table 7-22: Construction phase impact assessment due to Soil erosion and sedimentation

Potential Impacts: / SOIL EROSION AND SEDIMENTATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	3	**33**	**Moderate**	(-)	High
With Mitigation	2	1	1	2	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— Areas of construction should be (where practical) limited to the extent of the footprint, and activities outside of the footprint should be kept to a minimum. Traffic of construction vehicles should be kept to a minimum to reduce soil compaction and limited to existing or proposed roadways where practical. Any soil excavated during construction, should be appropriately stored in stockpiles which are protected from erosion. Wind erosion is dominant for the region. Water erosion action is considered limited, however backfilling with soil and use of gabions or Reno Mattresses should be used where evidence of erosion is present.								

WATER QUALITY DEGRADATION

Potential spillage of hazardous substances such as oils, fuel, grease from construction vehicles and machinery. The impact of water quality degradation on hydrology is shown in **Table 7-23**.

Table 7-23: Construction phase impact assessment due to Water quality degradation

Potential Impacts: / WATER QUALITY DEGRADATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	**2**	**2**	**3**	**2**	**2**	**18**	**Low**	**(-)**	**High**
With Mitigation	1	1	1	2	1	**5**	**Very Low**	(-)	High
Mitigation and Management Measures	— The proper handling and storage of hazardous materials, the use of hardstanding in storage areas of hazardous substances and where spillages are possible. The use of drip trays on machinery and vehicles.								

LOSS OF WETLAND AND RIPARIAN FUNCTIONALITY

Temporary degradation of wetland/riparian habitat due to the positioning of the powerlines. The loss of wetland and riparian functionality impact on hydrology is shown in **Table 7-24**.

Table 7-24: Construction phase impact assessment due to Loss of wetland and riparian functionality

Potential Impacts: / LOSS OF WETLAND AND RIPARIAN FUNCTIONALITY	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	4	1	1	2	3	**24**	**Low**	(-)	High
Mitigation and Management Measures	— The detailed freshwater habitat assessment must be used to determine the most suitable placement of the powerline poles.								

7.6.2 OPERATION PHASE

SOIL EROSION AND SEDIMENTATION

The overall increase in soil disturbance results in a higher potential for soil erosion and sedimentation. The increase in compaction post construction phase will result in more runoff. Routine monitoring and maintenance of the powerline infrastructure will further compact the soil. The soil erosion and sedimentation impact on hydrology is shown in **Table 7-25**.

Table 7-25: Operation phase impact assessment due to Soil erosion and sedimentation

Potential Impacts: SOIL EROSION AND SEDIMENTATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	3	**33**	**Moderate**	(-)	High
With Mitigation	2	1	1	2	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— Erosion control management procedures should be implemented to monitor and rehabilitate erosion.								

WATER QUALITY DEGRADATION

Potential spillage of hazardous substances such as oils, fuel, grease from construction vehicles and machinery. The impact of water quality degradation on hydrology is shown in **Table 7-26**.

Table 7-26: Operation phase impact assessment due to Water quality degradation

Potential Impacts: WATER QUALITY DEGRADATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
With Mitigation	1	1	1	2	1	**5**	**Very Low**	(-)	High
Mitigation and Management Measures	— The proper handling and storage of hazardous materials, the use of hardstanding in storage areas of hazardous substances and where spillages are possible. The use of drip trays on machinery and vehicles.								

7.7 BIODIVERSITY

Considering the anthropogenic activities and influences within the landscape, a limited amount of negative impacts to biodiversity were observed within the general and assessment area. These include:

- Present energy distribution infrastructure, including power lines;
- Historical sheep grazing land-use;
- Roads and associated vehicle traffic and road kills; and
- Fences.

This is impact assessment is applicable to all alternatives.

7.7.1 CONSTRUCTION PHASE

The following potential impacts were considered on terrestrial communities. This phase refers to the period when construction of the proposed infrastructure is built/installed. This phase usually has the largest direct impact on biodiversity.

DESTRUCTION, FURTHER LOSS AND FRAGMENTATION OF THE HABITATS, ECOSYSTEMS AND VEGETATION COMMUNITY

The proposed vegetation clearance for the pylon footprint and the associated access roads; clearing new roads/servitudes as well as potential widening of existing roads/servitudes will physically remove vegetation as well as remove and fragment communities/ecosystems for terrestrial plant species. The exposed road surface will also result in direct and indirect erosion of the servitude due to the loss of vegetation cover. These disturbances will increase the potential for the establishment of alien and invasive vegetation; disruption in natural areas of phytomass and disturbance of the soil. The associated human activities will increase the potential and likelihood of establishment of alien and invasive vegetation. These will all result in the destruction, further loss and fragmentation of the vegetation community/ ecosystems. The impact of the construction phase on the impact on flora is shown in **Table 7-27** below.

Table 7-27: Assessment of significance of potential impacts on the habitats, ecosystems and vegetation community associated with the construction phase of the project.

Potential Impact: **DESTRUCTION, FURTHER LOSS AND FRAGMENTATION OF HABITATS, ECOSYSTEMS & VEGETATION COMMUNITY**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	5	3	4	5	4	**68**	**High**	(-)	High
With Mitigation	4	2	3	2	3	**33**	**Moderate**	(-)	High
Mitigation and Management Measures	— All very high sensitivity areas must be avoided and declared an outright "No-go" area. All high sensitivity areas should be cautiously considered. Should development take place in the high sensitivity areas, the pole spacing should be extended to reduce the number of poles in these areas. The footprint area must be minimised, and clearing must also be restricted to the direct impact area and the 100 m corridor may not be cleared as a whole. — Drainage lines must be avoided for pole placement and access roads, and a no-go buffer of 20 m must be applied around them. — Areas of indigenous vegetation, even secondary communities outside of the direct pylon footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to flat areas as far as possible. No further loss (unnecessary) of very high/high sensitivity areas should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon. All structure footprints are to be rehabilitated and landscaped after installation is complete. Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. — Existing access routes, especially roads must be made use of. The development areas and access roads should be specifically demarcated so that during the construction phase, only the demarcated areas may be impacted upon — All laydown, chemical toilets etc. should be restricted offsite. No materials may be stored and all materials must be removed from the project area once the construction phase has been concluded. No permanent construction structures should be permitted. No storage of vehicles or equipment will be allowed outside of the designated project areas. — Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood and wind events. This will also reduce the likelihood of encroachment by alien invasive plant species. All livestock must always be kept out of the project area, especially areas that have been recently re-planted. — A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not									

Potential Impact: DESTRUCTION, FURTHER LOSS AND FRAGMENTATION OF HABITATS, ECOSYSTEMS & VEGETATION COMMUNITY	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers. Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them leaking and entering the environment. Construction activities and vehicles could cause spillages of lubricants, fuels and waste material potentially negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the project area. — It should be made an offence for any staff to take/ bring any plant species into/out of any portion of the project area. No plant species whether indigenous or exotic should be brought into/taken from the project area, to prevent the spread of exotic or invasive species or the illegal collection of plants. — A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas. — Any individual of the protected plants that are present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. High visibility flags must be placed near any threatened/protected plants in order to avoid any damage or destruction of the species. If left undisturbed the sensitivity and importance of these species needs to be part of the environmental awareness program. Pylon infrastructure, development areas and routes where protected plants cannot be avoided, these plants many being geophytes or small succulents should be removed from the soil and relocated/ re-planted in similar habitats where they should be able to resprout and flourish again. All protected and red-data plants should be relocated, and as many other geophytic species as possible. — For the threatened species that may not be destroyed, it is recommended that professional service providers that deal with plant search and rescue be used to remove such plants and use them either for later rehabilitation work other conservation projects								

INTRODUCTION OF ALIEN SPECIES, ESPECIALLY PLANTS

Clearance of vegetation and movement between areas will increase the potential for the establishment of alien and invasive vegetation. The proposed vegetation clearance for the pylon footprint and the associated access roads; clearing new roads/servitudes as well as potential widening of existing roads/servitudes will physically remove indigenous vegetation and potentially create an environment where alien species can be introduced. The "edge effect" caused by these disturbances will likely result in alien and invasive vegetation being established in these areas. The construction phase impact due to the introduction of alien species, especially plants is shown in **Table 7-28** below.

Table 7-28: Assessment of significance of potential impacts on the terrestrial biodiversity associated with the construction phase of the project.

Potential Impact: INTRODUCTION OF ALIEN SPECIES, ESPECIALLY PLANTS	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	3	4	**52**	**Moderate**	(-)	High

Potential Impact: INTRODUCTION OF ALIEN SPECIES, ESPECIALLY PLANTS	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
With Mitigation	3	2	2	2	2	**18**	**Low**	(-)	High
Mitigation and Management Measures	— Compilation of and implementation of an alien vegetation management plan for the 100 meter grid corridor. — The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Footprint of the roads must be kept to prescribed widths. — Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests from entering the site								

DESTRUCTION OF THREATENED PLANT SPECIES

The vegetation clearance for the pylon footprint and the associated access roads; clearing new roads/servitudes as well as potential widening of existing roads/servitudes will physically remove vegetation This will result in direct and indirect erosion of these working areas due to the loss of vegetation cover. This will increase the potential for the establishment of alien and invasive vegetation; disruption in natural areas of phytomass and the disturbance of the soil. These aspects will result in the destruction, further loss and fragmentation of the vegetation community/ ecosystems, including potential SCC individuals. The construction phase impact on threatened plant species is shown in **Table 7-29** below.

Table 7-29: Assessment of significance of potential impacts on the terrestrial flora associated with the construction phase of the project.

Potential Impact: DESTRUCTION OF THREATENED PLANT SPECIES	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	5	4	5	5	4	**76**	**High**	(-)	High
With Mitigation	3	2	4	3	3	**36**	**Moderate**	(-)	High
Mitigation and Management Measures	— Prevent the further loss and fragmentation of vegetation communities and the CBA 1 and CBA 2 areas in the vicinity of the project area (including water resource areas); — As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species; — Follow the guidelines for interpreting SEI; and — Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern).								

DISPLACEMENT AND FRAGMENTATION OF THE FAUNAL COMMUNITY DUE TO HABITAT LOSS, DIRECT MORTALITIES AND DISTURBANCE (NOISE, DUST AND VIBRATION)

The removal of vegetation will result in the direct loss of habitat, forcing fauna species (including potential IUCN listed species) to move into new areas. This will likely result in the disruption of faunal populations by interfering with their movements and/or breeding activities. Direct mortalities may arise from earth moving or transport vehicles and increased traffic due to construction work and the transportation of staff/materials. The unregulated movement of local people will also increase the likelihood of poaching of species in what was previously seen as secluded habitat for fauna species. The unregulated movement of local people could lead to introduction of diseases and feral species such as cats and dogs. The impact of the construction phase on the impact on fauna is shown in **Table 7-30** below.

Table 7-30: Assessment of significance of potential impacts on the terrestrial fauna associated with the construction phase of the project.

Potential Impact: DISPLACEMENT AND FRAGMENTATION OF THE FAUNAL COMMUNITY DUE TO HABITAT LOSS, DIRECT MORTALITIES & DISTURBANCE	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	3	3	4	4	**56**	**Moderate**	(-)	High
With Mitigation	3	2	3	2	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	– A qualified environmental control officer must be on site when construction begins. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the correct season and any SSC should be noted. In situations where the threatened and protected plants must be removed, the proponent may only do so after the required permission/permits have been obtained in accordance with national and provincial legislation. In the abovementioned situation the development of a search, rescue and recovery program is suggested for the protection of these species. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated – The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into the surrounding environments, – The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna. – Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals – No trapping, killing, or poisoning of any wildlife is to be allowed – All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings, dust and erosion is limited, this is especially true due to the presence of the Verrox's Tent Tortoise's. The speed limits should be restricted to at least 30 km/h. – Schedule activities and operations during least sensitive periods (June to August), to avoid migration, nesting and breeding seasons. – Driving on access roads close to very high and highly sensitive areas at night should be prevented in order to reduce or prevent wildlife road mortalities which occur more frequently during this period; – All areas to be developed must be walked through prior to any activity to ensure no nests or fauna species are found in the area. Should any Species of Conservation Concern not move out of the area or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken. – Any holes/deep excavations must be dug and planted in a progressive manner and shouldn't be left open overnight; – Should the holes overnight they must be covered temporarily to ensure no small fauna species fall in. – Ensure that cables and connections are insulated successfully to reduce electrocution risk. – Any exposed parts must be covered (insulated) to reduce electrocution risk. – Monitoring of the OHL route must be undertaken to detect bird carcasses, to enable the identification of any potential areas of high impact to be marked with bird flappers if not already done so.								

Potential Impact: DISPLACEMENT AND FRAGMENTATION OF THE FAUNAL COMMUNITY DUE TO HABITAT LOSS, DIRECT MORTALITIES & DISTURBANCE	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	Monitoring should be undertaken at least once a month for the first year of operation. – For transmission towers in high to very high sensitivity locations, it is recommended to install bird guard/spike structures (close to or along drainage features especially) to prevent birds from landing on and/or nesting on the towers. This has been linked with increases in corvid populations which can impact local reptile and avifauna species. Poles: The poles should be fitted with bird perches on top of the poles to draw birds, particularly vultures, away from the potentially risky insulators. – Appropriate bird mitigation measures should be put in place to avoid bird collisions and direct impacts to the infrastructure, as SCC presence in the area is high. These mitigation measures should entail the installation of 'bird-flappers' and bird-friendly power line structures. This is particularly relevant to the portions of the proposed power line which crosses the drainage features. Power line: The span that crosses drainage lines should be marked with Bird Flight Diverters on the earth wire of the line, five metres apart, alternating black and white; – The appropriate bird mitigation measures structures need to be monitored and serviced and should be made a top priority for the duration of the project.								

7.7.2 OPERATIONAL PHASE

The following potential impacts were considered on biodiversity (fauna and flora) during the operational phase. This phase refers to when construction has been completed and the proposed infrastructure has been built and is functional.

CONTINUED DISTURBANCE OF VEGETATION COMMUNITIES, ESPECIALLY THREATENED SPECIES, AND ENCROACHMENT BY ALIEN INVASIVE PLANT SPECIES

Due to the vegetation communities that were cleared within the footprint area during the construction phase, being entirely transformed, indirect impacts to the surrounding vegetation communities and ecosystems are the main impact considered. The edges of the access and service roads will likely be degraded by impacts such as dust (reduces the effectiveness of photosynthesis and pollination), livestock and alien vegetation will become a concern in these disturbed areas. The unregulated movement of local people into the areas surrounding the footprint will likely result in plant harvesting. The impact of the operational phase on the impact on vegetation is shown in **Table 7-31** below.

Table 7-31: Assessment of significance of potential impacts on the terrestrial flora associated with the operational phase of the project.

Potential Impact: CONTINUED DISTURBANCE OF VEGETATION COMMUNITIES, ESPECIALLY THREATENED SPECIES, AND ENCROACHMENT BY ALIEN INVASIVE PLANT SPECIES	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	(-)	High
With Mitigation	3	1	2	1	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	– Prevent the further loss and fragmentation of vegetation communities and the CBA 1 and CBA 2 areas in the vicinity of the project area (including water resource areas);								

Potential Impact: CONTINUED DISTURBANCE OF VEGETATION COMMUNITIES, ESPECIALLY THREATENED SPECIES, AND ENCROACHMENT BY ALIEN INVASIVE PLANT SPECIES	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	— As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species; — Follow the guidelines for interpreting SEI; and — Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern).							

ONGOING DISPLACEMENT, DIRECT MORTALITIES AND DISTURBANCE OF FAUNAL COMMUNITY DUE TO HABITAT LOSS AND DISTURBANCES (SUCH AS DUST AND NOISE MAINLY THROUGH THE MAINTENANCE OF THE SYSTEM)

Ongoing displacement due to sensory disturbance during operation (noise, light, dust, pollution and vibrations) from the service vehicles. The footprint area of the access route will likely be impacted by poaching, litter and roadkill.

The power line is anticipated to have a noteworthy impact during operation as during this time the power line will pose a threat to avifauna, especially sensitive species which are expected to occur in the area. If mitigation measures are followed this impact can be reduced as depicted in the tables below. The direct mortality of avifauna due to the OHL is a 'High' risk in general. Suitable mitigation measures include the installation of both bird flaps and diverters, but these are not 100% effective, especially with regards to mitigating against collisions by *Neotis ludwigii*. The impact of the operational phase on the impact on **fauna** is shown in **Table 7-32** below.

Table 7-32: Assessment of significance of potential impacts on the terrestrial fauna associated with the operational phase of the project.

Potential Impact: ONGOING DISPLACEMENT, DIRECT MORTALITIES AND DISTURBANCE OF FAUNAL COMMUNITY DUE TO HABITAT LOSS AND DISTURBANCES	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	5	3	3	4	5	**75**	**High**	(-)	High
With Mitigation	3	2	2	3	3	**30**	**Moderate**	(-)	High
Mitigation and Management Measures	— Prevent the further loss and fragmentation of vegetation communities and the CBA 1 and CBA 2 areas in the vicinity of the project area (including water resource areas); — As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species; — Follow the guidelines for interpreting SEI; and — Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern).								

7.8 AVIFAUNA

Negative impacts on avifauna by electricity infrastructure generally take two main forms namely electrocution and collisions (Ledger & Annegarn 1981; Ledger 1983; Ledger 1984; Hobbs and Ledger 1986a; Hobbs & Ledger 1986b; Ledger, Hobbs & Smith, 1992; Verdoorn 1996; Kruger & Van Rooyen 1998; Van Rooyen 1998; Kruger 1999; Van Rooyen 1999; Van Rooyen 2000; Van Rooyen 2004; Jenkins et al. 2010). Displacement due to habitat destruction and disturbance associated with the construction of the electricity infrastructure is another impact that could potentially impact on avifauna.

ELECTROCUTIONS

Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (Van Rooyen 2004). The electrocution risk is largely determined by the pole/tower design. In the case of the proposed Maralla overhead power line, the electrocution risk is envisaged to be negligible because the proposed design of the 132kV line, namely the steel monopole and the clearance distances between the live and earthed components. The Maralla grid connection power line should not pose an electrocution threat to the priority species which are likely to occur in the PAOI and immediate surrounding environment. This potential impact need not be further assessed.

COLLISIONS

Collisions are one of the biggest threat posed by overhead lines to birds in southern Africa (Van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds, and to a lesser extent, vultures. These species are mostly heavy-bodied birds with limited manoeuvrability, which makes it difficult for them to take the necessary evasive action to avoid colliding with transmission lines (Van Rooyen 2004, Anderson 2001). In a PhD study, Shaw (2013) provides a concise summary of the phenomenon of avian collisions with transmission lines:

"*The collision risk posed by power lines is complex and problems are often localised. While any bird flying near a power line is at risk of collision, this risk varies greatly between different groups of birds, and depends on the interplay of a wide range of factors (APLIC 1994). Bevanger (1994) described these factors in four main groups – biological, topographical, meteorological and technical. Birds at highest risk are those that are both susceptible to collisions and frequently exposed to power lines, with waterbirds, gamebirds, rails, cranes and bustards usually the most numerous reported victims (Bevanger 1998, Rubolini et al. 2005, Jenkins et al. 2010*).

The proliferation of man-made structures in the landscape is relatively recent, and birds are not evolved to avoid them. Body size and morphology are key predictive factors of collision risk, with large-bodied birds with high wing loadings (the ratio of body weight to wing area) most at risk (Bevanger 1998, Janss 2000). These birds must fly fast to remain airborne, and do not have sufficient manoeuvrability to avoid unexpected obstacles. Vision is another key biological factor, with many collision-prone birds principally using lateral vision to navigate in flight, when it is the lower-resolution, and often restricted, forward vision that is useful to detect obstacles (Martin & Shaw 2010, Martin 2011, Martin et al. 2012). Behaviour is important, with birds flying in flocks, at low levels and in crepuscular or nocturnal conditions at higher risk of collision (Bevanger 1994). Experience affects risk, with migratory and nomadic species that spend much of their time in unfamiliar locations also expected to collide more often (Anderson 1978, Anderson 2002). Juvenile birds have often been reported as being more collision-prone than adults (e.g. Brown et al. 1987, Henderson et al. 1996).

