DRAFT BASIC ASSESSMENT REPORT

Development of the Castle to Hydra Transmission Line near De Aar, Northern Cape Province

EnviroAgri (Pty) Ltd

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1 June 2022

Revision:1

Project Reference:

220523026

DEA&DP Reference:
Pending

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Document ratification				
Report title	Draft Basic Assessment Report: Development of the Castle to Hydra Transmission Line near De Aar, in the Northern Cape Province			
Project number	220523026			
File path	EnviroAgri/1 Projects/026 Castle Transmission line/4 Reports/Draft BAR			
Client	African Clean Energy Developments (Pty) Ltd	Applicant	Eskom Holdings SOC Limited	
Client contact	Kholofelo Rameetse	**Applicant contact**	Debbie Harding	
Date	**Current report**	**Author**	**Report number**	
2022-06-01	Rev. 1	Dirk Pretorius	026001	

Approval			
Author signature			
Name	Dirk Pretorius		
Title	EAP	**Date**	2022-06-01

This report is to be referred to in bibliographies as: EnviroAgri, 2022. Draft Basic Assessment Report: Development of the Castle to Hydra Transmission Line near De Aar, Northern Cape Province. Report No. 026001

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Appendix 1	**Content as required by NEMA**	**Section/Chapter**
3(a)	(i) details of the EAP who prepared the report; and	Control sheet, Section 1.5, Annexure A
	(ii) details of the expertise of the EAP, including a curriculum vitae.	
(b)	the location of the activity, including-	Section 1.2 and 4.2, Chapter 4.
	(i) the 21-digit Surveyor General code of each cadastral land parcel;	
	(ii) where available, the physical address and farm name;	
	(iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	N/A
(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	Section,1.4, Chapter 4 and Chapter 7
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	Chapter 4 and Annexure F
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	NA
(d)	a description of the scope of the proposed activity, including-	Chapter 4
	(i) all listed and specified activities triggered;	Section 2.2
	(ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Chapter 4.
(e)	a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process; how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Chapter 2
(f)	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 4.5
(g)	a motivation for the preferred site, activity and technology alternative;	Chapter 5
(h)	a full description of the process followed to reach the proposed preferred alternative within the site, including -	Chapter 5
	(i) details of all the alternatives considered;	
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 3.4, Section 3.5, Annexure C
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	Section 3.6, Annexure C
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 6
	(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts - (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Chapter 6.
	(vi) the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Chapter 3 Section 3.3.2
	(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 6
	(viii) the possible mitigation measures that could be applied and level of residual risk;	Chapter 6
	(ix) the outcome of the site selection matrix;	Chapter 5
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	Chapter 5
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	Chapter 7

(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including— (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	Chapter 6
(j)	an assessment of each identified potentially significant impact and risk, including— (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	Chapter 6
(k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Chapter 6 Annexure G
(l)	an environmental impact statement which contains— a summary of the key findings of the environmental impact assessment;	Chapter 7
	a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and	
	a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the proposed impact management outcomes for the development for inclusion in the EMPr;	Chapter 6 Annexure G
(n)	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Chapter 6
(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 1.6
(p)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Chapter 7
(q)	where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on which the activity will be concluded, and the post construction monitoring requirements finalised;	NA
(r)	an undertaking under oath or affirmation by the EAP in relation to- (i) the correctness of the information provided in the report; (ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and (iv) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	Annexure A
(s)	where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	NA
(t)	any specific information required by the competent authority; and	NA
(2)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	NA

GLOSSARY OF TERMS

Basic Assessment Report	A basic report assessing the potential significant impacts of issues identified during scoping.
Environment	The surroundings (biophysical, social and economic) within which humans exist and that are made up of i. the land, water and atmosphere of the earth; ii. micro-organisms, plant and animal life; iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing.
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action. A systematic process of identifying, assessing and reporting environmental impacts associated with an activity and includes basic assessment and S&EIR
Environmental impact	An environmental change caused by some human act.
Environmental Management Programme (EMPr)	A document that provides procedures for mitigating and monitoring environmental impacts, during the pre-construction, construction, operation and decommissioning phases.
Public Participation Process	A process of involving the public to identify needs, address concerns, to contribute to more informed decision making relating to a proposed project, programme or development.
Wind Turbine	A wind turbine is a rotary device that extracts energy from the wind.

UNITS OF MEASUREMENT

≈	Approximately
ha	Hectares
kL	Kilolitre
km	kilometres
Km/h	Kilometre per hour
kV	Kilovolt
MW	Megawatts

ABBREVIATIONS

ACED	African Clean Energy Developments (Pty) Ltd
BA	Basic Assessment
BAR	Basic Assessment Report
BW	Bidding Window
CAA	Civil Aviation Authority
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
COP	Convention of the Parties
CRR	Comments and Response Report
DEA	Department of Environmental Affairs (now DFFE)
DEA&DP	Department of Environmental Affairs and Development Planning (Western Cape)
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DoE	Department of Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (Act 73 of 1989)
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EMF	Environmental Management Framework
GN	Government Notice
I&APs	Interested and Affected Parties
IDZ	Industrial Development Zone
IEIM	Integrated Environmental Information Management
IPP	Independent Power Producer
IRP	Integrated Resource Plan
LM	Local Municipality
MTS	Main Transmission Substation
NBKB	Ngwao Boswa Kapa Bokone Northern Cape Provincial Heritage Resources Authority
NCDAERL	Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform
NCNCA	Northern Cape Nature Conservation Act (Act 9 of 2009)
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (No. 25 of 1999)
NRTA	National Road Traffic Act (Act 93 of 1996)
NWA	National Water Act (Act 36 of 1998)
OHL	Overhead Transmission Line
PPP	Public Participation Process
REFIT	Renewable Energy Feed-In Tariffs
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAHRA	South African Heritage Resources Agency
SACNSP	South African Council for Natural Scientific Professions
SDF	Spatial Development Framework
SKA	Square Kilometre Array
ToR	Terms of Reference
UNEP	United Nations Environmental Programme
WEF	Wind Energy Facility
WESSA	Wildlife and Environment Society of South Africa

1 INTRODUCTION AND BACKGROUND

1.1 Introduction

The applicant, Eskom Holdings SOC Limited (Eskom), proposes to construct an Overhead Transmission Line (OHL) to connect to the authorised Castle Wind Energy Facility (WEF) to the existing Hydra Main Transmission Substation (MTS), on farms near De Aar in the Northern Cape. The proposed transmission line would consist of a 132kV to 400kV (single or double circuit) OHL, from here referred to as the Castle to Hydra OHL. Associated infrastructure will include permanent access/service tracks (where no existing roads exist) as well as temporary laydown areas and site camps that will be rehabilitated after construction. The Castle WEF has been developed by African Clean Energy Developments (Pty) Ltd (ACED) under the Special Purpose Vehicle (SPV) Castle Wind Farm (Pty) Ltd, the proponent. ACED or successor in title will develop the OHL under a Self-Build agreement with Eskom, the applicant. Since the OHL will be ceded to Eskom this application for environmental authorisation is pursued by Eskom. EnviroAgri (Pty) Ltd (EnviroAgri) has been appointed by ACED to undertake the requisite Basic Assessment (BA) process for the proposed OHL as required in terms of the National Environmental Management Act (No. 107 of 1998) (NEMA), as amended, on behalf of the applicant, Eskom.