Topography and weather conditions affect how birds use the landscape. Power lines in sensitive bird areas (e.g. those that separate feeding and roosting areas, or cross flyways) can be very dangerous (APLIC 1994, Bevanger 1994). Lines crossing the prevailing wind conditions can pose a problem for large birds that use the wind to aid take-off and landing (Bevanger 1994). Inclement weather can disorient birds and reduce their flight altitude, and strong winds can result in birds colliding with power lines that they can see but do not have enough flight control to avoid (Brown et al. 1987, APLIC 2012).

The technical aspects of power line design and siting also play a big part in collision risk. Grouping similar power lines on a common servitude, or locating them along other features such as tree lines, are both approaches thought to reduce risk (Bevanger 1994). In general, low lines with short span lengths (i.e. the distance between two adjacent pylons) and flat conductor configurations are thought to be the least dangerous (Bevanger 1994, Jenkins et al. 2010). On many higher voltage lines, there is a thin earth (or ground) wire above the conductors, protecting the system from lightning strikes. Earth wires are widely accepted to cause the majority of collisions on power lines with this configuration because they are difficult to see, and birds flaring to avoid hitting the conductors often put themselves directly in the path of these wires (Brown et al. 1987, Faanes 1987, Alonso et al. 1994a, Bevanger 1994)."

From incidental record keeping by the Endangered Wildlife Trust, it is possible to give a measure of what species are generally susceptible to power line collisions in South Africa (Figure 5).

Power line collisions are generally accepted as a key threat to bustards (Raab *et al*. 2009; Raab *et al*. 2010; Jenkins & Smallie 2009; Barrientos *et al*. 2012, Shaw 2013). In a recent study, carcass surveys were performed under high voltage transmission lines in the Karoo for two years, and low voltage distribution lines for one year (Shaw 2013). Ludwig's Bustard was the most common collision victim (69% of carcasses), with bustards generally comprising 87% of mortalities recovered. Total annual mortality was estimated at 41% of the Ludwig's Bustard population, with Kori Bustards also dying in large numbers (at least 14% of the South African population killed in the Karoo alone). Karoo Korhaan was also recorded, but to a much lesser extent than Ludwig's Bustard. The reasons for the relatively low collision risk of this

species probably include their smaller size (and hence greater agility in flight) as well as their more sedentary lifestyles, as local birds are familiar with their territory and are less likely to collide with power lines (Shaw 2013).

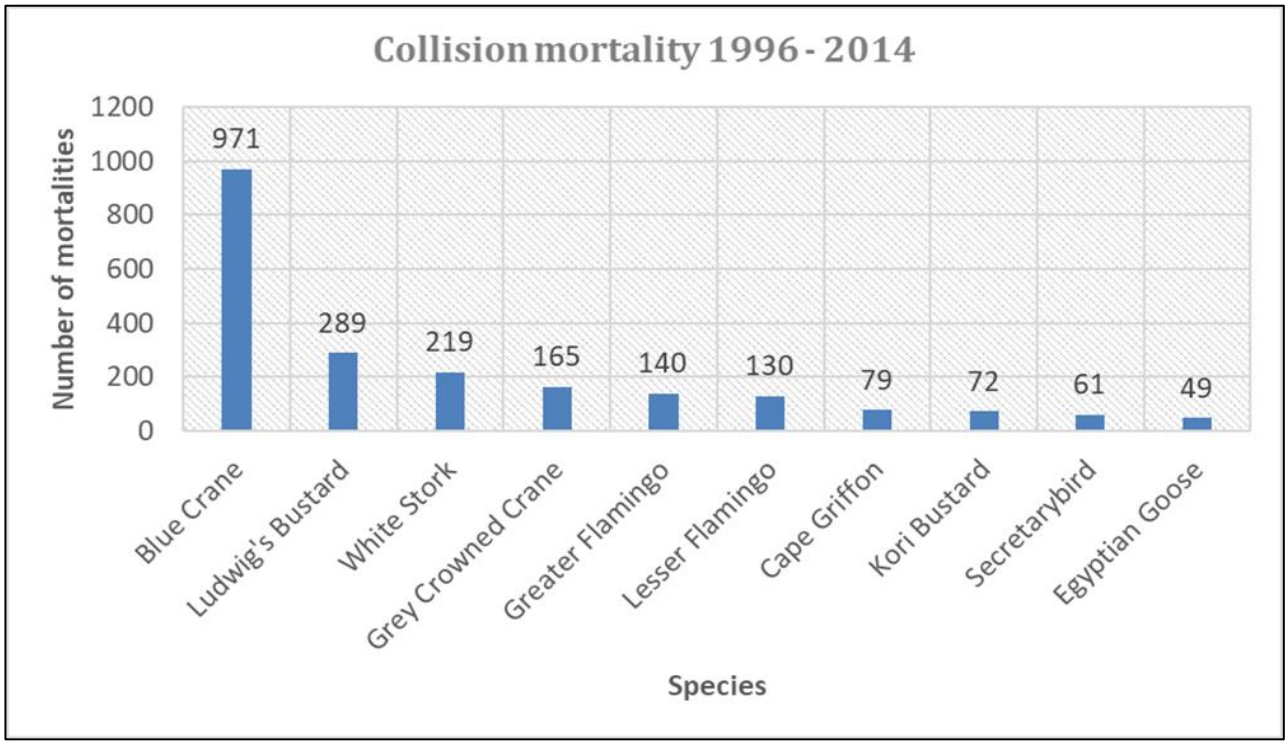


Figure 7-1: The top 10 collision prone bird species in South Africa, in terms of reported incidents contained in the Eskom/Endangered Wildlife Trust Strategic Partnership central incident register 1996 - 2014 (EWT unpublished data)

Several factors are thought to influence avian collisions, including the manoeuvrability of the bird, topography, weather conditions and power line configuration. An important additional factor that previously has received little attention is the visual capacity of birds; i.e. whether they are able to see obstacles such as power lines, and whether they are looking ahead to see obstacles with enough time to avoid a collision. In addition to helping explain the susceptibility of some species to collision, this factor is key to planning effective mitigation measures. Recent research provides the first evidence that birds can render themselves blind in the direction of travel during flight through voluntary head movements (Martin & Shaw 2010). Visual fields were determined in three bird species representative of families known to be subject to high levels of mortality associated with power lines i.e. Kori Bustards *Ardeotis kori*, Blue Cranes and White Storks. In all species the frontal visual fields showed narrow and vertically long binocular fields typical of birds that take food items directly in the bill under visual guidance. However, these species differed markedly in the vertical extent of their binocular fields and in the extent of the blind areas which project above and below the binocular fields in the forward-facing hemisphere. The importance of these blind areas is that when in flight, head movements in the vertical plane (pitching the head to look downwards) will render the bird blind in the direction of travel. Such movements may frequently occur when birds are scanning below them (for foraging or roost sites, or for conspecifics). In bustards and cranes pitch movements of only 25° and 35°, respectively, are sufficient to render the birds blind in the direction of travel; in storks, head movements of 55° are necessary. That flying birds can render themselves blind in the direction of travel has not been previously recognised and has important implications for the effective mitigation of collisions with human artefacts including wind turbines and power lines. These findings have applicability to species outside of these families especially raptors (A*ccipitridae*) which are known to have small binocular fields and large blind areas similar to those of bustards and cranes and are also known to be vulnerable to power line collisions.

Despite doubts about the efficacy of line marking to reduce the collision risk for bustards (Jenkins *et al*. 2010; Martin *et al.* 2010), there are numerous studies which prove that marking a line with PVC spiral type Bird Flight Diverters (BFDs) generally reduce mortality rates (e.g. Bernardino *et al.* 2018; Sporer *et al.* 2013, Barrientos *et al*. 2011; Jenkins *et al*. 2010; Alonso & Alonso 1999; Koops & De Jong 1982), including to some extent for bustards (Barrientos *et al*. 2012; Hoogstad 2015 pers.comm). Beaulaurier (1981) summarised the results of 17 studies that involved the marking of earth wires and found an average reduction in mortality of 45%. Barrientos *et al.* (2011) reviewed the results of 15 wire marking experiments in which transmission or distribution wires were marked to examine the effectiveness of flight diverters in

reducing bird mortality. The presence of flight diverters was associated with a decrease of 55–94% in bird mortalities. Koops and De Jong (1982) found that the spacing of the BFDs was critical in reducing the mortality rates - mortality rates are reduced up to 86% with a spacing of 5m, whereas using the same devices at 10m intervals only reduces the mortality by 57%. Barrientos *et al*. (2012) found that larger BFDs were more effective in reducing Great Bustard collisions than smaller ones. Line markers should be as large as possible, and highly contrasting with the background. Colour is probably less important as during the day the background will be brighter than the obstacle with the reverse true at lower light levels (e.g. at twilight, or during overcast conditions). Black and white interspersed patterns are likely to maximise the probability of detection (Martin *et al*. 2010).

Using a controlled experiment spanning a period of nearly eight years (2008 to 2016), the Endangered Wildlife Trust (EWT) and Eskom tested the effectiveness of two types of line markers in reducing power line collision mortalities of large birds on three 400kV transmission lines near Hydra substation in the Karoo. Marking was highly effective for Blue Cranes, with a 92% reduction in mortality, and large birds in general with a 56% reduction in mortality, but not for bustards, including the endangered Ludwig's Bustard. The two different marking devices were approximately equally effective, namely spirals and bird flappers, they found no evidence supporting the preferential use of one type of marker over the other (Shaw *et al*. 2017).

The priority species which are potentially vulnerable to this impact are listed below:

- African Black Duck
- African Sacred Ibis
- African Spoonbill
- Black Stork
- Black-headed Heron
- Cape Shoveler
- Cape Teal
- Common Moorhen
- Egyptian Goose
- Grey Heron
- Hadada Ibis
- Helmeted Guineafowl
- Karoo Korhaan
- Little Grebe
- Ludwig's Bustard
- Red-billed Teal
- Red-knobbed Coot
- Reed Cormorant
- Secretarybird
- South African Shelduck
- Southern Black Korhaan
- Spur-winged Goose
- Verreaux's Eagle
- White-breasted Cormorant
- Yellow-billed Duck

DISPLACEMENT DUE TO HABITAT DESTRUCTION AND DISTURBANCE

During the construction of power lines and service roads (jeep tracks), habitat destruction/transformation inevitably takes place. The construction activities will constitute the following:

- Site clearance and preparation;
- Construction of the infrastructure (i.e. the overhead power line);
- Transportation of personnel, construction material and equipment to the site, and personnel away from the site;
- Removal of vegetation for the proposed overhead power line, stockpiling of topsoil and cleared vegetation;
- Excavations for infrastructure;

These activities could impact on birds breeding, foraging and roosting in or in close proximity of the proposed powerline through transformation of habitat, which could result in temporary or permanent displacement. However, the habitat in the PAOI is relatively uniform from a bird impact perspective, with fairly large expanses of renosterveld. The loss of habitat for priority species in the PAOI due to direct habitat transformation associated with the construction of the proposed 132kV overhead power line is likely to be minimal, as the footprint of the poles is relatively small, and little vegetation clearance will be required due to the nature of the vegetation.

Apart from direct habitat destruction, the above-mentioned activities also impact on birds through disturbance; this could lead to breeding failure if the disturbance happens during a critical part of the breeding cycle. Construction activities in close proximity to breeding locations could be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. A potential mitigation measure is the timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle, although in practice that can admittedly be very challenging to implement. Terrestrial species in the PAOI are most likely to be affected by displacement due to disturbance.

The priority species which are potentially vulnerable to this impact are listed below:

- Ludwig's Bustard
- Helmeted Guineafowl
- Karoo Korhaan
- Southern Black Korhaan

7.8.1 CONSTRUCTION PHASE

This is impact assessment is applicable to all alternatives.

The following potential impacts have been identified:

- Displacement due to disturbance associated with the construction of the Maralla grid connection power line.
- Displacement due to habitat transformation associated with the construction of the Maralla grid connection power line.

DISPLACEMENT DUE TO DISTURBANCE ASSOCIATED WITH THE CONSTRUCTION

The displacement due to disturbance associated with the construction impact on avifauna habitat is shown in **Table 7-33** below.

Table 7-33: Displacement due to disturbance associated with the construction Impact on Avifauna

Potential Impacts: **DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE ASSOCIATED CONSTRUCTION**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	**4**	**2**	**3**	**2**	**4**	**44**	**Moderate**	**(-)**	**High**
With Mitigation	3	2	3	2	3	**30**	**Low**	(-)	High
Mitigation and Management Measures	— Conduct a pre-construction inspection (avifaunal walk-through) as soon as the OHL, together with its associated pole positions, have been approved to identify species of conservation concern (SCC) that may be breeding within the infrastructure footprints. If a nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season or other measures deemed suitable and practical at the time. — Bird Flight Diverters must be fitted to the entire OHL according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices								

Potential Impacts: DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE ASSOCIATED CONSTRUCTION	Magnitude	Extent	Reversibility	Duration	Probability	Significance	Character	Confidence
	must be installed as soon as the conductors and earthwire are strung. – Vegetation clearance must be limited to what is unavoidable. – Construction activity must be restricted to the immediate footprint of the infrastructure. – Access to the remainder of the site must be strictly controlled to prevent unnecessary disturbance of priority species. – Measures to control noise and dust must be applied according to current best practice in the industry. – Maximum used must be made of existing access roads and the construction of new roads should be kept to a minimum.							

DISPLACEMENT DUE TO HABITAT TRANSFORMATION ASSOCIATED WITH THE CONSTRUCTION

The displacement due to habitat transformation associated with the construction impact on avifauna is shown in **Table 7-34** below.

Table 7-34: Displacement due to habitat transformation associated with the construction Impact on Avifauna

Potential Impacts: DISPLACEMENT DUE TO HABITAT TRANSFORMATION ASSOCIATED WITH THE CONSTRUCTION	Magnitude	Extent	Reversibilit	Duration	Probability	Significance		Character	Confidence
Without Mitigation	**4**	**2**	**3**	**2**	**4**	**44**	**Moderate**	**(-)**	**High**
With Mitigation	3	2	3	2	3	**30**	**Low**	(-)	High
Mitigation and Management Measures	– Conduct a pre-construction inspection (avifaunal walk-through) as soon as the OHL, together with its associated pole positions, have been approved to identify species of conservation concern (SCC) that may be breeding within the infrastructure footprints. If a nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season or other measures deemed suitable and practical at the time. – Bird Flight Diverters must be fitted to the entire OHL according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors and earthwire are strung. – Vegetation clearance must be limited to what is unavoidable. – Construction activity must be restricted to the immediate footprint of the infrastructure. – Access to the remainder of the site must be strictly controlled to prevent unnecessary disturbance of priority species. – Measures to control noise and dust must be applied according to current best practice in the industry. – Maximum use must be made of existing access roads and the construction of new roads should be kept to a minimum.								

7.8.2 OPERATIONAL PHASE

This is impact assessment is applicable to all alternatives. The following potential impacts have been identified:

- Displacement of priority species due to habitat transformation associated with the operation of the on-site substation and 132kV overhead power line
- Mortality of priority species due to collisions with the Maralla 132kV overhead power line

DISPLACEMENT OF PRIORITY SPECIES DUE TO HABITAT TRANSFORMATION

The displacement of priority species due to habitat transformation operational impact on avifauna is shown in **Table 7-35** below.

Table 7-35: Displacement of priority species due to habitat transformation Operation Impact on Avifauna

Potential Impacts: DISPLACEMENT OF PRIORITY SPECIES DUE TO HABITAT TRANSFORMATION	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	4	2	**24**	**Low**	**(-)**	**High**
With Mitigation	2	2	3	4	2	**22**	**Low**	(-)	High
Mitigation and Management Measures	— The mitigation measures proposed by the biodiversity specialist must be strictly enforced. — Bird flight diverters should be installed for the full span length on the earthwire (according to Eskom guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.								

MORTALITY OF PRIORITY SPECIES DUE TO COLLISIONS

The **mortality of priority species due to collisions** operational impact on avifauna is shown in **Table 7-36** below.

Table 7-36: Mortality of priority species due to collisions Operation Impact on Avifauna

Potential Impacts: MORTALITY OF PRIORITY SPECIES DUE TO COLLISIONS	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	5	3	3	4	4	**60**	**Moderate**	**(-)**	**High**
With Mitigation	3	3	3	4	3	**39**	**Moderate**	(-)	High
Mitigation and Management Measures	— The mitigation measures proposed by the biodiversity specialist must be strictly enforced. — Bird flight diverters should be installed for the full span length on the earthwire (according to Eskom guidelines - five metres apart). Light and dark colour devices must be alternated to provide contrast against both dark and light backgrounds respectively. These devices must be installed as soon as the conductors are strung.								

7.8.3 DECOMMISSIONING PHASE

This impact assessment is applicable to all alternatives. The following potential impacts have been identified:

- Displacement due to disturbance associated with the decommissioning of the Maralla grid connection power line.

DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE ASSOCIATED WITH DECOMMISSIONING OF THE ON-SITE SUBSTATION AND 132KV OVERHEAD POWER LINE

The displacement of priority species due to disturbance associated with decommissioning of the on-site substation and 132kV overhead power line decommissioning impact on avifauna is shown in **Table 7-37** below.

Table 7-37: Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and 132kV overhead power line Decommissioning Impact on Avifauna

Potential Impacts: **DISPLACEMENT OF PRIORITY SPECIES DUE TO DISTURBANCE ASSOCIATED WITH DECOMMISSIONING OF THE ON-SITE SUBSTATION AND 132KV OVERHEAD POWER LINE**	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	4	2	3	2	4	**44**	**Moderate**	**(-)**	**High**
With Mitigation	3	2	3	2	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— Conduct an avifaunal inspection of the OHL prior to its decommissioning to identify nests on the poles/towers. — Decommissioning activity should be restricted to the immediate footprint of the infrastructure as far as possible. — Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species. — Measures to control noise and dust should be applied according to current best practice in the industry. — Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum.								

7.9 VISUAL

This is impact assessment is applicable to all alternatives

7.9.1 CONSTRUCTION PHASE

POTENTIAL VISUAL IMPACT OF CONSTRUCTION ACTIVITIES ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE PROPOSED GRID CONNECTION INFRASTRUCTURE

During construction, there may be an increase in heavy vehicles utilising the roads to the power line and substation that may cause, at the very least, a visual nuisance to other road users and landowners in the area. The construction impact on the visual landscape is indicated in **Table 7-38** below.

Table 7-38: Construction Impact on Visual Landscape

Potential Impact: **VISUAL IMPACT OF CONSTRUCTION ACTIVITIES ON SENSITIVE VISUAL RECEPTORS IN CLOSE PROXIMITY TO THE PROPOSED GRID CONNECTION INFRASTRUCTURE**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
With Mitigation	1	2	3	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	Planning: — Retain and maintain natural vegetation immediately adjacent to the development footprint/servitude. Construction: — Ensure that vegetation is not unnecessarily removed during the construction phase.								

	— Plan the placement of lay-down areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible. — Restrict the activities and movement of construction workers and vehicles to the immediate construction area and existing access roads. — Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed of regularly at licensed waste facilities. — Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). — Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts. — Rehabilitate all disturbed areas immediately after the completion of construction works.