1.2 Background

Environmental Authorisation (EA) for the construction of the Castle WEF and associated infrastructure, near De Aar (DEA ref: 14/12/16/3/3/2/278) was obtained on 8 May 2015. Subsequently the Environmental Authorisation (EA) has been amended several times[1] to account for changes to the proposed project's scope and holder of the EA. Moreover, an EA for a proposed OHL from Castle to the Hydra MTS was obtained (DEA ref: 14/12/16/3/3/1/1351), on 5 October 2018. During the several years ensuing these EAs the number of Renewable Energy (RE) developments and associated infrastructure such as transmission lines planned for around the town of De Aar (specifically the Hydra MTS) has increased significantly. This can mainly be attributed to two factors, the availability of RE resources and ability of RE developments to feed into the national grid at the Hydra MTS. The congestion of RE infrastructure has subsequently led to the OHL authorised (DEA ref: 14/12/16/3/3/1/1351[2]) to evacuate electricity generated from the Castle WEF to become unfeasible. Consequently, a technically feasible alternative OHL route to connect the Castle WEF to the Hydra MTS has been identified. The new alternative includes in part a new OHL (Section A) and in part the upgrading of an existing OHL (Section B) as well as a small section that could potentially feed into the planned (authorised but not built) De Aar South WEF substation (Section C) (Figure 1-2).

1.3 Location

The site of the Castle WEF which the proposed OHL will connect to is located approximately 26 kilometres (km) east of De Aar and the existing Hydra MTS is approximately 7 km southeast of De Aar, in the Northern Cape Province (Figure 1-1). The site is bordered in the west by the N10 from where access to can be gained through unsurfaced roads and jeep tracks. The entire proposed OHL is situated in the Pixley ka Seme District Municipality and the majority of within Emthanjeni Local Municipality (Ward 6) although a small section of the proposed eastern section of the OHL falls within the Renosterberg Local Municipality (Ward 1). The OHL will cross over several farm portions as provided in Figure 1-2.

[1] Amendments: DEA ref: 14/12/16/3/3/2/278/AM1, DEA ref: 14/12/16/3/3/2/278/AM2 DEA ref: 14/12/16/3/3/2/278/AM3, DEA ref: 14/12/16/3/3/2/278/AM4; DEA ref: 14/12/16/3/3/2/278/1 and DEA ref: 14/12/16/3/3/2/278/2

[2] Amendments: DEA ref: 14/12/16/3/3/1/1351/AM1 and DEA ref: 14/12/16/3/3/1/1351/AM2

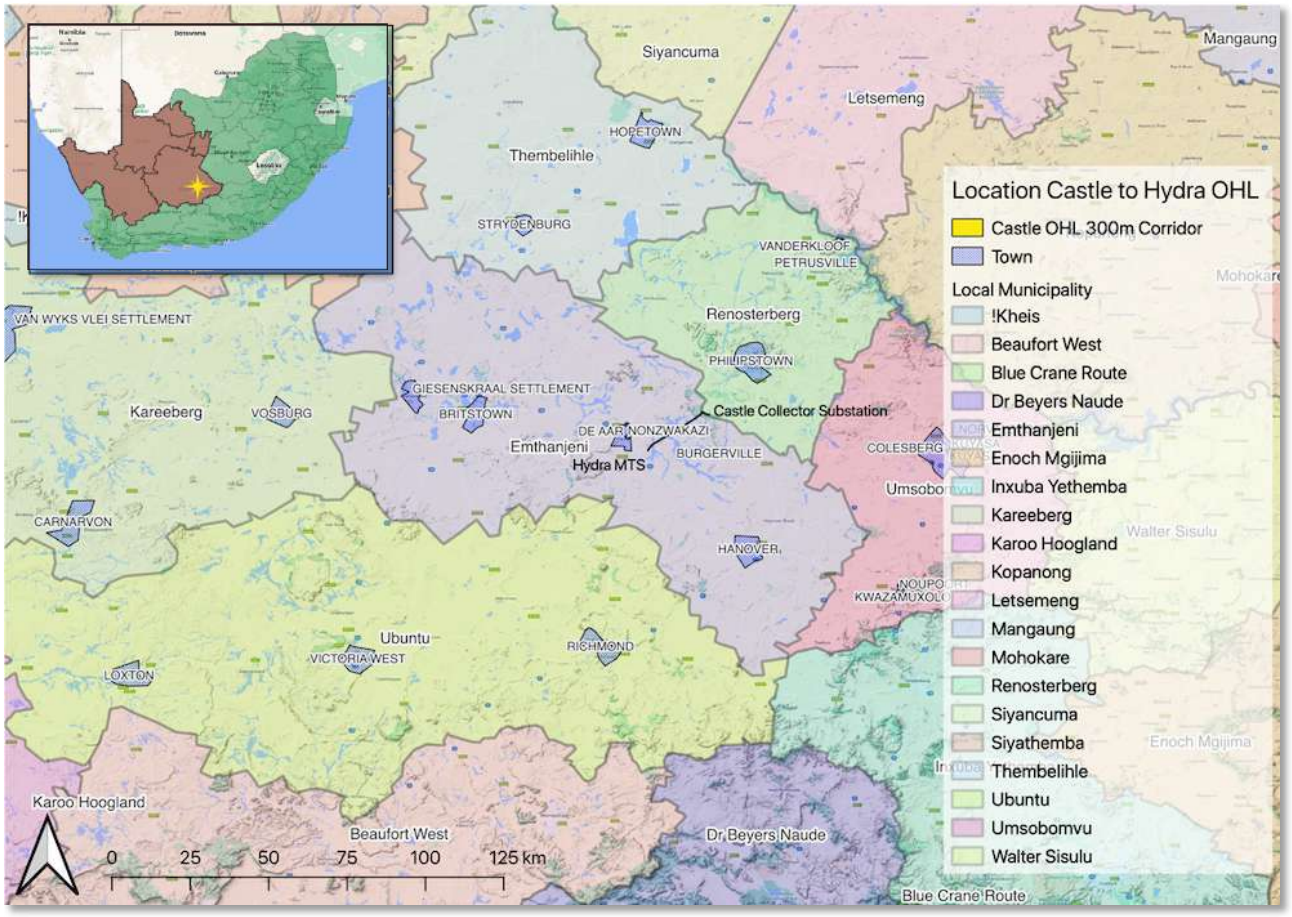


Figure 1-1: Location of the proposed Castle to Hydra MTS OHL near De Aar in the Norther Cape Province.

Table 1-1: Farm details for the proposed Castle to Hydra OHL.

Erf number	21-digit SG code	Name of farm	Farm Size (ha)
Portion 13 of Farm 165	C03000000000016500013	Vendussie Kuil	152,18
Portion 12 of Farm 165	C03000000000016500012	Vendussie Kuil	758,19
Portion 3 of Farm 5	C03000000000000500003	Wagt en Bittje (Hydra)	179,77
Portion 1 of Farm 5	C03000000000000500001	Wagt en Bittje	21,72
Remainder of Farm 5	C03000000000000500000	Wagt en Bittje	2425,42
Remainder of Farm 144	C03000000000014400000	Hydra	37,84
Portion 3 of Farm 3	C03000000000000300003	Carolus Poort	1807,06
Portion 4 of Farm 3	C03000000000000300004	Carolus Poort	888,49
Portion 2 of Farm 3	C03000000000000300002	Carolus Poort	1724,89
Remainder of Farm 2	C03000000000000200000	Slingers Hoek	4209,31
Portion 2 of Farm 2	C03000000000000200002	Slingers Hoek	1273,11

1.4 Project details and extent

The proposed development entails the construction of an OHL required to connect the Castle WEF to the national Eskom electricity grid at the Hydra MTS (Figure 1-2 and Figure 1-3). The Proponent (or their successor in title) proposes to develop the OHL under a Self-Build agreement with Eskom. It is anticipated that construction would commence within 5 years of the date of authorisation (if granted), and the construction phase would last approximately 6-18 months. Once construction of the grid connection infrastructure is complete, it is envisaged that the infrastructure (and the associated Environmental Authorisation, if granted) will be ceded to Eskom as per Eskom's requirements. Eskom is thus expected to be the eventual owner of the infrastructure and will be responsible for the long-term operation and maintenance of the grid connection infrastructure. Alternately, pending confirmation from Eskom, part or all of the grid connection infrastructure will be owned and maintained by the Proponent instead of Eskom (i.e. Own-Build agreement).