7.9.2 OPERATIONAL PHASE

POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS LOCATED WITHIN A 0.5KM RADIUS OF THE GRID CONNECTION INFRASTRUCTURE DURING THE OPERATIONAL PHASE

The power line is expected to have a **low** visual impact (significance rating = 26) on observers within a 0.5km radius of the power line structures. This is due to the general absence of potentially sensitive visual receptors brought about by the remote location of the infrastructure. The areas of potential visual impact (i.e. De Kom, Oranjefontein and De Hoopis) are unlikely to be affected, as these dwellings are all located on the properties earmarked for either the Hidden Valley of Maralla WEFs, implying their approval of the WEF infrastructure.

The Komsberg/Kareedoringkraal secondary road may be affected by Alternatives 1A, 1B and 3 (more so than by Alternative 2A, 4A and 4B), but this road does not carry a large amount of traffic and is not considered as a regional tourist route. It is further expected that once the wind turbine structures are constructed, the much larger wind turbines would distract attention away from the more constrained power line structures.

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

The operational impact on the visual landscape is indicated in **Table 7-39** below.

Table 7-39: Operational Impact on Visual Landscape

Potential Impact:	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Visual impact on observers travelling along the roads and residents at homesteads in close proximity to the power line structures.									
Without Mitigation	4	2	3	4	2	**26**	**Low**	(-)	High
With Mitigation	4	2	3	4	2	**26**	**Low**	(-)	High
Mitigation and Management Measures	— Maintain the general appearance of the infrastructure. —								

POTENTIAL VISUAL IMPACT ON SENSITIVE VISUAL RECEPTORS WITHIN THE REGION (0.5 – 3KM RADIUS) DURING THE OPERATION OF THE GRID CONNECTION INFRASTRUCTURE

The grid connection infrastructure will have a **low** visual impact (significance rating = 26) on observers traveling along the roads and residents of homesteads within a 1.5 - 3km radius of the infrastructure.

No mitigation of this impact is possible (i.e. the structures will be visible regardless), but general mitigation and management measures are recommended as best practice. The table below illustrates this impact assessment.

The visual impact of operation activities on sensitive visual receptors within the region (0.5– 3km radius) is indicated in **Table 7-40** below.

Table 7-40: Operational Impact on Visual Landscape

Potential Impact:	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Visual impact on sensitive visual receptors within the region (0.5 – 3km radius) during the operation of the grid connection infrastructure									
Without Mitigation	3	3	3	4	2	**26**	**Low**	(-)	High
With Mitigation	3	3	3	4	2	**26**	**Low**	(-)	High
Mitigation and Management Measures	— Maintain the general appearance of the infrastructure. —								

7.10 WASTE MANAGEMENT

This is impact assessment is applicable to all alternatives.

7.10.1 CONSTRUCTION PHASE

Construction-related waste is not anticipated to trigger the need for a Waste Management Licence (WML) in terms of NEMWA (Refer to **Section 2**). Waste management at the Project site will be undertaken in line with the EMPr to consider the correct disposal of general and hazardous waste generated on the Project. **Table 7-41** describes the different waste streams that the proposed Project will likely generate, as well as the various potential management options. Due to the nature of the Project, waste will mainly be generated during the construction phase. During operation, Eskom staff are only on the site for limited amount of time as and when maintenance is required. The construction impact on improper waste management and littering is indicated in **Table 7-47**.

Table 7-41: Waste Management Options

WASTE	TYPE OF WASTE	MANAGEMENT OPTIONS
Hydrocarbons (Contaminated soil)	Hazardous	Fuel and oil spillages can be a source of contamination of water sources and the soil. Management options include: — Ensure hazardous waste is stored separately from general waste; — Using spill kits to clean any spillages; — Ensure storage facilities are maintained and meet industry regulations; — Transportation and storage of fuel must be regulated and correctly managed according to the EMPr; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; — Co-ordinate waste removal with the removal of waste from the contractor laydown area; and — All hazardous waste is to be disposed of at a registered hazardous landfill (safe disposal certificates must be obtained).
Contaminated Personal Protective Equipment (PPE) / Used oil containers	Hazardous	PPE can be contaminated during handling of hydrocarbons. Management options include: — Store contaminated PPE / used oil containers in hazardous waste skips along the servitude; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; — Co-ordinate waste removal with the removal of waste from the contractor laydown area; and — Ensure contaminated PPE is disposed of at a registered hazardous landfill (safe disposal certificates must be obtained).

WASTE	TYPE OF WASTE	MANAGEMENT OPTIONS
General waste	General	General waste (inorganic matter) can be disposed of as per normal and form part of the municipal waste management system. Management options include: — Ensure waste is stored securely in refuse bins; — Recycling of waste to be undertaken, where possible; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; and — Co-ordinate waste removal with the general removal of waste from the contractor laydown area.
Food waste	General	Food waste is generated as site personnel take their meals on the construction site. Management options include: — Store any waste and packaging into a labelled food waste bin; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; — Co-ordinate waste removal with the removal of waste from the contractor laydown area; and — Co-ordinate waste removal with the general removal of waste from the contractor laydown area.

The construction impact on improper waste management and littering is indicated in **Table 7-42** below.

Table 7-42: Construction Impact on Improper Waste Management

Potential Impact: IMPROPER WASTE MANAGEMENT AND LITTERING	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	1	3	1	4	**32**	**Moderate**	(-)	High
With Mitigation	2	1	1	1	3	**15**	**Low**	(-)	High
Mitigation and Management Measures	— Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be stored at the construction camp / laydown area and removed from site on a weekly basis to prevent rodents and pests entering the site; — A minimum of one toilet must be provided per 10 persons; — The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility; — Hazardous waste must be stored separately in covered containers and appropriately disposed of at a licensed disposal facility; — Recycling should take place, where possible; — Where a registered disposal facility is not available close to the Project area, the Contractor shall provide a method statement with regards to waste management. Under no circumstances may domestic waste be burned on site; and — Storage of domestic waste shall be in covered waste skips.								

7.10.2 OPERATIONAL PHASE

No operational phase impacts are expected as a maintenance team will only be on site as and when required (intermittently) and for an extremely limited time. As such, the impacts are considered negligible.

7.11 HERITAGE

The two previously proposed Maralla WEF OHL routes were not field tested and Webley and Halkett's (2017a) assumptions in the HIA about the likely archaeology of the area were based on the field assessments undertaken for the Esizayo WEF and the Maralla East and West WEFs (Webley and Halkett 2017b, 2017c), for the Sutherland WEF (Halkett & Webley 2011) and for the Hidden Valley (now Soetwater) WEF, immediately south of the Maralla WEFs (Booth (2012).

Generally, these studies found that there is very little evidence for ESA or MSA material in the area. Scatters of LSA stone artefacts do occur and are often found on the talus slopes, below shelters some of which contain rock art. They are of medium significance.

Three rock art sites were reported from the Maralla WEF study area, and these sites are of high significance.

A few "pastoralist settlements" were identified along dry riverbeds in the bottom of valleys and contain LSA artefacts, ceramics and grindstones. They are of medium significance. There are, potentially, graves/cairns within the study area and these are of high significance. There are numerous roughly packed, circular enclosures of dry stone walling, which may represent both pre-colonial and colonial era stone kraals, distributed along the lower slopes of small koppies, and close to streams or fountains across the study area. They are of low to medium significance. Booth (2012) reports examples of stone walling in the Hidden Valley WEF.

The field surveys referred to above identified a handful of archaeological stone scatters and isolated artefacts within the Maralla West WEF in the vicinity of the OHL options where they converge on the onsite WEF substation (see Figure 7 and Appendices 4 and 5). The stone scatters were graded as being of medium significance (IIIB) while the isolated artefacts were not deemed to be conservation worthy (NCW) (Halkett & Webley 2011; Webley & Halkett 2017c).

This is impact assessment is applicable to all alternatives.

7.11.1 CONSTRUCTION PHASE

ARCHAEOLOGY

Very little archaeological material was identified on those portions of the three OHL route options (1(A), 1(B) and 2(A)) accessed in 2021. Neither Alternative 4 nor the preferred landowner route option have been specifically subject to archaeological survey. However, the results of the numerous archaeological assessments conducted in the Klein-Roggeveldberge serve as a good indicator of the distribution and type of archaeological sites and materials that may be expected on the OHL route options under consideration.

The nature of the local geology means that rock shelters with layered deposits are rare and archaeological material tends to be found in open contexts. Material is also generally not visible on the surface, except where exposed by the erosion of the colluvial coversands which mantle the area. Sites are often associated with watercourses and do not tend to occur on the exposed mountaintops of the area.

The material identified by this and other nearby assessments tends to comprise mainly isolated artefacts or very thin scatters of lithics, most usually dating to the MSA, and of generally low to very low archaeological significance. Should this material be damaged or destroyed during the construction of the OHL the loss to heritage will not be significant.

Where more dense occurrences of material have been recorded, such as the LSA scatter on OHL Option 2(A), these have been assigned a medium archaeological significance and damage to or the destruction of such sites during the construction of the OHL will be more significant.

Based on the above, the impact significance of the construction of the OHL on archaeological resources is assessed as low (negative).

This assessment applies to the all the OHL route options under consideration which are all likely to have a lower impact significance than the considerably longer authorised grid connection to the Komsberg substation.

Impacts due to the construction of OHL access roads will probably be greater than those attributable to excavations for pylon footings.

Significant further impacts during the operational and de-commissioning phases of the electrical infrastructure are not anticipated.

Potential impacts on archaeological heritage resources arising from the construction of the Maralla East and West WEF OHL are assessed. The potential impact on heritage resources is indicated in **Table 7-43** below.

Table 7-43: Construction Impact on Heritage Resources

Potential Impact: / **DAMAGE TO HERITAGE RESOURCES**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	5	5	2	**26**	**Low**	(-)	High
With Mitigation	1	1	3	1	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— Conduct site excavations carefully to avoid damaging any potential heritage resources; and — If any heritage resources are discovered, SAHRA should be notified and investigation conducted before any activities can commence. — A Chance Find Procedure must be developed to manage any heritage chance finds.								

BUILT ENVIRONMENT

The 2021 walkover survey identified a number of historical stone structures in the vicinity of a number of the OHL options. These features have all been assessed to have moderate local value as evidence of historical land use pattern in the region and have been graded IIIB.

The significance of potential impacts on the boundary marker feature arising from the construction of the OHL are indicated in **Table 7-44**.

Table 7-44: Construction Impact on Damage to the Built Environment

Potential Impact: / **DAMAGE TO HERITAGE RESOURCES**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	1	5	5	3	**42**	**Moderate**	(-)	High
With Mitigation	1	1	3	1	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— It is recommended that activities related to the construction of the proposed OHL avoid the line of packed stone boundary markers. — This can be accomplished by adjusting the route alignment either slightly westwards or eastwards to ensure that the OHL does not overprint or overlie this feature. — The line of boundary markers must also be demarcated as a no-go area during the construction of the line..								

7.11.2 OPERATIONAL PHASE

There are no anticipated heritage impacts during the operational phase, as any existing resources would have been discovered during excavations and other intrusive construction activities.

7.12 PALAEONTOLOGY

This is impact assessment is applicable to all alternatives.

7.12.1 CONSTRUCTION PHASE

IMPACTS ON FOSSIL HERITAGE

Given the very uniform underlying geology (and hence expected palaeontological resources), this Basic Assessment applies equally to all the 132 kV grid connection corridors under consideration.

All South African fossil heritage is protected by law (South African Heritage Resources Act, 1999) and fossils may not be collected, damaged or disturbed without a permit from the relevant Provincial Heritage Resources Agency (in this case Heritage Western Cape) . The construction phase of the proposed 132 kV powerline will entail extensive surface clearance (notably for access roads, pylon footings) as well as excavations into the superficial sediment cover and possibly also into the underlying bedrock, albeit to a limited extent (*e.g. for* pylon footings). The development may adversely affect potential fossil heritage within the study area by destroying, damaging, disturbing or permanently sealing-in fossils preserved at or beneath the surface of the ground that are then no longer available for scientific research or other public good. The operational and de-commissioning phases of the transmission integration infrastructure are very unlikely to involve further adverse impacts on local palaeontological heritage and are therefore not separately assessed here. Based on experience with WEFs currently under construction, the main source of potential impacts on palaeontological heritage due to grid connection projects is the construction of new access roads, especially in hilly terrain.

Due to slow-acting natural weathering and erosion processes in a semi-arid Karoo setting, where rates of erosion usually exceed rates deposition, fossils already exposed at the ground surface are being gradually destroyed while new, previously buried fossils are being exposed and "prepared out". Farming activities within the project area have a minimal impact on local palaeontological heritage resources. Fossil collection by qualified palaeontologists or (illegal) amateurs is probably negligible. This assessment refers to impacts on fossil heritage preserved at or beneath the ground surface within the footprint of 132 kV powerlines during the construction phase, mainly due to surface clearance and excavation activities. It is noted that surface clearance for lengthy access roads associated with new powerlines is likely to have greater impact on fossil heritage than the intermittent, shallow excavations for pylon footings. Such impacts on fossil heritage are *limited to the site* (development footprint) and are generally *direct*, *negative* and of *permanent* effect (*irreversible*). While fossils of some sort (including microfossils, invertebrate trace fossils and plant debris) are of widespread occurrence within the project area, unique or scientifically-important fossils are very scarce indeed here, even where bedrock exposure levels are locally high. No highly-sensitive no-go areas have been identified within the Maralla grid connection study area. It is concluded that impacts on *palaeontological heritage resources of scientific and / or conservation value* are of *low probability* and of *low magnitude* since (1) significant fossil sites are unlikely to be affected and (2) in many cases these impacts can be mitigated through the proposed Chance Fossil Finds Protocol. The overall impact significance during the construction phase of the powerline infrastructure *without mitigation* is rated as LOW (NEGATIVE) in terms of palaeontological heritage resources. Should the proposed mitigation measures be fully implemented, the impact significance would remain LOW (NEGATIVE). However, residual negative impacts such as the inevitable loss of fossil heritage would be partially offset by an improved understanding of Karoo fossil heritage which is considered a *positive* impact.

The potential for any fossil heritage impacts is indicated in **Table 7-45** below.

Table 7-45: Construction Impact on Fossil Heritage

Potential Impact: / **DAMAGE TO HERITAGE RESOURCES**	**Magnitude**	**Extent**	**Reversibilit**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	1	5	5	2	**26**	**Low**	(-)	High
With Mitigation	2	1	5	5	2	**26**	**Low**	(-)	High
Mitigation and Management Measures	— Monitoring of all surface clearance and substantial excavations (>1 m deep) by the ECO / ESO for fossil material (*e.g.* bones, teeth, fossil wood) on an on-going basis during the construction phase. — Safeguarding of chance fossil finds (preferably *in situ*) during the construction phase by the responsible ECO / ESO, followed by reporting of finds to SAHRA. — Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy) (Phase 2 mitigation).								

Potential Impact:	Magnitude	Extent	Reversibilit	Duration	Probability	Significance	Character	Confidence
DAMAGE TO HERITAGE RESOURCES								
	– Curation of fossil material within an approved repository (museum / university fossil collection) and submission of a Phase 2 palaeontological heritage report to SAHRA by a qualified palaeontologist.							

7.12.2 OPERATIONAL PHASE

There are no anticipated impacts on palaeontology during the operational phase as any existing resources would have been discovered during excavations and other intrusive construction activities.

7.13 SOCIO-ECONOMIC

Positive socio-economic impacts associated with the proposed OHPL include job creation, skills development and local business opportunities as well as increased energy security. The findings of the SIA indicate that the significance of the potential negative impacts is likely to be low. The potential negative impacts associated with the proposed power line can be effectively mitigated if the recommended mitigation measures are implemented.

This impact assessment is applicable to all alternatives.

7.13.1 CONSTRUCTION PHASE

CREATION OF EMPLOYMENT AND BUSINESS OPPORTUNITIES AND THE OPPORTUNITY FOR SKILLS DEVELOPMENT AND ON-SITE TRAINING

Based on similar projects the construction phase of for the grid connection will extend over a period of approximately 3-6 months and create in the region of 30-40 employment opportunities. Approximately 80% of the jobs will be low-skilled, 15% semi-skilled and 5% skilled. Most of the low and semi-skilled employment opportunities would benefit community members from local towns in the area, including Sutherland, Laingsburg and Matjiesfontein. A percentage of the high skilled positions may also benefit the local community. Most of the employment opportunities are also likely to accrue to Historically Disadvantaged (HD) members from these local communities. Given high local unemployment levels and limited job opportunities in the area, this will represent a localised, social benefit. The remainder of the skilled employment opportunities are likely to be associated with the contactors appointed to construct the grid infrastructure. However, in the absence of specific commitments from the developer to maximise local employment targets the potential opportunities for local employment will be limited. The proponent should therefore commit to employing as many local community members as possible.

The total wage bill will be in the region of R 1.5 million (2021 Rand values). This is based on assumption of R 8 000 per month for low skilled workers, R 12 000 per month for semi-skilled workers and R 25 000 per month for high skilled workers over 4 months. A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in KHM. The capital expenditure associated with the construction of grid infrastructure will be ~ R 15 million and will create opportunities for local companies and the regional and local economy. Implementing the enhancement measures listed below can enhance these opportunities. The sector of the local economy that is most likely to benefit from the proposed development is the local service industry. The potential opportunities for the local service sector would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site. However, given the relatively small scale of the project and short duration of the construction phase these benefits will be limited.

The impact on employment, skills development and business opportunities is shown in **Table 7-46**.

Table 7-46: Construction Impact on Employment, Skills Development and Business Opportunities

Potential Impact: CREATION OF EMPLOYMENT AND BUSINESS OPPORTUNITIES AND THE OPPORTUNITY FOR SKILLS DEVELOPMENT AND ON-SITE TRAINING	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	2	2	0	2	3	**18**	**Low**	(+)	High
With Mitigation	2	3	0	2	4	**28**	**Low**	(+)	High
Mitigation and Management Measures	Employment – Stakeholder engagement should pro-actively start so that we get buy in from the interested and affected stakeholders – Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area. – Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria. – Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase. – The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the Project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the Project. – Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase. – The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. Business – The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work. *Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.*								

PRESENCE OF CONSTRUCTION WORKERS AND POTENTIAL IMPACTS ON FAMILY STRUCTURES AND SOCIAL NETWORKS

The presence of construction workers can pose a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the

disruption of existing family structures and social networks. This risk is linked to potentially risky behaviour, mainly of male construction workers, including:

- An increase in alcohol and drug use.
- An increase in crime levels.
- The loss of girlfriends and/or wives to construction workers.
- An increase in teenage and unplanned / unwanted pregnancies.
- An increase in prostitution.
- An increase in sexually transmitted diseases (STDs), including HIV.

Given the relatively small number of construction workers, namely ~ 30-40, the potential impact on the local community is likely to be negligible.

The impact of the presence of construction workers on family structures and social networks is show in **Table 7-47**.

Table 7-47: Construction Impact on Family Structures and Social Networks

Potential Impact: **PRESENCE OF CONSTRUCTION WORKERS AND POTENTIAL IMPACTS ON FAMILY STRUCTURES AND SOCIAL NETWORKS**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	2	2	3	2	2	**18**	**Low**	(-)	High
With Mitigation	1	1	3	2	2	**14**	**Low**	(-)	High
Mitigation and Management Measures	— Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories. — The proponent and the contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. — The proponent and the contractor should implement an awareness programme for communicable diseases (including HIV/AIDS and COVID-19) for all construction workers at the outset of the construction phase. — The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site. — The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days of their contract coming to an end. — No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.								

SAFETY RISK, LIVESTOCK THEFT AND DAMAGE TO FARM INFRASTRUCTURE ASSOCIATED WITH PRESENCE OF CONSTRUCTION WORKERS

The presence on and movement of construction workers on and off the site poses a potential safety threat to local famers and farm workers in the vicinity of the site. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open. The presence of construction workers on the site also increases the exposure to local farming operations to the outside world, which, in turn, increases the potential risk of stock theft.

The majority of farmers in the area have been exposed to the construction of the Roggeveld, Karusa and Soetwater WEFs, and therefore have first-hand experience of the impacts associated with the construction of WEFs and the associated infrastructure, such as grid connections. The key issues raised included:

- Impact of construction related activities and movement of construction vehicles on the veld. Due to the sensitivity of the vegetation disturbances take many years to recover.

- Farm gates left open by contractors and Eskom employees. This was raised as key concern by all the affected landowners interviewed. This has resulted in stock losses and increased vulnerability to stock theft. Mixing of flocks of different breeds (e.g., meat and wool sheep) also impacts on farming operations. Time and resources are also spent on recovering stock that has escaped due to gates being left open.
- Damage to farm fences. The damage to farm fences poses the same risks to farming operations as leaving farm gates open. In many instances damage to fences caused by contractors occurs in remote areas and is not reported to the farmer.
- Lack of awareness amongst contractors of the impacts that their activities can have on farming operations.

The potential risks (safety, livestock, and farm infrastructure) can be effectively mitigated by careful planning and managing the movement of construction workers on the site during the construction phase. The mitigation measures to address these risks are outlined below. However, as indicated by the comments from local farmers in the area, it would appear that these measures have not been effectively implemented during the construction of Roggeveld, Karusa and Soetwater WEFs. The proponent must therefore take the necessary steps to ensure that the required procedures are put in place to ensure that the mitigation measures are effectively implemented. This includes the implementation of an effective monitoring and evaluation programme during the construction phase. The impact of the presence of construction workers on safety, livestock, and farm infrastructure is shown in **Table 7-48.**

Table 7-48: Construction Impact on Safety, Livestock, and Farm Infrastructure

Potential Impact: **RISK TO SAFETY, LIVESTOCK, AND FARM INFRASTRUCTURE**	**Magnitude**	**Extent**	**Reversibility**	**Duration**	**Probability**	**Significance**		**Character**	**Confidence**
Without Mitigation	3	2	3	2	4	**40**	**Moderate**	(-)	High
With Mitigation	2	1	3	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. — All farm gates must be closed after passing through. — Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site. — The proponent should consider the option of establishing a MF that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site. — The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below). — The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested. — Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. — Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.								

	— It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.

CONSTRUCTION ACTIVITIES AND VEHICLES

The construction activities on site and movement of heavy construction vehicles during the construction phase has the potential to create noise and dust impacts, damage local roads and create safety impacts for other road users. Based on the findings of the SIA the potential dust and noise impacts associated with the construction of the power line are likely to be negligible. The traffic related impacts associated with the transport of materials to the site are also likely to be limited. However, the construction of renewable energy facilities and the associated grid infrastructure has resulted in increased traffic and damage to local roads in the area. The transport of workers to site and speed at which taxis travelled was raised as a concern. Given the relatively small number of construction workers and the short construction period the traffic related impacts associated with transporting workers to and from the site are likely to be limited. As indicated above, the construction phase also poses a risk to farming operations. The impact of construction vehicles and activities is shown in **Table 7-49**.

Table 7-49: Construction Impact on Noise, Dust and Safety

Potential Impact:	**Magnitud**	**Extent**	**Reversibili**	**Duration**	**Probabilit**	**Significan ce**		**Character**	**Confidenc e**
NOISE, DUST AND SAFETY									
Without Mitigation	2	2	1	2	3	**21**	**Low**	(-)	High
With Mitigation	2	1	1	2	2	**12**	**Low**	(-)	High
Mitigation and Management Measures	— The proponent should consider the establishment of a Monitoring Forum (MF) to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts. — Ongoing communication with landowners and road users during construction period. — Establishment of a Grievance Mechanism (GM) that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads. — Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads are maintained in a good condition. — Repair of all affected road portions at the end of construction period, where required. — Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers. — All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.								

RISK OF VELD FIRES

The presence on and movement of construction workers on and off the site and construction related activities such as welding etc., increases the risk of veld fires which pose a risk to livestock, farm infrastructure and game. The loss of grazing also poses a threat to local livelihoods that are dependent on livestock farming. The risk of veld fires is higher during the dry, windy summer months of December through to March. The local landowners indicated that although the risk of veld fires was low, they do pose a threat to farming operations. The impact of veld fires to livestock, farm infrastructure and grazing is shown in **Table 7-50**.

Table 7-50: Construction Impact on Veld Fires

Potential Impact: / RISK OF VELD FIRES	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	2	3	2	3	**30**	**Low**	(-)	High
With Mitigation	2	1	3	2	2	**16**	**Low**	(-)	High
Mitigation and Management Measures	— The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences. — Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas. — Smoking on site should be confined to designated areas. — Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months. — Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle. — Contractor should provide fire-fighting training to selected construction staff. — No construction staff, with the exception of security staff, to be accommodated on site overnight. — As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.								

7.13.2 OPERATIONAL PHASE

IMPROVED ENERGY SECURITY AND ESTABLISHMENT OF ENERGY INFRASTRUCTURE

The proposed power line is essential to enable the development and operation of Maralla WEF. The primary goal of the proposed Maralla WEF is to improve energy security in South Africa by generating renewable energy. The proposed power line should therefore be viewed within the context of the South Africa's current power supply constraints and the reliance on coal powered energy to meet most of its energy needs.

South Africa's energy crisis, which started in 2007 and is ongoing, has resulted in widespread rolling blackouts (referred to as load shedding) due to supply shortfalls. The load shedding has had a significant impact on all sectors of the economy and on investor confidence. The mining and manufacturing sector have been severely impacted and will continue to be impacted until such time as there is a reliable supply to energy. Load shedding in the first six months of 2015 was estimated to have cost South African businesses R13.72 billion in lost revenue with an additional R716 million was spent by businesses on backup generators[7]. A survey of 3 984 small business owners found that 44% said that they had been severely affected by load shedding with 85% stating that it had reduced their revenue, with 40% of small businesses losing 20% or more or revenue during due to load shedding period[8]. The operational impact on energy security is shown in **Table 7-51**.

[7]Goldberg, Ariel (9 November 2015). "The economic impact of load shedding: The case of South African retailers" (PDF). Gordon Institute of Business Science. p. 109

[8] "How does load shedding affect small business in SA?". *The Yoco Small Business Pulse (3: Q1 2019):*

Table 7-51: Operational Impact on Improved Energy Security

Potential Impact: DEVELOPMENT OF INFRASTRUCTURE TO IMPROVE ENERGY SECURITY AND REDUCE RELIANCE ON COAL	Magnitude	Extent	Reversibility	Duration	Probability	Significance		Character	Confidence
Without Mitigation	3	4	0	4	4	**44**	**Moderate**	(+)	High
With Mitigation	3	4	0	4	5	**55**	**High**	(+)	High
Mitigation and Management Measures	— Maximise the number of employment opportunities for local community members. — Implement training and skills development programs for members from the local community. — Maximise opportunities for local content and procurement.								

Residual impacts include improved energy security and overall benefit for economic development and investment, reduction in CO_2 emission and reduction in water consumption for energy generation.

CREATION OF EMPLOYMENT, SKILLS DEVELOPMENT, AND BUSINESS OPPORTUNITIES

The potential employment opportunities associated with the power line will be limited and largely confined to periodic maintenance and repairs. The potential socio-economic benefits will therefore be limited. The impact on employment, skills development and business creation opportunities is shown in **Table 7-52**.

Table 7-52: Operational Impact on Employment Opportunities

Potential Impact: CREATION OF EMPLOYMENT OPPORTUNITIES	Magnitud	Extent	Reversibili	Duration	Probabilit	Significan ce		Character	Confidenc e
Without Mitigation	1	1	0	4	2	**12**	**Low**	(+)	High
With Mitigation	2	2	0	4	3	**30**	**Low**	(+)	High
Mitigation and Management Measures	— Maximise the number of employment opportunities for local community members. — Implement training and skills development programs for members from the local community. — Maximise opportunities for local content and procurement.								

Residual impacts include the creation of permanent employment and skills and development opportunities for members from the local community and creation of additional business and economic opportunities in the area.

GENERATE INCOME FOR AFFECTED LANDOWNERS

The proponent will be required to either purchase the land or enter into a rental agreement with the affected landowners for the use of the land for the establishment of the proposed transmission line. Based on the findings of the SIA the area is prone to droughts and farming operations can be challenging. Any additional source of income therefore represents a significant benefit for the affected landowner(s). The additional income would assist to reduce the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as fuel, feed etc. The additional income would improve economic security of farming operations, which in turn would improve job security of farm workers and benefit the local economy. The impact on income generated for affected farmer(s) is shown in **Table 7-53**.

Table 7-53: Operational Impact on income generated for affected farmer(s)

Potential Impact: RISKS POSED TO FARMING ACTIVITIES BY MAINTENANCE WORKERS	Magnitud	Extent	Reversibili	Duration	Probabilit	Significan ce		Character	Confidenc e
Without Mitigation	2	1	0	3	3	**21**	**Low**	(-)	High
With Mitigation	3	2	0	2	5	**45**	**Moderate**	(-)	High

Mitigation and Management Measures	– Implement agreements with affected landowners.

VISUAL IMPACT AND IMPACT ON SENSE OF PLACE

The areas existing sense of place has been significantly altered by existing transmission lines associated with the Komsberg substation and the establishment of a number of WEFs and associated grid connections. The proposed power line is also located within the Komsberg REDZ and Central Transmission Corridor.The area has therefore been identified as suitable for the establishment of the grid infrastructure. The potential impact on the broader areas sense of place associated with the proposed grid connection will therefore be low.

Based on the findings of the SIA no concerns were raised regarding the potential visual impacts associated with Alternative 1A, 2A, Option A or Option B. However, concerns were raised regarding Alternative 1B and the impact on the viewshed from the dwelling on De Hoop 202/RE and entrance road (van Zyl, Erasmus – pers. comm).

The owners of Drie Roode Heuwels 188/RE (De Kom), Orange Fontein 203/RE and 203/2 and Kentucky 206 (De Plaat) did however indicate that Alternative 1A and 1B were acceptable as both were located within the Komsberg road corridor and thus confined to a disturbed area. In this regard, Alternative 2A Option A and Option B are located in an area that has not been impacted by existing transmission lines. The identification of the preferred alternative should be informed by the VIA.

The visual impact and impact on sense of place is shown in **Table 7-54.**

Table 7-54: Operational Impact on Visual impact and impact on sense of place

Potential Impact: **RISKS POSED TO FARMING ACTIVITIES BY MAINTENANCE WORKERS**	**Magnitud**	**Extent**	**Reversibili**	**Duration**	**Probabilit**	**Significan ce**		**Character**	**Confidenc e**
Without Mitigation	2	2	1	4	3	**27**	**Low**	(-)	High
With Mitigation	2	2	1	4	3	**27**	**Low**	(-)	High
Mitigation and Management Measures	– Recommendations contained in the VIA should be implemented.								

IMPACT ON FARMING OPERATIONS DURING MAINTENANCE

The impacts on farming operations are associated with the footprint of the transmission line and the presence maintenance workers on and off the site. The footprint related impacts are associated with the potential loss of productive farmland. The impacts associated with presence maintenance workers are related to stock losses as result of farm gates being left open and or damaged and damage to fences. The presence of maintenance workers on the site also increases the exposure of their farming operations and livestock to the outside world, which, in turn, increased the potential risk of stock theft and crime. Based on experience with maintenance of the existing Eskom power lines this is an issue that will need to be addressed. The comments from the directly affected land owners on these issues are summarized below

The owners of Drie Roode Heuwels 188/RE (De Kom), Orange Fontein 203/RE and 203/2 and Kentucky 206 (De Plaat) indicated that Alternative 1A and 1B were acceptable as both were located within the Komsberg road corridor and thus confined to a disturbed area. The owners of Drie Roode Heuwels 188/RE (De Kom), Orange Fontein 203/RE and 203/1 indicated that Alternative 2 was not suitable as it would expose more remote sections of the farms to construction and maintenance workers and the related disturbances (Hanekom and Paulsen– pers. comm). Kentucky 206 (De Plaat) is not affected by Alternative 2.

The owner of Orange Fontein 203/1 indicated that Alternative 2A would be acceptable as it impacted on less productive land. Alternative 1A was not supported as it traversed the most productive land on the farm, including potential cropping areas. The property is not affected by Alternative 1B. The owner of De Hoop 202/RE indicated that Alternatives 1A and 2 were acceptable, as the impact would affect the western portion of the property which already accommodates Karusa substation and a transmission line from the Soetwater WEF. Alternative 1B was not supported as it would traverse good pasture and potential cropping areas affect the viewshed from the dwelling on De Hoop 202/RE and entrance road (van Zyl, Erasmus – pers. comm). The concerns associated with Option 2A identified in the SIA are linked to the potential risks posed to farming activities due to the remote location of the area and the potential challenges associated with managing and monitoring construction related activities. These risks also apply to Option A Line and Option B Line However, these risks can be effectively addressed by implementing the mitigation measures listed in the SIA.

Ts indicated above, the concerns associated with Alternative 2A are linked to development of the proposed powerline in remote farming areas and the increased risk that this may pose to farming operations. The concerns associated with Alternative 1A and 1B are linked to impact on productive farmland and visual impacts.

The potential risks (safety, livestock, and farm infrastructure) can be mitigated by ensuring the maintenance teams take care to ensure that gates are kept closed and affected property owners are kept informed about timing of maintenance operations. Mitigation measures to address these risks are outlined below. However, the findings of the SIA indicate that despite measures being in place, these measures are not being implemented affectively by the contractors currently working in the area.

The impact **on farming operations during maintenance** is shown in **Table 7-55**.

Table 7-55: Operational Impact on on Farming Operations during Maintenance

Potential Impact: **RISKS POSED TO FARMING ACTIVITIES BY MAINTENANCE WORKERS**	**Magnitud**	**Extent**	**Reversibili**	**Duration**	**Probabilit**	**Significan ce**		**Character**	**Confidenc e**
Without Mitigation	3	2	3	2	4	**30**	**Low**	(-)	High
With Mitigation	2	2	3	2	3	**27**	**Low**	(-)	High
Mitigation and Management Measures	— The proponent should set up a meeting with owners of Aurora to see if their concerns can be addressed. — Affected property owners should be notified in advance of the timing and duration of maintenance activities. — Maintenance teams must ensure that all farm gates must be closed after passing through. — Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities. — Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations. — Strict traffic speed limits must be enforced on the farm. — No maintenance workers should be allowed to stay over-night on the affected properties.								

7.14 HEALTH AND SAFETY

This is impact assessment is applicable to all alternatives.

7.14.1 CONSTRUCTION PHASE

During construction, the employees are exposed to health and safety hazards from the mechanical machines and equipment used on the site. Furthermore, there is a potential for snakes and other dangerous animals in the area, to which the employees must be warned about and trained on how to handle situations if any encounters occur. The construction impact on health and safety is indicated in **Table 7-56** below.

Table 7-56: Construction Impact on Employee Health and Safety

Potential Impact: **EMPLOYEE HEALTH AND SAFETY**	**Magnitud**	**Extent**	**Reversibili**	**Duration**	**Probabilit**	**Significan ce**		**Character**	**Confidenc e**
Without Mitigation	4	2	3	4	4	**52**	**Moderate**	(-)	High
With Mitigation	2	1	3	4	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— An HSE officer must be appointed to monitor safety conditions during construction activities;								

Potential Impact:	Magnitud	Extent	Reversibili	Duration	Probabilit	Significan ce		Character	Confidenc e
EMPLOYEE HEALTH AND SAFETY									
	— Ensure employees are properly trained to use specific equipment or machinery; — Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area; — Provide suitable personal protective equipment (PPE); — Conduct site and safety induction to raise awareness of the risks associated with the site; — Conduct regular toolbox talks as refreshers to improve health and safety; — Develop safe work instruction method statements that should be used by employees in completing their tasks; — Train all relevant personnel on handling, use and storage of hazardous substances; — Provide Material Safety Data Sheets (MSDS) for all hazardous substances kept onsite; and — All visitors should undergo site induction and be made aware of the risks associated with the site.								

7.14.2 OPERATIONAL PHASE

The operational phase health and safety impacts are expected to be limited to loading and unloading of heavy equipment as well as via the storage and handling of any hazardous material onsite. The impact is expected to be low following mitigation and is indicated in **Table 7-57** below.

Table 7-57: Operation Impact on Employee Health and Safety

Potential Impact:	Magnitud	Extent	Reversibili	Duration	Probabilit	Significan ce		Character	Confidenc e
EMPLOYEE HEALTH AND SAFETY									
Without Mitigation	3	2	3	3	3	**33**	**Moderate**	(-)	High
With Mitigation	2	1	3	4	2	**20**	**Low**	(-)	High
Mitigation and Management Measures	— The HSE officer will monitor safety conditions during activities; — Ensure employees are properly trained to use specific equipment or machinery; — Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area; — Provide suitable PPE; — Conduct site and safety induction to raise awareness of the risks associated with the site; — Conduct regular toolbox talks as refreshers to improve health and safety; — Develop safe work instruction method statements that should be used by employees in completing their tasks; — Train all relevant personnel on handling, use and storage of hazardous substances; — Provide MSDSs for all hazardous substances kept onsite; and — All visitors should undergo site induction and be made aware of the risks associated with the site.								

7.15 NO-GO ALTERNATIVE

The no-go alternative will mean none of the negative and positive impacts described above will come into effect.

The no-go alternative will result in the current status quo being maintained at the proposed development site as far as the avifauna is concerned. The study area itself consists mostly of renosterveld, ephemeral drainage lines and ridge lines. The no-go option would maintain the natural habitat which would be beneficial to the avifauna currently occurring there. However, it is acknowledged that the large number of wind turbines and roads planned for the study area will significantly impact the natural environment.

This assessment found no fatal flaws in the proposed project with regard to heritage resources that would require the implementation of the no-go option in respect of the proposed construction of the OHL**.**

The proposed power line is essential to enable the proposed Maralla WEF to connect to the national electricity grid to address the current energy supply constraints and reduce South Africa's reliance on coal generated energy. As indicated above, energy supply constraints and associated load shedding have had a significant impact on the economic development of the South African economy. South Africa also relies on coal-powered energy to meet more than 90% of its energy needs. South Africa is therefore one of the highest per capita producers of carbon emissions in the world and Eskom, as an energy utility, has been identified as the world's second largest producer of carbon emissions.

The No-Development option would represent a lost opportunity for South Africa to improve energy security and supplement is current energy needs with renewable energy. Given South Africa's current energy security challenges and its position as one of the highest per capita producer of carbon emissions in the world, this would represent a negative social cost

8 CUMULATIVE IMPACT ASSESSMENT

Although the BA process is essential to assessing and managing the environmental and social impacts of individual projects, it often may be insufficient for identifying and managing incremental impacts on areas or resources used or directly affected by a given development from other existing, planned, or reasonably defined developments at the time the risks and impacts are identified.

IFC PS 1 recognizes that, in some instances, cumulative effects need to be considered in the identification and management of environmental and social impacts and risks. For private sector management of cumulative impacts, IFC considers good practice to be two pronged:

- effective application of and adherence to the mitigation hierarchy in environmental and social management of the specific contributions by the project to the expected cumulative impacts; and
- best efforts to engage in, enhance, and/or contribute to a multi-stakeholder, collaborative approach to implementing management actions that are beyond the capacity of an individual project proponent.