The proposed infrastructure is expected to be permanent and will remain in place for the duration of the lifespan of the associated Castle WEF (20 years or more). Note that the construction of the proposed grid connection infrastructure is dependent on the construction timelines of the associated Castle WEF, which are not yet known. If/when the WEF are decommissioned at some point in the future, the grid connection infrastructure may also be decommissioned. The owner of the grid connection infrastructure (Eskom, or their successor in title) would be responsible for the decommissioning phase.

Table 1-2: Clarification of roles and responsibilities.

EAP	Applicant	Proponent
EnviroAgri	**Eskom**	**Castle Wind Farm (Pty) Ltd**
Undertakes BA process.	Holder of the EA.	Self-built agreement with Eskom, i.e. builds OHL and cedes infrastructure to Eskom.
Appointed by the Proponent.	Responsible for construction, operation, maintenance and decommissioning.	Responsible for EA and EMPr implementation.
Responsibility end with DFFE final decision and notification of I&APs of this decision.	Liable for EA and EMPr implementation.	Builds Castle WEF (or successor in title).

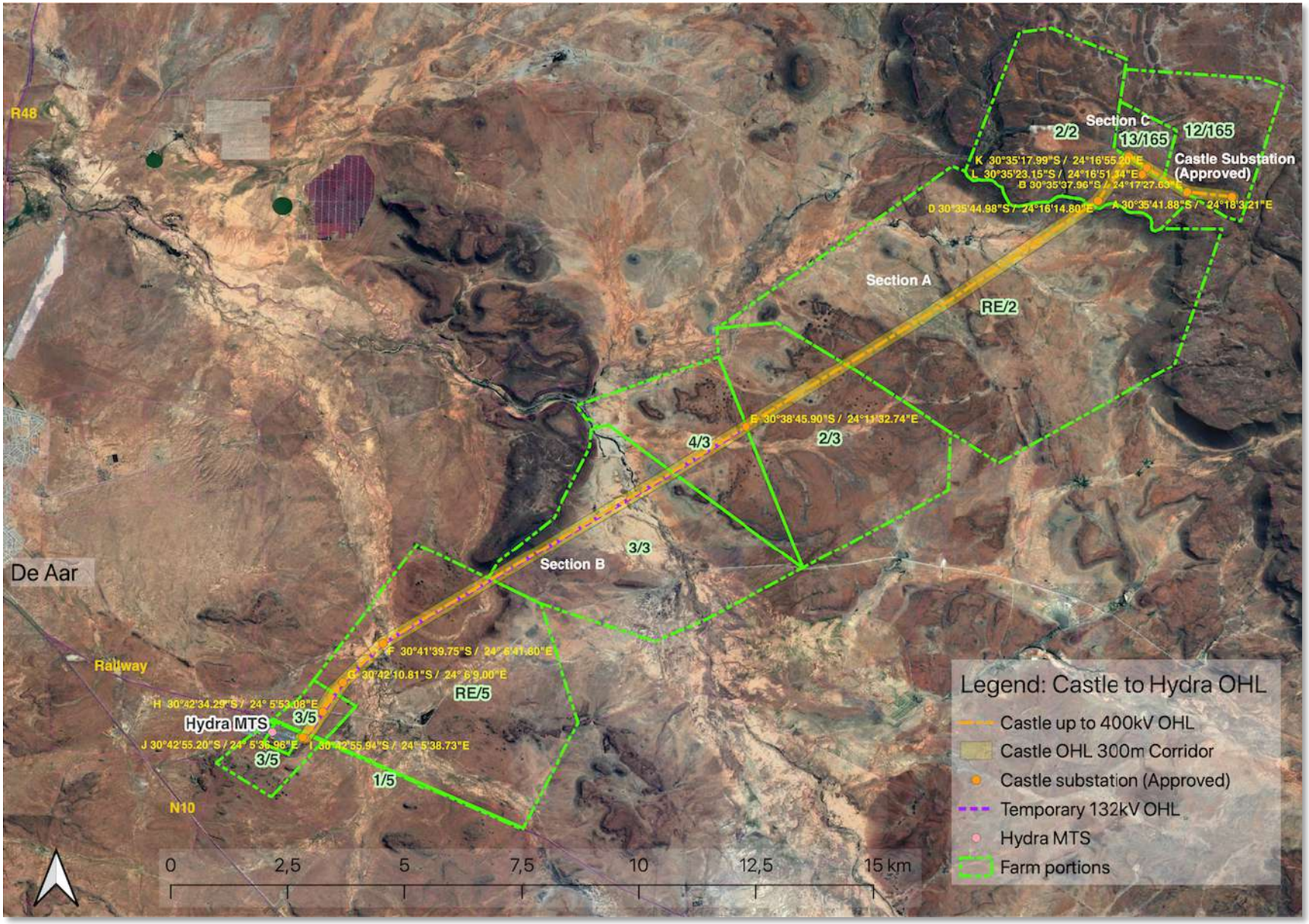


Figure 1-2: Layout of the proposed Castle to Hydra OHL near De Aar in the Norther Cape Province (Satellite image).