Even though Performance Standard 1 does not expressly require, or put the sole onus on, private sector clients to undertake a cumulative impact assessment (CIA), in paragraph 11 it states that the impact and risk identification process "*will take into account the findings and conclusions of related and applicable plans, studies, or assessments prepared by relevant government authorities or other parties that are directly related to the project and its area of influence*" including "*master economic development plans, country or regional plans, feasibility studies, alternatives analyses, and cumulative, regional, sectoral, or strategic environmental assessments where relevant*."

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities (IFC GPH).

Evaluation of potential cumulative impacts is an integral element of an impact assessment. In reference to the scope for an impact assessment, IFC's Performance Standards specify that "*Risks and impacts will be analysed in the context of the project's area of influence. This area of influence encompasses…areas potentially impacted by cumulative impacts from further planned development of the project, any existing project or condition, and other project-related developments that are realistically defined at the time the Social and Environmental Assessment is undertaken; and (iv) areas potentially affected by impacts from unplanned but predictable developments caused by the project that may occur later or at a different location.*" (IFC 2006).

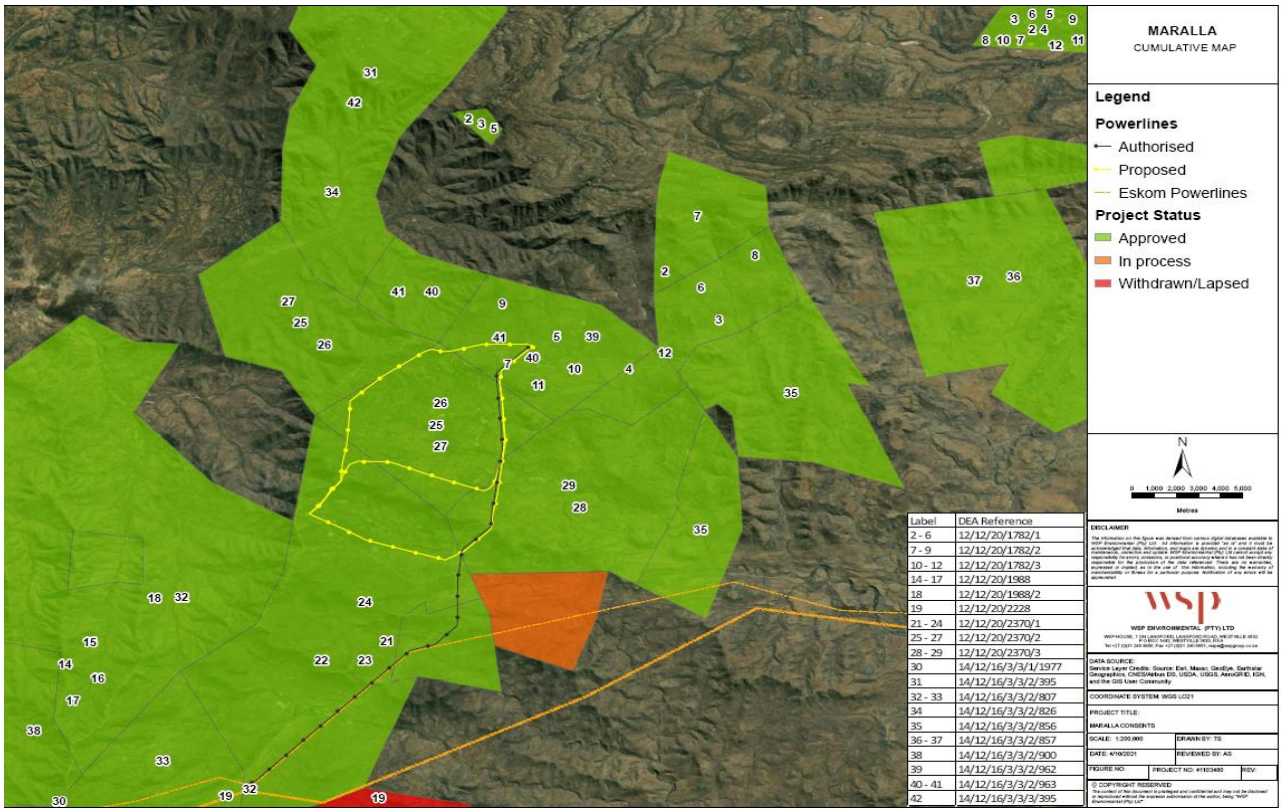
A cumulative impact assessment is the process of (a) analysing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible (IFC GPH).

Cumulative impacts with existing and planned facilities may occur during construction and operation of the proposed OHPL. While one project may not have a significant negative impact on sensitive resources or receptors, the collective impact of the projects may increase the severity of the potential impacts.

Potential cumulative impacts identified are summarised below. Other planned or existing projects that can interact with the Project will be identified during stakeholder engagement and finalisation of the BA process.

AVIFAUNA

According to the official database of DFFE, there are currently 42 registered applications involving at least ten planned wind energy projects within a 10km radius around the proposed development as shown in **Figure 8-1** below.



Label	DEA_REF	PROJ_TITLE	MEGAWATT	PRJ_STATUS
2 - 6	12/12/20/1782/1	140 Megawatts (MW) Rietrug Wind Energy Facility near Sutherland, Northern Cape Province	0	Approved
7 - 9	12/12/20/1782/2	140 Megawatts (MW) Sutherland Wind Energy Facility near Sutherland, Northern Cape Province and Western Cape Provinces	0	Approved
10 - 12	12/12/20/1782/3	140 Megawatts (MW) Sutherland 2 Wind Energy Facility near Sutherland Wind Energy, Northern Cape Province and Western Cape Provinces	0	Approved
14 - 17	12/12/20/1988	Proposed Construction of the 750 Mw Roggeveld Wind Farm Within The Karoo Hoogland Local Municipality Of The Northern Cape Province And Within The Laingsburg Local Municipality Of The Western Cape Province	750	Approved
18	12/12/20/1988/2	Proposed Construction of the 140Mw Roggeveld Wind Farm Within The Karoo Hoogland Local Municipality Of The Northern Cape Province And Within The Laingsburg Local Municipality Of The Western Cape Province	0	Approved
19	12/12/20/2228	Proposed Wind Energy Facility near Komsberg, Western Cape	0	Withdrawn/Lapsed
21 - 24	12/12/20/2370/1	Proposed Hidden Valley Wind Energy Facility, Northern Cape (Karusa Wind Farm)	150	Approved
25 - 27	12/12/20/2370/2	Proposed Hidden Valley Wind Energy Facility, Northern Cape (Soetwater Wind Farm)	150	In process
28 - 29	12/12/20/2370/3	Proposed Hidden Valley Wind Energy Facility, Northern Cape	150	In process
30	14/12/16/3/3/1/1977	Proposed development of the 14MW Rietkloof Wind Energy Facility and associated infrastructure near Matjiesfontein in the Western Cape	147	Approved
31	14/12/16/3/3/2/395	Proposed 280 MW Gunstfontein Wind Energy Facility, Northern Cape Province	280	Approved

Label	DEA_REF	PROJ_TITLE	MEGAWATT	PRJ_STATUS
32 - 33	14/12/16/3/3/2/807	The Proposed Karreebosch Wind Farm (Roggeveld Phase 2) and its Associated Infrastructure within the Karoo Hoogland Local Municipality and the Laingsburg Local Municipality in the Northern and Western Cape Provinces	140	Approved
34	14/12/16/3/3/2/826	Environmental Authorisation for the 200 MW Gunstfontein Wind Energy Facility on the Remainder of the Farm Gunstfontein 131 South of the Town of Sutherland Within the Karoo Hoogland Local Municipality In The Northern Cape Province	200	Approved
35	14/12/16/3/3/2/856	275 Komsberg West Wind Energy Facility near Sutherland within the Karoo Hoogland and Laingsburg Local Municipalities in the Northern and Western Cape Provinces.	275	Approved
36 - 37	14/12/16/3/3/2/857	275 MW Komsberg East Wind Energy Facility near Sutherland within the Karoo Hoogland and Lainsgburg Local Municipalities in the Northern and Western Cape Provinces.	275	Approved
38	14/12/16/3/3/2/900	147MW Brandvalley Wind Energy Facility North of the town of Matjiesfontein within Karoo Hoogland	147	Approved
42	14/12/16/3/3/3/395	Proposed Gunstfontein Wind Energy Facility, Northern Cape Province	0	Approved

Figure 8-1: Renewable energy applications and existing high voltage power lines within 10km of the proposed Maralla grid connection project.

The proposed Maralla grid connection will be a maximum of 19.7km in length, which is the length of the longest alternative, namely Alternative 3. There are approximately 43km of existing high voltage lines within the 10km radius around the Maralla project (counting parallel lines as one). In addition, at least around 200+ km of new grid connections from the projects in Figure 6 are planned to connect to the Komsberg MTS. The Maralla grid connection grid project will thus increase the total number of existing high voltage lines by approximately 7.8%.

The contribution of the proposed Maralla grid connection to the cumulative impact of all the high voltage lines is thus low. However, the combined cumulative impact of the existing and proposed high voltage power lines on avifauna within a 10km radius is considered to be high pre-mitigation.

The cumulative impact of displacement due to disturbance and habitat transformation in the Maralla 132kV grid connection considered to be low, due to the small size of the footprint, and the availability of similar habitat within the 10km radius area.

BIODIVERSITY

The impacts of projects are often assessed by comparing the post-project situation to a pre-existing baseline. Where projects can be considered in isolation this provides a good method of assessing a project's impact. However, in areas where baselines have already been affected, or where future development will continue to add to the impacts in an area or region, it is appropriate to consider the cumulative effects of development. This is similar to the concept of shifting baselines, which describes how the environmental baseline at a point in time may represent a significant change from the original state of the system. This section describes the potential impacts of the project that are cumulative for terrestrial fauna and flora.

These are the assumed cumulative impacts that may result from the activities in the immediate vicinity of the project area. Localised impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers (such as other power lines and the associated roads and within the area). These include dust deposition, noise and vibration, disruption of wildlife corridors or habitat, surface water quality, and transport.

Long-term cumulative impacts due to extensive wind farm footprints, power lines and substations can lead to the loss of endemic species and threatened species, loss of habitat and vegetation types and even degradation of well conserved areas. A number of turbines and power lines can already be found in the project area and surrounds, with more expected. This combination of obstacles increases the risk of bird collisions and habitat loss. This is however expected, due to the area being demarcated as a REDZ zone. In the light of all above, the expected cumulative impact is High-severely detrimental. Hence why the fourth option is preferred.

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HERITAGE

Cumulative impacts or effects can be described as “changes to the environment that are caused by an action in combination with other past, present and future human actions”. They are the result of multiple activities whose individual direct impacts may be relatively minor but which, in combination with others result are significant environmental effects (DEAT 2004:5).

There are a number of environmental authorisations either issued or in progress within area around the proposed OHL route options, which is located within the Komsberg REDZ and is therefore considered to be located within the renewable energy hub that is intended for the Komsberg area.

In respect of potential cumulative impacts on palaeontological resources of the installation of the OHL, these are anticipated to be moderate (negative). Provided that the proposed monitoring and mitigation recommendations made for all these various projects are followed through their significance would probably fall to low (negative). These anticipated levels of change are *acceptable.*

Archaeological material and the historical built environment is potentially at greater risk from cumulative impacts, given its widespread occurrence and exposure across the region.

Multiple human activities in the surrounding landscape, of which the construction of the OHL is the latest, can erode the integrity of these heritage resources through their physical damage or destruction. At an individual project level these impacts may not appear to be significant, but the cumulative effects of multiple developments on archaeological and built environment heritage resources are expected to be moderate (negative).

Both Option 2(A) and the preferred landowner route parallel an existing OHL and service road for a Karusa powerline for much of their length and this has the potential to reduce the cumulative impacts of the OHLs on archaeological and built environment heritage resources.

The implementation of measures at individual project level can, however, do much to mitigate and reduce cumulative impacts to low (negative)

In respect of the cultural landscape and visual impacts, the proposed OHL will add to the existing power generation infrastructure in the area. Although Gebhardt (2017) points out that it is not possible to accurately estimate the significance of the cumulative impacts as not all facilities granted environmental approval will be constructed, she does indicate that it is reasonable to assume that the cumulative impact of any combination of the projects that are built within the Komsberg REDZ will have a high (negative) visual impact on the landscape.

There are not many mitigation measures that can significantly reduce the cumulative visual impact of the introduction of renewable energy projects into a rural landscape, but the consistent implementation of mitigation measures across all projects can help to reduce visual impact to some extent. Additionally, the dissected nature of the topography that comprises the Komsberg REDZ breaks up views and will partially obscure developments from viewpoints.

PALAEONTOLOGY

Cumulative impacts inferred for the various alternative energy developments in the Klein-Roggeveldberge region between Matjiesfontein and Sutherland have been previously assessed by Almond (2016i) on the basis of desktop and field-based palaeontological impact assessment reports for these projects, the great majority of which were submitted by the present author (See references provided below and SAHRIS website). The projects concerned lie within a radius of some 50-70 km of the Maralla WEF project area. WEF projects within a smaller, 30 km radius of the Maralla grid connection project are highlighted by the black circle in Figure 42 while existing Eskom powerlines in the vicinity of the Esizayo WEF grid connection project area are shown in Figure 43. Relevant published palaeontological literature for the region has also been taken into account (e.g. Loock et al. 1994). This assessment applies only to the construction phase of the WEF powerline development, since significant additional impacts on palaeontological heritage during the operational and de-commissioning phases are not anticipated.

In all the strictly relevant field-based palaeontological studies in the Klein-Roggeveldberge region the palaeontological sensitivity of the project area and the palaeontological heritage impact significance for the developments concerned has been rated as low. In all cases it was concluded by the author that, despite the undoubted occurrence of scientifically-important fossil remains (notably fossil vertebrates, vertebrate trackways and burrows, petrified wood), the overall impact significance of the proposed developments was low because the probability of significant impacts on scientifically important, unique or rare fossils was slight. While fossils do indeed occur within some of the formations present, they tend to be sparse – especially as far as fossil vertebrates are concerned - while the great majority represent common forms that occur widely within the outcrop areas of the rock units concerned.

Cumulative impacts for the Maralla WEF 132 kV powerline in the context of comparable alternative energy projects proposed or authorised in the Klein-Roggeveld region are assessed in Table 2. It is concluded that the cumulative impact significance of the proposed new developments and other regional projects is low (negative), provided that the proposed monitoring and mitigation recommendations made for all these various projects are followed through. Unavoidable residual negative impacts may be partially offset by the improved understanding of Karoo palaeontology resulting from appropriate professional mitigation. This is regarded as a positive impact for Karoo palaeontological heritage. However, without mitigation the magnitude of cumulative (negative, direct) impacts of such a large number of WEFs affecting the same (albeit sparsely) fossiliferous rock successions would be significantly higher and probable. The cumulative impact significance without mitigation is accordingly assessed as medium.

VISUAL

The construction of the grid connection infrastructure for the Maralla 132kV Transmission Integration Project may increase the cumulative visual impact of industrial type infrastructure within the region.

The anticipated cumulative visual impact of the proposed grid connection infrastructure is expected to be of moderate significance, which is considered to be acceptable from a visual perspective. This is once again due to the relatively low viewer incidence within close proximity to the proposed infrastructure and the presence of the existing/authorised electricity distribution infrastructure, and the potential future wind turbine structures.

SOCIAL

SENSE OF PLACE

The Scottish Natural Heritage (2005) describes a range of potential cumulative landscape impacts associated with wind farms on landscapes. These issues raised in these guidelines as to what defines a cumulative impact are also regarded as pertinent to transmission lines. The relevant issues identified by Scottish Natural Heritage study include:

- Combined visibility (whether two or more transmission lines) will be visible from one location).
- Sequential visibility (e.g. the effect of seeing two or more two or more transmission lines) along a single journey, e.g. road or walking trail).
- The visual compatibility of different two or more transmission lines in the same vicinity.
- Perceived or actual change in land use across a character type or region.
- Loss of a characteristic element (e.g. viewing type or feature) across a character type caused by developments across that character type.

There are existing transmission lines associated with the Komsberg substation. Several WEFs and associated transmission lines are also being constructed and or are proposed in the area. The potential for cumulative impacts associated with combined visibility (whether two or more power lines will be visible from one location) and sequential visibility (e.g., the effect of seeing two or more power lines along a single journey, e.g., road or walking trail) does therefore exist. However, the cumulative impact on the areas sense of place is likely to be limited.

As indicated above, based on the findings of the SIA no concerns were raised regarding the potential visual impacts associated with Alternative 1A, and 2A, Option A or Option B.. However, concerns were raised regarding Alternative 1B and the impact on the viewshed from the dwelling on De Hoop 202/RE and entrance road (van Zyl, Erasmus – pers. comm).

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9 ENVIRONMENTAL IMPACT STATEMENT

The essence of any impact assessment process is aimed at ensuring informed decision-making, environmental accountability, and to assist in achieving environmentally sound and sustainable development. In terms of NEMA, the commitment to sustainable development is evident in the provision that "*development must be socially, environmentally and economically sustainable…. and requires the consideration of all relevant factors…*". NEMA also imposes a duty of care, which places an obligation on any person who has caused, is causing, or is likely to cause damage to the environment to take reasonable steps to prevent such damage. In terms of NEMA's preventative principle, potentially negative impacts on the environment and on people's environmental rights (in terms of the Constitution of the Republic of South Africa, Act No. 108 of 1996) should be anticipated and prevented, and where they cannot be prevented altogether, they must be minimised and remedied in terms of "reasonable measures".

In assessing the environmental feasibility of the proposed construction of the powerline, the requirements of all relevant legislation have been considered. The identification and development of appropriate mitigation measures that should be implemented to minimise potentially significant impacts associated with the project, has been informed by best practice principles, past experience, and the relevant legislation (where applicable).

The conclusions of this BA are the result of comprehensive assessments. These assessments were based on issues identified through the BA process and public participation undertaken to date. The BAR was subject to public review, which will be undertaken according to the requirements of NEMA with every effort made to include representatives of all stakeholders within the process. The BAR will be updated and finalised taking into consideration all comments received during the public review period before being submitted to the CA for consideration.

9.1 ENVIRONMENTAL SENSITIVITIES

The following environmental sensitivities were identified on the site, as a result of the Project location and proposed activities and will require specific applications or measures for mitigation to minimise impact.

- **Biodiversity:**
  - CBA
  - ESA
  - Critically endangered and endangered species
  - Critical habitat
- **Avifauna:**
  - High value habitat unit
  - Presence of sensitive species
- **Freshwater:**
  - Aquatic CBAs
  - Wetland features
  - Freshwater ecosystem priority areas
- **Palaeontology:**
  - Features with very high paleontological sensitivity

The above sensitivities are discussed in the sub-sections below. The combined environmental sensitivities of the proposed powerline Project footprint are shown in **Figure 9-1** and **Figure 9-2** below.

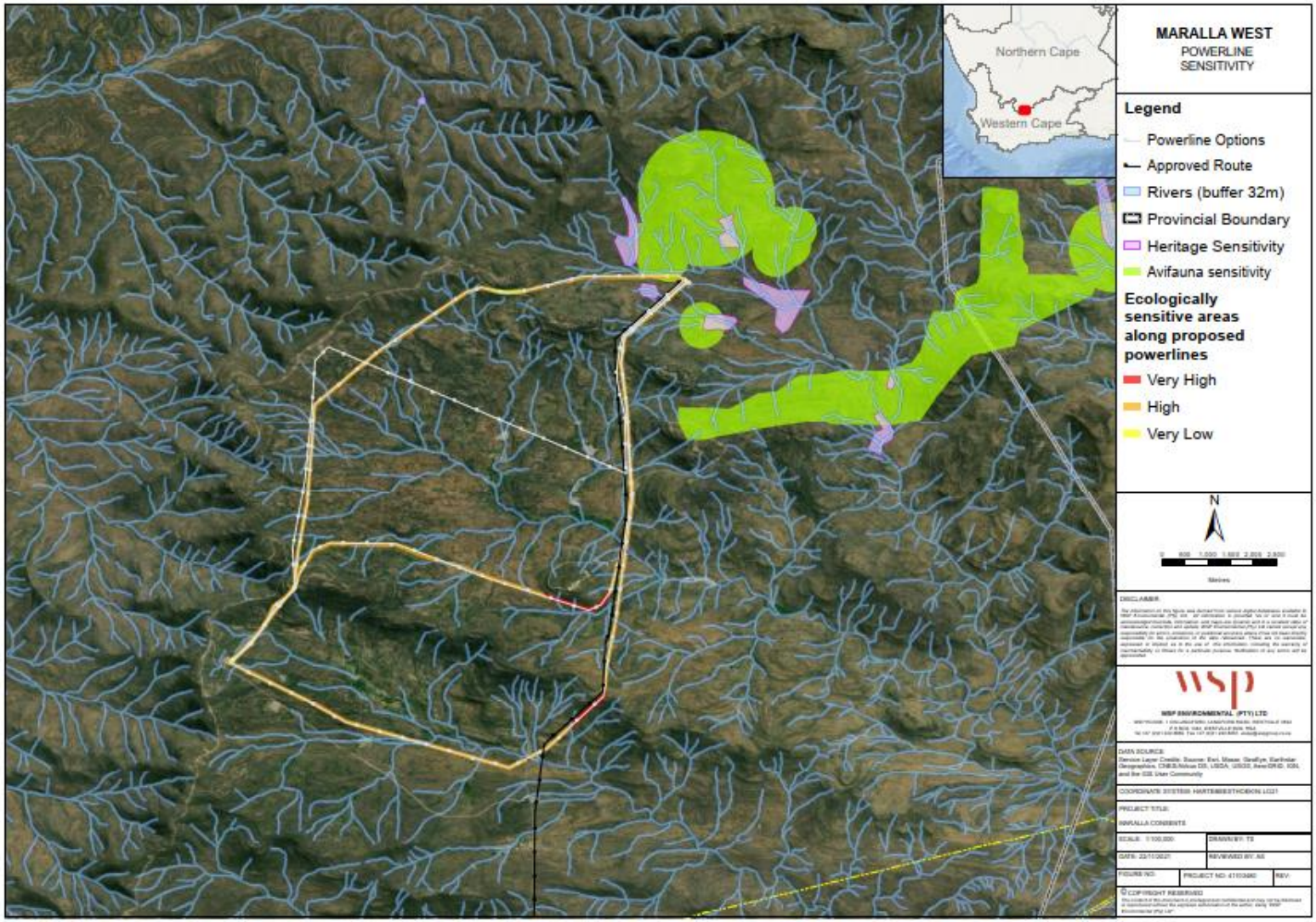


Figure 9-1: Combined Sensitivity Map

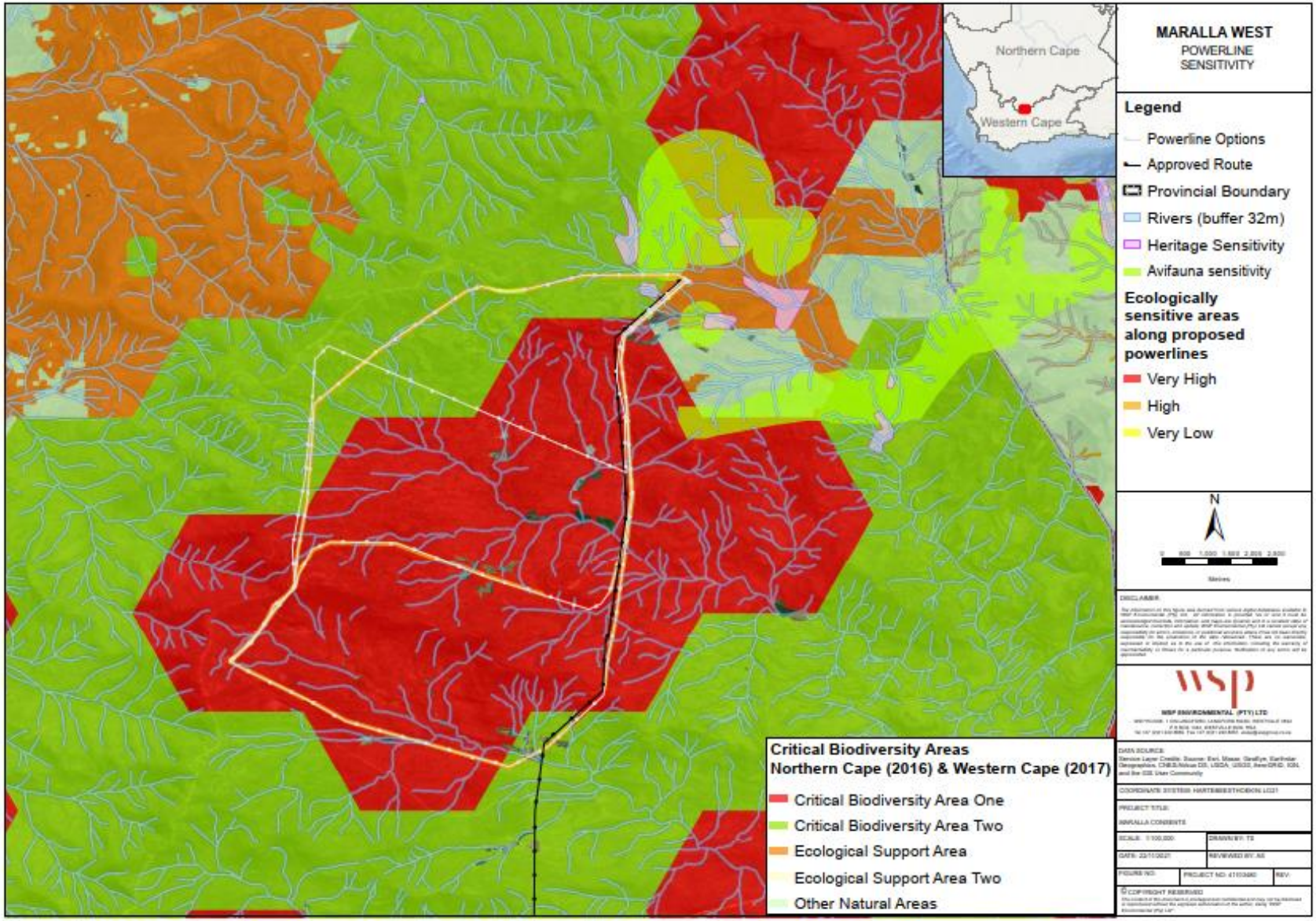
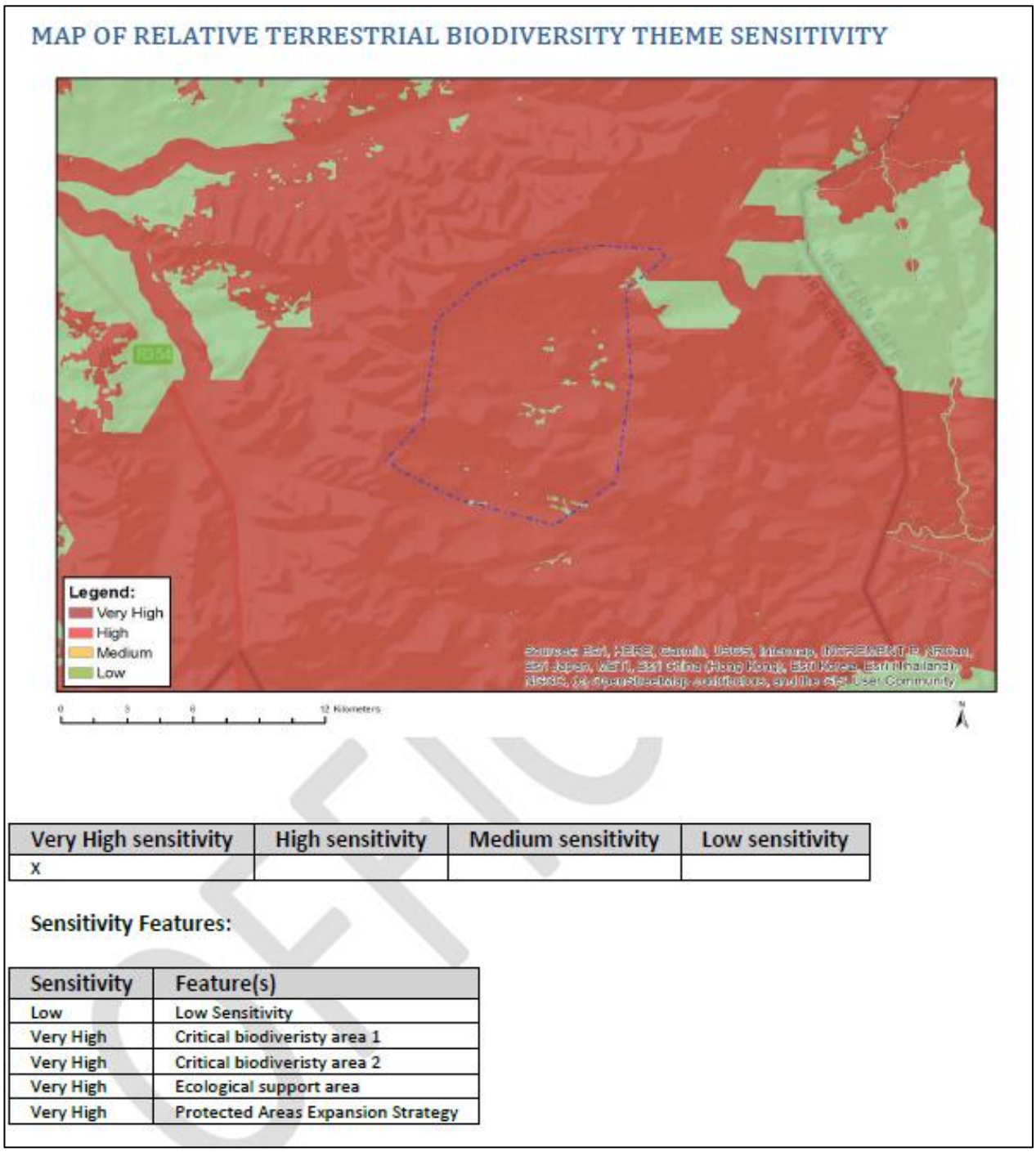


Figure 9-2: Combined Sensitivity Map (Including CBAs)

9.1.1 BIODIVERSITY

The biodiversity theme sensitivity, as indicated in the Screening Report of the National Web based Environmental Screening Tool, was derived to be Very High sensitivity, mainly due to the area comprising CBA 1 & 2 and ESA (**Figure 9-3**).



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Low	Low Sensitivity
Very High	Critical biodiveristy area 1
Very High	Critical biodiveristy area 2
Very High	Ecological support area
Very High	Protected Areas Expansion Strategy

Figure 9-3 Terrestrial Biodiversity Theme Sensitivity, DEA Screening Report

The different terrestrial habitat types that were delineated within the project area, can be seen in (**Table 9-1**). The sensitivities of the habitat types delineated are illustrated in Error! Reference source not found.. Very High and High S ensitivity' areas are due to the following:

- Habitats within the assessment area were observed to be utilised by threatened species during the field survey. These species comprised of one (1) VU avifauna species, two (2) EN avifauna species, and 1 NT mammal and reptile;
- Unique and low resilience habitats;
- Threatened and Protected flora species were abundant and ubiquitous within; and
- A high richness of protected fauna species was present.

Table 9-1 Summary of habitat types delineated within the field assessment area of the project area

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Transformed	Low	Very Low	Very Low	Low	Very Low
Drainage features	Medium	High	High	Low	High
Shrubland	Medium	Medium	Medium	Low	High
Ridges, Rocky Slopes and Rocky Areas	Medium	Medium	Medium	Low	High
Ridges and Rocky Slopes with steep slope and some Drainage features	High Slope Habitats FEPA Rivers	High	High	Low	Very High

Table 9-2 Guidelines for interpreting Site Ecological Importance) in the context of the proposed development activities

SITE ECOLOGICAL IMPORTANCE (SEI)	INTERPRETATION IN RELATION TO PROPOSED DEVELOPMENT ACTIVITIES
Very High	Avoidance mitigation – no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e., last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation – changes to project infrastructure design to limit the amount of habitat impacted, limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation – development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation – development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very Low	Minimisation mitigation – development activities of medium to high impact acceptable and restoration activities may not be required.

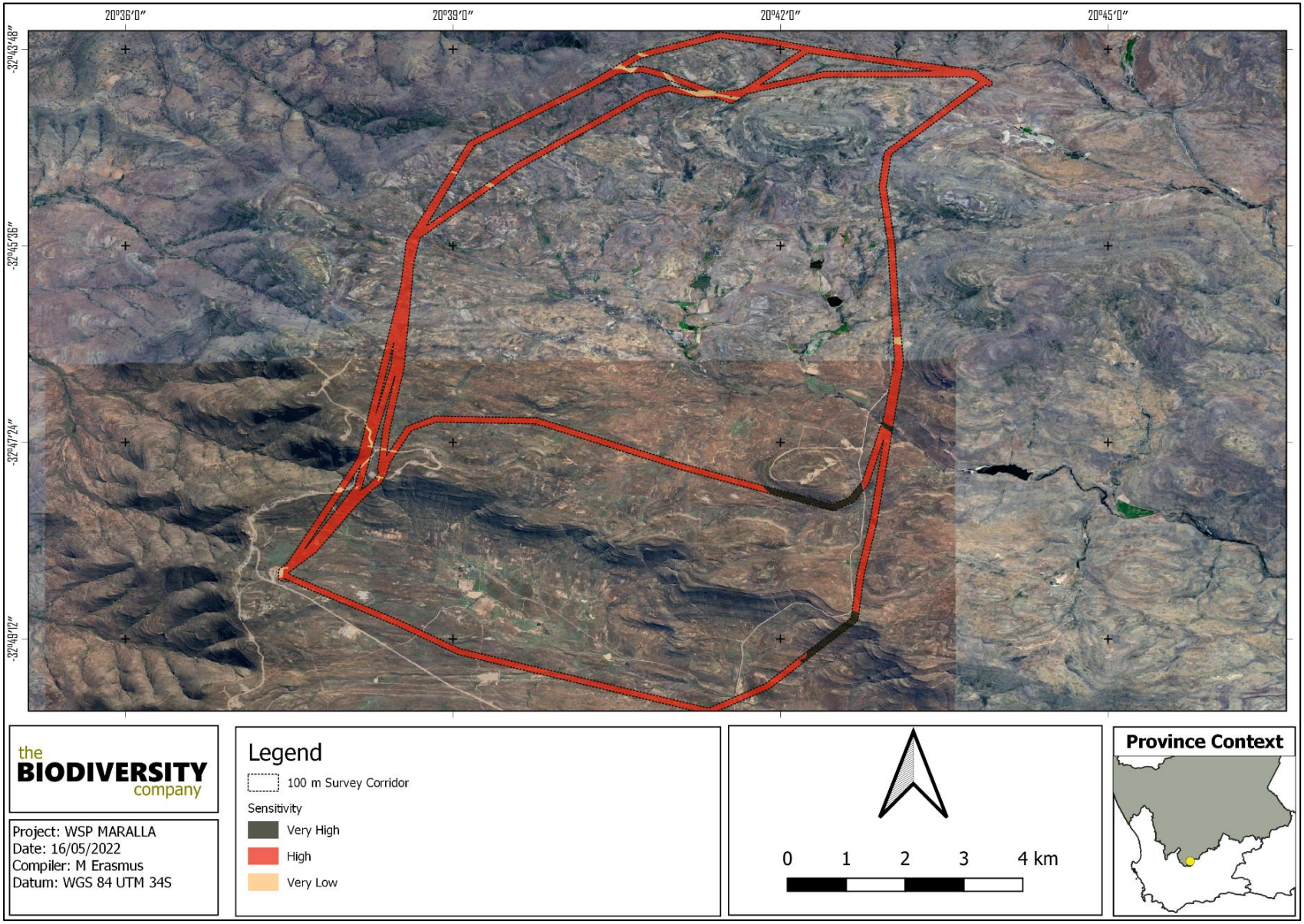
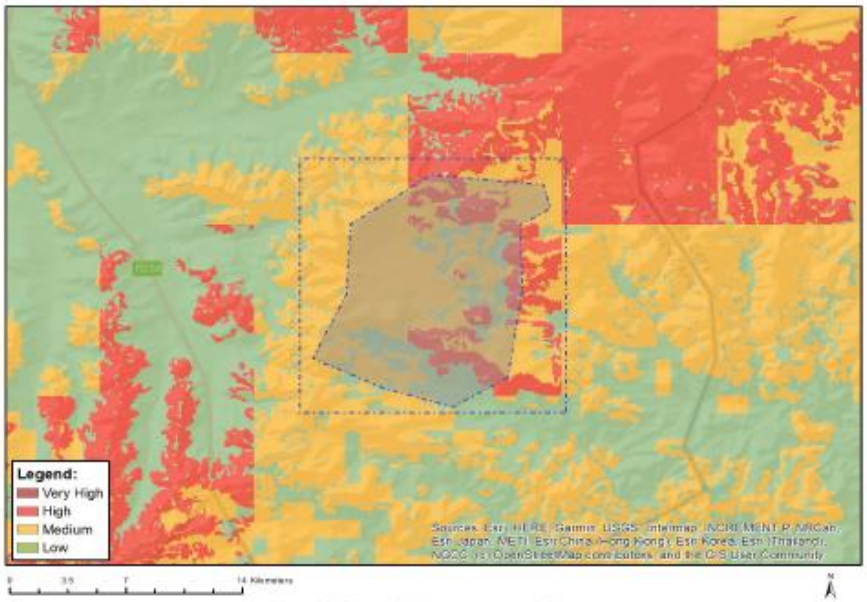


Figure 9-4: Sensitivity of the project area in relation to the 100 m project area

9.1.2 AVIFAUNA

The DFFE National Screening Tool classifies parts of the study area as medium to highly sensitive from an animal species theme perspective, due to the potential presence of Ludwig's Bustard Neotis ludwigii and Verreaux's Eagle *Aquila verreauxii*. A site sensitivity verification was conducted through the use of both a desktop analysis and site surveys. The desktop analysis and site surveys confirmed and concur with the HIGH sensitivity rating assigned to the study area, based on the habitat available to Ludwig's Bustard and Verreaux's Eagle and the confirmed presence of both species within the project study area (**Figure 9-5**).

MAP OF RELATIVE ANIMAL 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)
High	Aves-Aquila verreauxii
Low	Low sensitivity
Medium	Aves-Neotis ludwigii
Medium	Aves-Sagittarius serpentarius
Medium	Aves-Aquila verreauxii
Medium	Mammalia-Bunolagus monticularis

Figure 9-5: The DFFE screening tool rating for the study area. The medium sensitivity rating is related to the presence of Ludwig's Bustard (*Neotis ludwigii*) and Secretarybird (*Sagittarius serpentarius*) and the high sensitivity rating is related to the presence of Verreaux's Eagle (*Aquila verreauxii*).

9.1.3 FRESHWATER

The DFFE National Screening Tool classifies parts of the study area as very high sensitivity due to the presence of rivers, wetlands and estuaries (Error! Reference source not found.)

Figure 9-6: The DFFE screening tool rating for the Aquatic Biodiversity Theme

According to the NFEPA database, a total of thirteen (13) wetland systems were identified within 500m of the proposed OHPL.