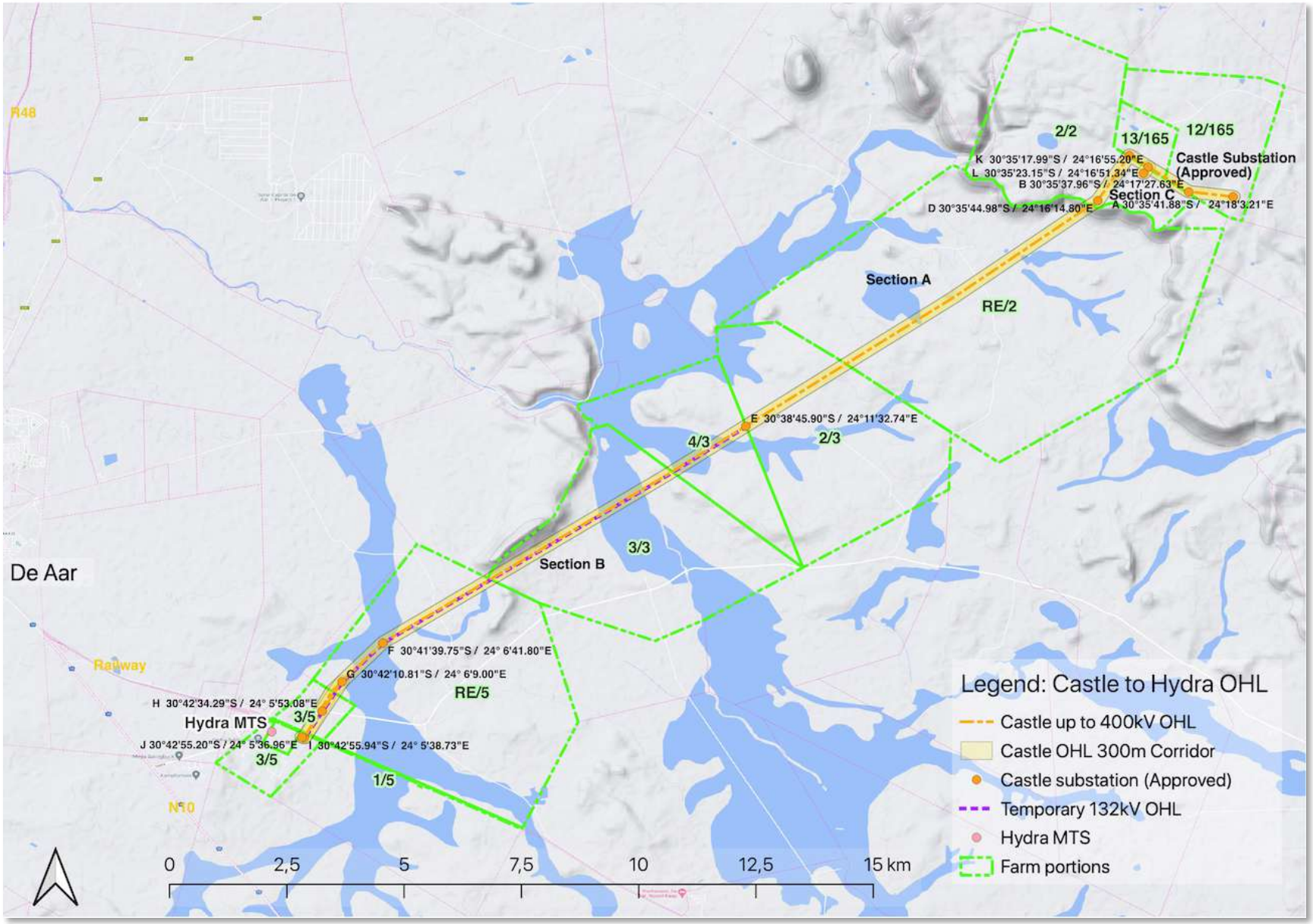


Figure 1-3: Layout of the proposed Castle to Hydra MTS OHL near De Aar in the Norther Cape Province (terrain image).