Table 9-3: NFEPA Wetlands Located within 500m buffer

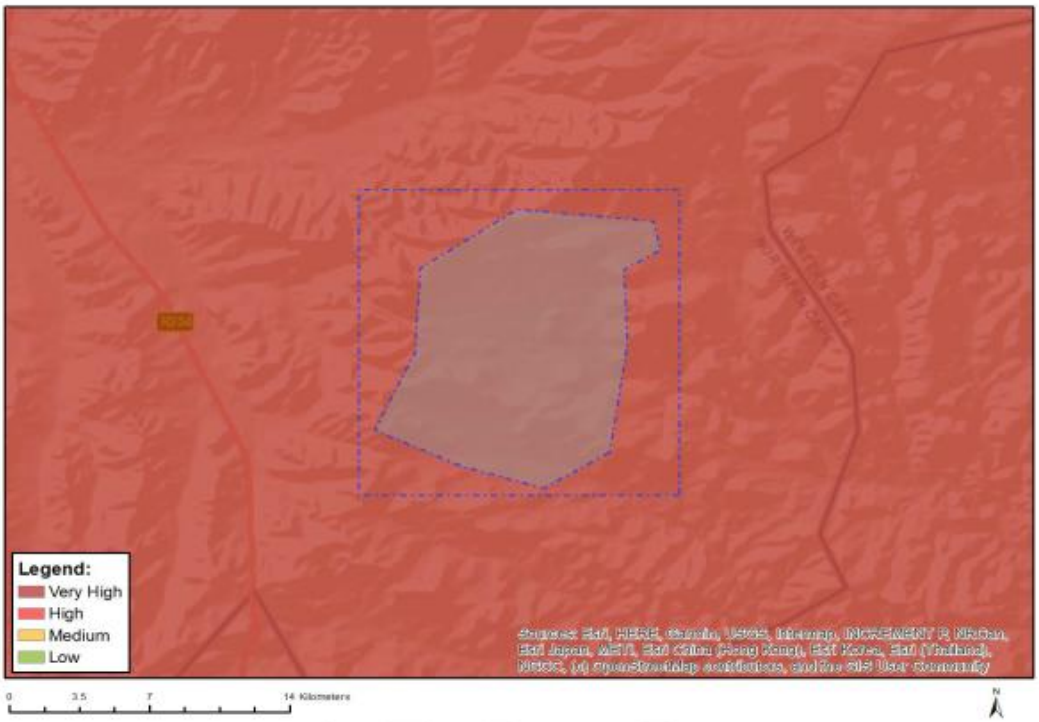
HGM unit	Natural/Artificial	NFEPA Condition	Field Observation
Seep	Artificial	Z3	Portion of a naturally occurring CVB system
Flat	Artificial	Z3	Dam
Seep	Artificial	Z3	These systems form part of a dam constructed on a CVB system
Seep	Artificial	Z3	

HGM unit	Natural/Artificial	NFEPA Condition	Field Observation
Channelled valley-bottom wetland	Artificial	Z3	Dam
Channelled valley-bottom wetland	Artificial	Z3	These systems for part of a dam constructed on a CVB system
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Artificial	Z3	
Channelled valley-bottom wetland	Natural	Z3	
Channelled valley-bottom wetland	Artificial	Z3	
Channelled valley-bottom wetland	Natural	Z3	

9.1.4 PALAEONTOLOGY

The DFFE National Screening Tool classifies parts of the study area as very high sensitivity due to the presence of features with a very high palaeontological sensitivity **(Figure 9-7**).

MAP OF RELATIVE PALEONTOLOGY THEME SENSITIVITY



Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
X			

Sensitivity Features:

Sensitivity	Feature(s)
Very High	Features with a Very High paleontological sensitivity

Figure 9-7: The DFFE screening tool rating for the Palaeontological Theme

In recent years the Middle Permian sedimentary bedrocks in the Klein-Roggeveldberge powerline study region (Abrahamskraal Formation, Lower Beaufort Group) have yielded scientifically-important fossils of petrified wood, tetrapod (terrestrial vertebrate) and lungfish burrows and trackways plus exceedingly rare skeletal remains of the Tapinocephalus Assemblage Zone, but well-preserved fossils are very sparsely distributed. The Abrahamskraal Formation bedrocks here are extensively covered by Late Caenozoic superficial sediments (e.g. scree, surface gravels, alluvium, gravelly soils) that are usually unfossiliferous. The overall palaeontological sensitivity of the study area is rated as low, although the potential for rare fossil sites of high palaeontological interest cannot be entirely discounted.

9.2 SPECIALIST CONCLUSIONS

9.2.1 AVIFAUNA ASSESSMENT

The expected impacts of the 132kV overhead power line were rated to be of ranging from High to Low significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to Low negative, except in the case of powerline collisions, where the significance will be reduced, but will remain at a Moderate level. No fatal flaws were discovered in the course of the investigation. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures are strictly implemented.

9.2.2 BIODIVERSITY ASSESSMENT

The proposed development overlaps with a single vegetation type, the Central Mountain Shale Renosterveld, which is a poorly studied vegetation type, although it possesses a high level of biodiversity. The conservation status is classified as Least Threatened albeit the protection level is regarded as 'Not Protected'. Moreover, the proposed activity overlaps with a CBA 1 and CBA 2, as well as a NPAES focus area. The assessment area possesses a high diversity and abundance of protected flora species as well as flora species that are threatened

Regarding the current layout, several of the infrastructure locations fall within sensitive vegetation types, sensitive habitats, and other areas of high biodiversity potential. The current layout as well as the expected access and service road of the development would be considered to have a significant and high negative impact as it would directly affect the ecosystem as well as the habitat of several flora and fauna species. Schedule 1 and schedule 2 protected fauna are ubiquitous within the assessment area and surrounding landscape. Five threatened species of fauna were observed to occur and utilise the habitats within the assessment area during the survey period and comprised of three avifauna species and one mammal and one reptile species. The three avifauna species, *Polemaetus bellicosus* (Eagle, Martial) *Neotis ludwigii* (Ludwigs Bustard) and *Afrotis afra* (Southern Black Korhaan), possess high priority scores indicating that they are particularly susceptible to collisions with power lines. The mammal and reptile species, *Pelea capreolus* (Grey Rhebok) and *Psammobates tentorius veroxii* (Verrox's Tent Tortoise), is unlikely to be impacted by the OHL itself, but will be impacted by the disturbance created during the construction phase. Excessive noise will lead to displacement of the species and the vehicle traffic potentially will lead to direct mortality.

The present land use has had a direct impact on both the fauna and the flora in the area, however minimal. Historically, overgrazing from sheep and mismanagement has led to the deterioration of these habits. However, the very high and high sensitivity areas can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging, water resource and movement corridors for fauna within a landscape fragmented by development. The habitat existence and importance of these habitats is regarded as crucial, due to the species recorded as well as the role of this intact unique habitat to biodiversity within a very fragmented disturbed local landscape, not to mention the sensitivity according to various ecological datasets.

- The very high and sensitivity terrestrial areas still:
- Serve as and represent CBA 1& 2 and ESA as per the Conservation Plan;
- Utilised by threatened and protected flora and fauna species which were abundant and ubiquitous within;
- Unique and low resilience habitats; and
- Support various organisms and may play a more important role in the ecosystem if left to recover from the superficial impacts.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity. The preservation of these systems is the most important aspect to consider for the proposed project.

Six alternatives were provided. All alternatives traverse either very high or high sensitivity areas. Option 4 is considered the preferred option. Option A is considered the 2nd preferred option if option 4 isn't feasible. This is attributed to the existing adjacent impacts stemming from the wind farm developments. It was observed during the site visit, that there are already existing power lines and associated access roads, with several more under

construction. It's the specialist opinion that if feasible, the proposed alternative should attempt to use/partner with existing infrastructure and/or access roads to limit the overall impact.

Any development on the very high and high sensitivity areas will lead the direct destruction and loss of portions of functional CBA/ESA, and also the floral and faunal species that are expected to utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigations, management and associated monitoring regarding these operational impacts will be the most important factor of this project and must be considered by the issuing authority.

That being said, special consideration needs to be taken regarding the construction and operational phase impacts of the access and service road infrastructure, as they could result in large scale detrimental impacts if not planned, managed and monitored appropriately..

No fatal flaws are evident for the proposed project, and it is preferred that the very high declared no-go and that high sensitivity areas be avoided as much is feasible. Mitigation measures as described in this report can be implemented to reduce the significance of the risk. There is still a high possibility of collision by large avifauna species and there are impacts that cannot be reduced to a low risk. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes (CBAs and NPAES focus area), development may proceed but with caution. It is the opinions of the specialists that the project may be favourably considered, on condition all prescribed mitigation measures and supporting recommendations are implemented. Implementation of the mitigation measures as well as recommendations as described in this report will reduce the significance of the risk to an acceptable level. Furthermore, cumulative impacts within the broader landscape are a concern, due to the number of WEFs.

9.2.3 FESHWATER ASSESSMENT

WSP was appointed to conduct a specialist freshwater ecological assessment as part of the EAWUA processes for the proposed 132 kilovolt (kV) overhead powerline route as part of the proposed Maralla wind energy facility, located near Sutherland, in the Northern Cape Province.

The freshwater habitat assessment identified a total of twenty-seven (27) seasonal channelled valley-bottom (CVB) wetlands, twenty-eight (28) riparian zones associated with the ephemeral headwaters and twenty-one (21) riparian zones associated with the ephemeral tributaries within a 500m radius of the proposed OHPL.

The CVB wetland systems were assessed to have a **PES** of **C**, with the exception CVB 1, CVB 2, SVB 4 and CVB 18, which have a **PES** of **D** and **E** (CVB 18 only). The riparian systems were assessed to have a **PES** of **C**. The **EIS** of the wetland and riparian systems ranged between **moderate** to **moderately high** for biodiversity maintenance.

The results of the ecological assessment of the 27 CVB wetland systems within 500m of the proposed 132kV powerline and riparian systems associated with the ephemeral tributaries and headwaters identified, are summarised in Table 9-4 and Error! Reference source not found..

Table 9-4: Overall PES of the Identified Wetlands

Unit	PES Score (out of 10)	Class
CVB 1	5.1	D: Largely Modified
CVB 2	5.6	D: Largely Modified
CVB 3	2.4	C: Moderately Modified
CVB 4	4.5	D: Largely Modified
CVB 5	2.2	C: Moderately Modified
CVB 6	2.3	C: Moderately Modified
CVB 7	2.5	C: Moderately Modified
CVB 8	2.3	C: Moderately Modified
CVB 9	2.4	C: Moderately Modified
CVB 10	2.3	C: Moderately Modified

Unit	PES Score (out of 10)	Class
CVB 11	2.6	C: Moderately Modified
CVB 12	2.3	C: Moderately Modified
CVB 13	2.4	C: Moderately Modified
CVB 14	2.3	C: Moderately Modified
CVB 15	2.6	C: Moderately Modified
CVB 16	2.3	C: Moderately Modified
CVB 17	2.3	C: Moderately Modified
CVB 18	6.2	E: Critically Modified
CVB 19	2.4	C: Moderately Modified
CVB 20	2.3	C: Moderately Modified
CVB 21	2.2	C: Moderately Modified
CVB 22	2.3	C: Moderately Modified
CVB 23	2.3	C: Moderately Modified
CVB 24	2.3	C: Moderately Modified
CVB 25	2.3	C: Moderately Modified
CVB 26	2.3	C: Moderately Modified
CVB 27	2.3	C: Moderately Modified

Table 9-5: Overall PES of the Identified Riparian Area

Unit	PES Score (out of 10)	Class	Unit	PES Score (out of 10)	Class
RH 1	2.4	C: Moderately Modified	**RT 1**	2.9	C: Moderately Modified
RH 2	2.6	C: Moderately Modified	**RT 2**	2.4	C: Moderately Modified
RH 3	2.5	C: Moderately Modified	**RT 3**	2.6	C: Moderately Modified
RH 4	2.7	C: Moderately Modified	**RT 4**	2.9	C: Moderately Modified
RH 5	2.9	C: Moderately Modified	**RT 5**	2.8	C: Moderately Modified
RH 6	2.3	C: Moderately Modified	**RT 6**	2.5	C: Moderately Modified
RH 7	2.4	C: Moderately Modified	**RT 7**	2.7	C: Moderately Modified
RH 8	2.4	C: Moderately Modified	**RT 8**	2.9	C: Moderately Modified
RH 9	2.6	C: Moderately Modified	**RT 9**	2.8	C: Moderately Modified
RH 10	2.8	C: Moderately Modified	**RT 10**	2.5	C: Moderately Modified
RH 11	2.7	C: Moderately Modified	**RT 11**	2.7	C: Moderately Modified

Unit	PES Score (out of 10)	Class	Unit	PES Score (out of 10)	Class
RH 12	2.7	C: Moderately Modified	**RT 12**	2.9	C: Moderately Modified
RH 13	2.9	C: Moderately Modified	**RT 13**	2.8	C: Moderately Modified
RH 14	2.5	C: Moderately Modified	**RT 14**	2.6	C: Moderately Modified
RH 15	2.3	C: Moderately Modified	**RT 15**	2.8	C: Moderately Modified
RH 16	2.4	C: Moderately Modified	**RT 16**	2.8	C: Moderately Modified
RH 17	2.4	C: Moderately Modified	**RT 17**	2.7	C: Moderately Modified
RH 18	2.6	C: Moderately Modified	**RT 18**	2.9	C: Moderately Modified
RH 19	2.8	C: Moderately Modified	**RT 19**	2.6	C: Moderately Modified
RH 20	2.5	C: Moderately Modified	**RT 20**	2.9	C: Moderately Modified
RH 21	2.5	C: Moderately Modified	**RT 21**	2.9	C: Moderately Modified
RH 22	2.6	C: Moderately Modified	-	-	-
RH 23	2.4	C: Moderately Modified	-	-	-
RH 24	2.5	C: Moderately Modified	-	-	-
RH 25	2.3	C: Moderately Modified	-	-	-
RH 26	2.3	C: Moderately Modified	-	-	-
RH 27	2.7	C: Moderately Modified	-	-	-
RH 28	2.5	C: Moderately Modified	-	-	-

The outcomes of the impact assessment determined that the construction, operation of the proposed infrastructure does have the potential to impact the identified wetland and riparian systems, with impact ratings between **Low** and **Medium**. However, with mitigative measures in place the risks associated with the proposed infrastructure are **Low**.

Prior to undertaking the proposed activities, construction method statements and emergency response plans must be developed, with specific consideration given to the environment, including wetland habitats. Furthermore, the required authorisation must be attained from the Department of Water and Sanitation.

It is envisaged that the implementation of these measures would provide sufficient mitigation in order to reduce the environmental impact. If the recommended mitigative measures are implemented correctly, including adherence to the DWS Environmental Best Practice Guidelines and the Work Method Statements, the overall significance of the impacts may be reduced.

9.2.4 HERITAGE ASSESSMENT

This assessment has found that the area identified for proposed Maralla 132 kV Transmission Integration Project is a moderately sensitive heritage environment, and that, impacts on heritage resources arising from the construction of the project can be expected.

The Option A Line, Option B Line or Option 2(A) are the preferred OHL alignments in respect of heritage resources.

It is our considered opinion that provided the mitigation measures set out above are implemented, the overall impact and significance of the proposed OHL on heritage resources will be range from low to moderate, and the proposed activity is acceptable.

9.2.5 HYDROLOGICAL ASSESSMENT

The development of the 132kV Maralla powerline may result in numerous negative impacts on the environment. To reduce these impacts, proper mitigation and management procedures are to be adhered to. Erosion is a predominant negative impact associated with the development. If adequate erosion control measures are implemented correctly during and after the construction of the 132kV powerline, the risk of erosion may be minimized. Implementation of these measures is not only good practice to ensure the minimisation of degradation, but also necessary to ensure further compliance with the necessary legislative requirements.

9.2.6 SOCIO-ECONOMIC ASSESSMENT

The energy security benefits associated with the proposed Maralla WEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure.

The findings of the SIA indicate that the significance of the potential negative social impacts for both the construction and operational phase of the proposed 132 kV Maralla overhead power line are Low Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The power line is also located within the Komsberg REDZ and Central Transmission Corridor. The establishment of proposed 132 kV Maralla overhead power line is therefore supported by the findings of the SIA.

In terms of alternatives, the owners of the impacted properties indicated that the different alignments have the potential to impact on their farming operations. The concerns associated with Alternative 2 are linked to development of the proposed powerline in remote farming areas and the increased risk that this may pose. The concerns associated with Alternative 1A and 1B are linked to impact on productive farmland and visual impacts on existing farmsteads. The potential impacts associated with Alternative 2A can be addressed by ensuring that the recommended mitigation measures are effectively implemented. The potential impacts associated with Alternative 1A and 1B can mitigated by sensitive siting of pylons and or adjusting the final alignment.

Based on the findings of the SIA and follow up discussions with the affected landowners the alignment alternatives located to the north-west of the approved route, namely, Option 2 (A), Option A Line and Option B Line were identified as the preferred alignments due to the reduced impact on productive land and visual impacts on farmsteads. Option 2 (A) is the preferred alternative as it runs along the cadastral boundary between Zwanepoelshoek 184/RE and Orange Fontein 203/REM and 203/1.

9.2.7 PALAEONTOLOGY ASSESSMENT

The great majority of the fossils recorded so far within the Maralla grid connection project area comprise widely-occurring forms (poorly-preserved fossil wood, sphenophyte ferns, lungfish burrows, low diversity invertebrate trace fossils) that are not considered to be of exceptional scientific or conservation value. None of the fossil sites recorded here lies within the footprints of the 132 kV powerline route options under. Direct impacts on these known fossil sites are therefore not anticipated and no mitigation is recommended in regard to them.

The impact significance of the construction phase of the 132 kV powerline for the Maralla West and Maralla East WEFs is assessed as LOW (NEGATIVE) in terms of palaeontological heritage resources. This is a consequence of (1) the paucity of irreplaceable, unique or rare fossil remains within the project area as well as (2) the extensive

superficial sediment cover overlying most potentially-fossiliferous bedrocks here. This assessment applies equally to the three 132 kV powerline corridors to Karusa Substation under consideration here. All the new powerline options to the Karusa Substation are likely to have a lower impact significance than the considerably longer approved connection to the Komsberg Substation. Impacts due to the construction of new access powerline access roads will probably be greater than those attributable to excavations for pylon footings. Significant further impacts during the operational and de-commissioning phases of the electrical infrastructure are not anticipated. There are therefore no preferences on palaeontological heritage grounds for any particular powerline route option among those under consideration. The no-go alternative (i.e. no development) will probably have a low (neutral) impact on palaeontological heritage.

Cumulative impacts on palaeontological heritage resources that are anticipated as a result of the numerous renewable energy developments currently proposed or authorised for the Klein-Roggeveldberge region, including the Maralla West and Maralla East WEFs and their electrical infrastructure, are anticipated to be MODERATE (NEGATIVE). Their significance would probably fall to LOW (NEGATIVE) provided that the proposed monitoring and mitigation recommendations made for all these various projects are followed through (*cf* Almond 2016f). These anticipated levels of change are acceptable.

There are no fatal flaws in the Maralla WEF grid connection infrastructure development proposal as far as fossil heritage is concerned. *Provided that* the recommendations for palaeontological monitoring and mitigation measures are fully implemented, there are no objections on palaeontological heritage grounds to authorisation of the proposed 132 kV powerline. Pending the potential discovery of significant new fossil remains during construction, specialist palaeontological mitigation is not recommended for this project. The following general recommendations concerning conservation and management of palaeontological heritage resources apply.

- The Environmental Control Officer (ECO) / Environmental Site Officer (ESO) responsible for the Maralla WEF grid connection development should be made aware of the potential occurrence of scientifically important fossil remains within the development footprint.
- During the construction phase all major clearance operations (e.g. for new access roads, pylon footings) and deeper (> 1 m) excavations should be monitored for fossil remains on an on-going basis by the ECO / ESO.
- Should significant fossil remains - such as vertebrate bones and teeth, or petrified logs of fossil wood - be encountered at surface or exposed during construction, the ECO / ESO should safeguard these, preferably in situ. They should then alert the relevant provincial heritage management agency as soon as possible - i.e. SAHRA (Contact details: Dr Ragna Redelstorff, SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: rredelstorff@sahra.org.za). This is to ensure that appropriate action (i.e. recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the developer's expense

9.2.8 VISUAL ASSESSMEMT

The construction and operation of the proposed grid connection infrastructure for the Maralla 132kV Transmission Integration Project may have a visual impact on the study area, especially within a 0.5km radius (and potentially up to 1.5km) of the power line structures. The visual impact will differ amongst places, depending on the distance from the infrastructure,

Overall, the significance of the visual impacts is expected to range from moderate to low as a result of the generally undeveloped character of the landscape. No visual impacts of a high significance are expected to occur.

Even though none of the alignment alternatives are considered fatally flawed, the Alternative 2A alignment has the greatest opportunity to remove the potential visual impact away from the Komsberg/Kareedoringkraal secondary road. It also has the highest potential to consolidate the linear infrastructure within the region e.g. it will traverse adjacent to the authorised (surveyed) Heuwels-Hidden Valley power line for 6km. It is also the shortest alignment and is therefore the preferred alternative from a visual impact perspective.

A number of mitigation measures have been proposed. Regardless of whether or not mitigation measures will reduce the significance of the anticipated visual impacts, they are considered to be good practice and should all be implemented and maintained throughout the construction, operation and decommissioning phases of the proposed grid connection infrastructure.

If mitigation is implemented as recommended, it is concluded that the significance of most of the anticipated visual impacts will remain at or be managed to acceptable levels. As such, the grid connection infrastructure for

the Maralla 132kV Transmission Integration Project is considered to be acceptable from a visual impact perspective.

9.3 IMPACT SUMMARY

A summary of the identified impacts and corresponding significance ratings for the proposed powerline is provided in **Table 9-6** below.

Table 9-6: Impact Summary

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Air Quality	Generation of Dust and PM	Construction	**Moderate**	(-)	**Low**	(-)
Noise	Noise Emissions	Construction	**Low**	(-)	**Low**	(-)
Soil Erosion & Contamination	Soil Erosion	Construction	**Moderate**	(-)	**Low**	(-)
	Soil Contamination	Construction	**Moderate**	(-)	**Low**	(-)
	Soil Contamination	Operation	**Low**	(-)	**Low**	(-)
Groundwater	Deterioration of Groundwater Quality	Construction	**Moderate**	(-)	**Low**	(-)
Freshwater	Alteration of the Natural Flow Regime	Construction	**Moderate**	(-)	**Low**	(-)
	Water Quality	Construction	**Moderate**	(-)	**Low**	(-)
	Loss of wetland and riparian functionality ER quality	Construction	**Moderate**	(-)	**Low**	(-)
	Increased soil erosion and sedimentation	Construction	**Moderate**	(-)	**Low**	(-)
	Alien vegetation establishment	Construction	**Low**	(-)	**Very Low**	(-)
	Water Quality	Operation	**Low**	(-)	**Very Low**	(-)
	Loss of wetland and riparian habitat	Operation	**Low**	(-)	**Very Low**	(-)
	Increased soil erosion and sedimentation	Operation	**Moderate**	(-)	**Very Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Water Quality	Decommissioning	**Low**	**(-)**	**Very Low**	**(-)**
	Loss of wetland and riparian habitat	Decommissioning	**Low**	**(-)**	**Very Low**	**(-)**
	Increased soil erosion and sedimentation	Decommissioning	**Moderate**	**(-)**	**Very Low**	**(-)**
	Alien vegetation establishment	Decommissioning	**Low**	**(-)**	**Very Low**	**(-)**
Biodiversity	Destruction, Loss and Fragmentation of Habitats, Ecosystems & Vegetation Community	Construction	**High**	**(-)**	**Moderate**	**(-)**
	Introduction of Alien Species	Construction	**Moderate**	**(-)**	**Low**	**(-)**
	Destruction of Threatened Plant Species	Construction	**High**	**(-)**	**Moderate**	**(-)**
	Displacement and Fragmentation of Faunal Community due to Habitat Loss, Direct Mortalities & Disturbance	Construction	**Moderate**	**(-)**	**Low**	**(-)**
	Continued Disturbance of Vegetation Communities, especially Threatened Species and Encroachment by AIS	Operation	**Moderate**	**(-)**	**Low**	**(-)**
	Ongoing Displacement, Direct Mortalities & Disturbance of Faunal Community due to Habitat Loss and Diturbances	Operation	**High**	**(-)**	**Moderate**	**(-)**
Avifauna	Displacement due to disturbance associated with the construction	Construction	**Moderate**	**(-)**	**Low**	**(-)**
	Displacement due to habitat transformation associated with the construction	Construction	**Moderate**	**(-)**	**Low**	**(-)**

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Displacement of priority species due to habitat transformation	Operation	**Low**	(-)	**Low**	(-)
	Mortality of priority species due to collisions	Operation	**Moderate**	(-)	**Moderate**	(-)
	Electrocution of priority species on the on-site substation infrastructure	Operation	**Low**	(-)	**Low**	(-)
	Displacement of priority species due to disturbance associated with decommissioning of the on-site substation and 132kV overhead power line	Decommissioning	**Moderate**	(-)	**Low**	(-)
Visual	Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure	Construction	**Low**	(-)	**Low**	(-)
	Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase	Operation	**Low**	(-)	**Low**	(-)
	Potential visual impact on sensitive visual receptors within the region (0.5 – 3km radius) during the operation of the grid connection infrastructure	Operation	**Low**	(-)	**Low**	(-)
Waste	Improper Waste Management	Construction	**Moderate**	(-)	**Low**	(-)
Traffic	Increased Local Traffic	Construction	**Low**	(-)	**Low**	(-)
Heritage	Damage to Heritage Resources	Construction	**Low**	(-)	**Low**	(-)
Palaeontology	Impacts on fossil heritage	Construction	**Low**	(-)	**Low**	(-)

ASPECT	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Socio-economic	Creation of Employment, Business Development and Skills Development	Construction	**Low**	(+)	**Low**	(+)
	Presence of Construction Workers and Impact on Family Structures and Social Networks	Construction	**Low**	(-)	**Low**	(-)
	Risk to safety, livestock, and farm infrastructure	Construction	**Moderate**	(-)	**Low**	(-)
	Construction activities and vehicles	Construction	**Low**	(-)	**Low**	(-)
	Risk of veld fires	Construction	**Low**	(-)	**Low**	(-)
	Improve energy security and establishment of energy infrastructure	Operation	**Moderate**	(+)	**Moderate**	(+)
	Creation of Employment Opportunities	Operation	**Low**	(+)	**Moderate**	(+)
	Generate income for affected landowners	Operation	**Low**	(+)	**Moderate**	(+)
	Visual impact and impact on sense of place	Operation	**Low**	(-)	**Moderate**	(-)
	Impact on farming operations during maintenance	Operation	**Low**	(-)	**Low**	(-)
Health and Safety	Employee Health & Safety	Construction	**Moderate**	(-)	**Low**	(-)
	Employee Health & Safety	Operation	**Moderate**	(-)	**Low**	(-)

9.4 ALTERNATIVES ASSESSMENT

Project alternatives in terms of activity, technology, location and layout were considered as part of the BA process.

As previous discussed, six alternative alignments have been assessed (i.e. the 132kV OHPL connecting the proposed Maralla WEF to the existing Komsberg Eskom substation. Alternative activities for the current Project are not considered reasonable or feasible as the purpose of this OHPL is to transmit electrical energy generated

by the proposed Maralla WEF to the existing Komsberg substation for distribution via the national electrical grid network. Similarly, distribution of electricity via an overhead 132kV powerline utilising the assessed routes is considered the most appropriate technology and layout and is in line with Eskom design requirements. A summary of the specialists' powerline alternative alignment preference and corresponding supporting reasons is provided in Error! Reference source not found. below.

Table 9-7: Powerline Alternative Alignment Preferences

SPECIALIST	PREFERRED ROUTE	SUPPORTING REASON
Avifauna Specialist	Option 1A or 1B	Alternative 1A or 1B run next to the busy district road for approximately 50% of the way. The district road likely acts as a deterrent to some powerline sensitive species such as *Ludwig's Bustard*, thereby reducing the risk of collisions with the proposed powerline (Shaw 2013). Furthermore, both these alternatives then west towards the Karusa Substation, which is parallel to the general migration movement of Ludwig's Bustard (Shaw 2013), thereby reducing the risks of collisions. However, none of the proposed options are fatally flawed, as they can all be mitigated to acceptable levels.
Biodiversity Specialist	Option 4 or Option A	All alternatives traverse either very high or high sensitivity areas. Option 4 is considered the preferred option. Option A is considered the 2nd preferred option if option 4 isn't feasible. This is attributed to the existing adjacent impacts stemming from the wind farm developments. It was observed during the site visit, that there are already existing power lines and associated access roads, with several more under construction. It's the specialist opinion that if feasible, the proposed alternative should attempt to use/partner with existing infrastructure and/or access roads to limit the overall impact
Heritage Specialist	Option A or Option B or Option 2(A)	Option 2A, Option A and Option B keep to relatively high ground where archaeological sites and material are less prevalent which suggest that these route option may have a lower potential for impact. Furthermore, the preferred landowner negotiated OHL option has been designed to reduce the impact of the powerline on the usable land of the farms it crosses.
Palaeontology Specialist	No preference	N/A
Socio-economic Specialist	Option 2 (A), Option A or Option B	Based on the findings of the SIA and follow up discussions with the affected landowners the alignment alternatives located to the north-west of the approved route, namely, Option 2 (A), Option A Line and Option B Line were identified as the preferred alignments due to the reduced impact on productive land and visual impacts on farmsteads. Option 2 (A) is the preferred alternative as it runs along the cadastral boundary between Zwanepoelshoek 184/RE and Orange Fontein 203/REM and 203/1. Option 2 (A), Option A Line and Option B Line
Soils and Surface Water	No preference	N/A
Visual Specialist	Option 2A	Alternative 2A alignment has the greatest opportunity to remove the potential visual exposure away from the Komsberg/Kareedoringkraal secondary road, as well as to consolidate the linear infrastructure within the region e.g. it will traverse adjacent to the authorised (surveyed) Heuwels-Hidden Valley power line for 6km. It is also the shortest alignment.
Landowner Preference	Option B	After consultation with the various landowners, Option B was identified as the preferred route.

Option B was identified as the preferred Alternative as none of the Specialist Assessments identified any fatal flaws with this alternative. Furthermore, the preference was confirmed during various landowner consultations. Option B is therefore the route that has been pre-negotiated.

Figure 9-8 and **Table 9-8** illustrate the alignment and co-ordinate points of the preferred route Option B.

Table 9-8: Co-ordinate Points of the Preferred Alternative – Option B

Point	LATITUDE	LONGITUDE
B1	32° 48' 38.365" S	20° 37' 25.790" E
B10	32° 44' 5.898" S	20° 43' 53.141" E
B2	32° 47' 33.029" S	20° 38' 9.489" E
B3	32° 45' 29.962" S	20° 38' 40.333" E
B4	32° 44' 39.909" S	20° 39' 9.983" E
B5	32° 43' 59.861" S	20° 40' 30.324" E
B6	32° 43' 58.996" S	20° 40' 44.597" E
B7	32° 44' 16.119" S	20° 41' 32.916" E
B8	32° 43' 48.448" S	20° 42' 14.454" E
B9	32° 44' 0.810" S	20° 43' 46.668" E

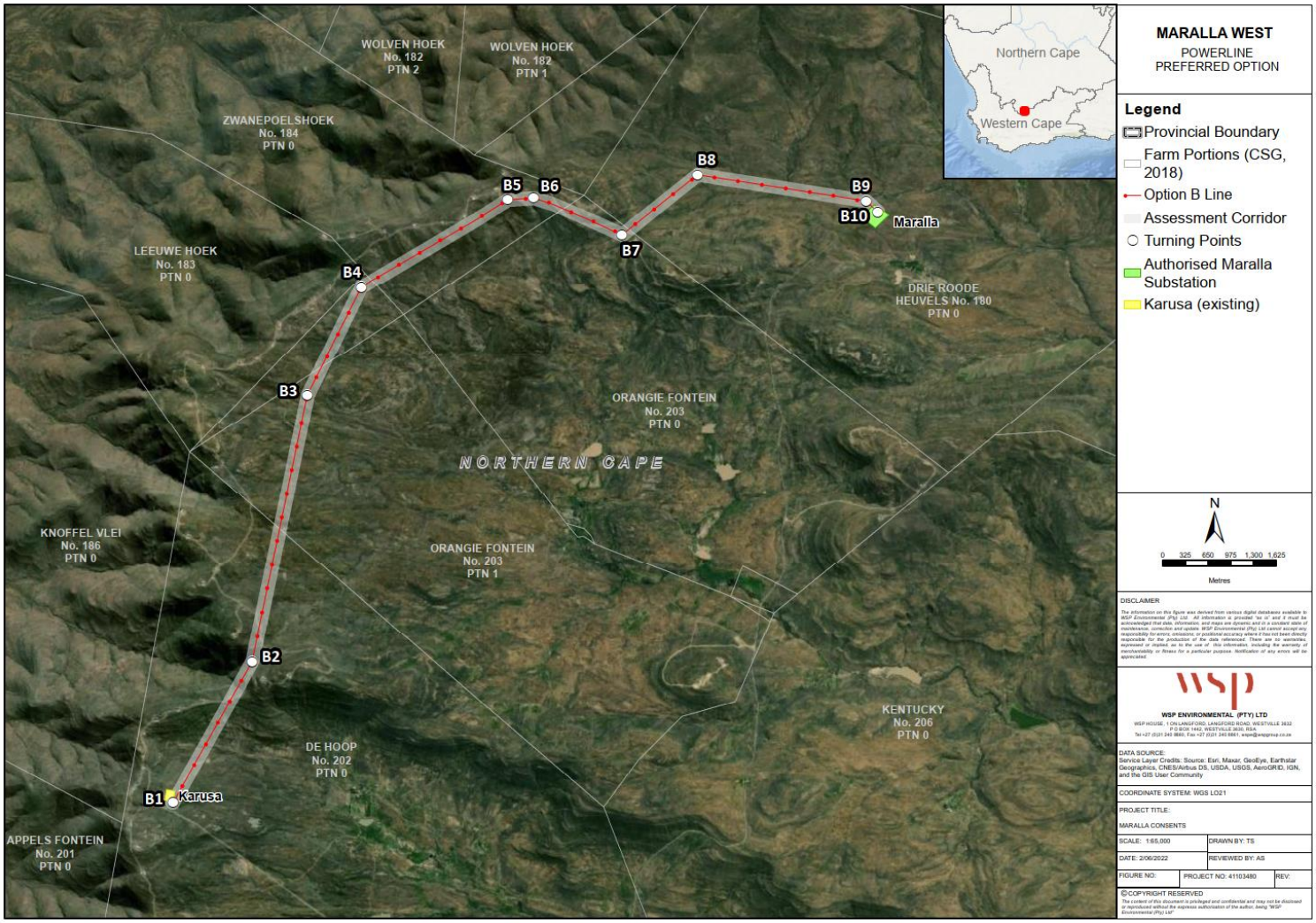


Figure 9-8: Option B – Preferred Alternative

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The no-go option would represent a lost opportunity for South Africa to improve energy security and supplement its current energy needs with renewable energy given that energy security benefits associated with the proposed Maralla WEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. Considering South Africa's current energy security challenges and its position as one of the highest per capita producer of carbon emissions in the world, this would represent a significant socio-economic cost. Accordingly, the no-go option is not the preferred option.

9.5 RECOMMENDATIONS

The following recommendation are made in respect of the proposed 132kV OHPL:

- In the opinion of the Biodiversity Specialist, it is preferred that the very high and high sensitivity biodiversity areas be avoided where feasible;
- Potential design alternatives regarding the placement of poles in high sensitivity areas to reduce the number of poles required in these areas;
- A vegetation alien invasive management plan should be implemented from the onset of the construction phase of the project;
- A rehabilitation plan needs to be implemented in the disturbed areas;
- A specialist walkdown must be undertaken by the avifauna, biodiversity, and heritage specialists prior to construction; and
- All proposed mitigation measures included in this BA Report and in the EMPr (**Appendix G**) must be implemented in order to reduce possible impacts to an acceptable level.

9.6 CONCLUSION AND AUTHORISATION OPINION

The overall objective of the BA is to provide sufficient information to enable informed decision-making by the authorities. This was undertaken through consideration of the proposed Project components, identification of the aspects and sources of potential impacts and subsequent provision of mitigation measures.

It is the opinion of WSP that the information contained in this document (read in conjunction the EMPr) is sufficient for DFFE to make an informed decision for the environmental authorisation being applied for in respect of this Project.

Mitigation measures have been developed, where applicable, for the above aspects and are presented within the EMPr (**Appendix G**). It is imperative that all impact mitigation recommendations contained in the EMPr, of which the environmental impact assessment took cognisance, are legally enforced.

Considering the findings of the respective studies, no fatal flaws were identified for the proposed Project. Should the avoidance and mitigation measures prescribed be implemented, the significance of the considered impacts for all negative aspects pertaining to the environmental aspects is expected to be low. It is thus the opinion of the EAP that the Project can proceed, and that all the prescribed mitigation measures and recommendations are considered by the issuing authority.

EA AUTHORISATION PERIOD

Appendix 1(3)(1)(q) of the NEMA EIA Regulations 2014, as amended requires "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" must be included in the BA Report.

The EA is required for a period of 5 years from the date of issuance of the EA to the end of the construction period (including rehabilitation), when the proposed activities applied for are completed. This is a reasonable period as it allows Eskom to conduct its internal processes which can only begin after issuance of the EA, when the proposed route is confirmed.

10 WAY FORWARD

Maralla Wind (RF) Proprietary Limited proposes to construct a 132kV OHTL approximately 19km in length to connect the proposed Maralla WEF onsite substation to the national grid via the existing Eskom Karusa Substation. This report provides a description of the proposed Project and details the aspects associated with the construction and operation. The report also includes the methodology followed to undertake the BA process. A detailed description on the existing environment (biophysical as well as socio-economic) is provided based on findings from the specialist surveys and existing information. Stakeholder engagement undertaken from the onset of the assessment to date, has been conducted in a transparent and comprehensive manner. This report was subjected to a public review period in line with NEMA EIA Regulations, 2014 as amended. Outcomes of all comments received from the public review period have been recorded and responded to in this Final BAR. Based on the environmental description, specialist surveys as well as the stakeholder engagement undertaken to date, a detailed impact assessment was undertaken and, where relevant, the necessary management measures have been recommended.

In summary, the BA process assessed both biophysical and socio-economic environments and identified appropriate management and mitigation measures. The biophysical impact assessment revealed that there are no moderate or major environmental fatal flaws and no significant negative impacts associated with the proposed Project should mitigation and management measures be implemented. In addition, it should be noted that there are positive (albeit limited) socio-economic impacts associated with the Project.

The Draft BAR (this report) was made available for public review from **23 June 2022** to **25 July 2022**. All issues and comments were submitted to WSP (as per the contact details provided below) and have been incorporated in the Stakeholder Engagement Report which is attached as **Appendix D** to the Final BAR (this report).

The Final BAR has also been submitted to the competent authorities. It is the opinion of WSP that the information contained in this document is sufficient for the DFFE to make an informed decision for the EA being applied for in respect of this Project.

Please submit all comments or queries to:

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