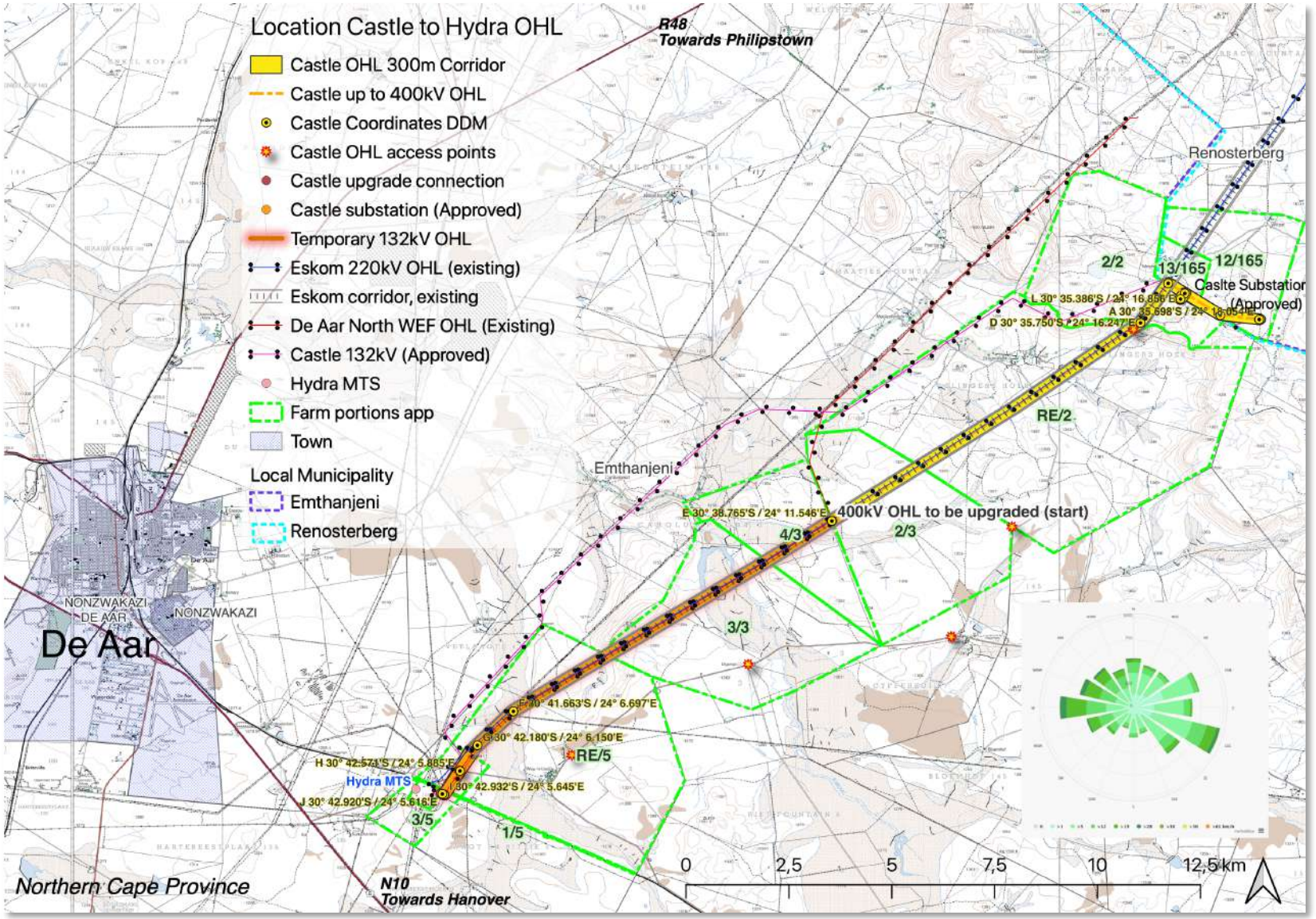


Figure 1-4: Layout of the proposed Castle to Hydra MTS OHL near De Aar in the Norther Cape Province (cadastral image), wind rose in bottom right.

In terms of the NEMA, the proposed project triggers a suite of listed activities which require authorisation from the competent environmental authority via an BA process before they can be undertaken. Since the project is for the evacuation of energy, and energy projects are dealt with by the national authority, the competent authority is thus the national DFFE. DFFE's decision will be based on the outcome of this BA process. The BA process entails several phases which are further detailed in Section 3.2.

The purpose of this BAR[3] is to set out and assess the environmental outcomes, impacts and residual risks of the proposed activity. Accordingly, the BAR includes the following chapters:

- Chapter 1
  - Introduces the OHL, EIA project team and provides a summary of the main assumptions and limitations.
- Chapter 2
  - Outlines an analysis of the legal framework relevant to the project.
- Chapter 3
  - EIA methodology, detailing the phases of the BA process as well as the public participation process.
- Chapter 4
  - Project description of the proposed OHL.
- Chapter 5
  - Alternatives that have been considered.
- Chapter 6
  - Baseline environment and assessment of the potential impacts on the environment that may be caused by the project.
- Chapter 7
  - Environmental Impacts Statement summarising the outcomes of the impact assessment and key issues and a
- Chapter 8
  - Conclusion and way forward in terms of the application for Environmental Authorisation.

Annexures to this report and include:

- Annexure A
  - Details on the Environmental Assessment Practitioners (EAP) who compiled this report.
- Annexure B
  - Correspondence with DFFE to date.
- Annexure C
  - Public participation process.
- Annexure D
  - Specialist input, where this was submitted in a report format.
- Annexure E
  - DFFE Screening Tool Report.
- Annexure F
  - Transmission line route coordinates at 150m intervals (WGS84)

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

- Annexure G
  - Generic EMPr
- Annexure H
  - Site photographs, General photos taken on 22 April 2022

1.5 EIA Project Team

A team of experienced sub-consultants (specialists) and practitioners have contributed to this BA, Table 1-3 BA Project Team or a list of the team. CVs of the EAP is attached in Annexure A. Should a CV of a Specialist be required it will be provided upon request from the EnviroAgri.

Table 1-3: BA Project Team.

Role	Consultant	Company
EAP		
EAP	Dirk Pretorius	EnviroAgri
Review	Gert Pretorius	EnviroAgri
Specialists		
Avifauna (birds)	Chris van Rooyen Albert Froneman	Chris van Rooyen consulting CC
Aquatic Ecology	Brian Colloty	EnviroSci (Pty) Ltd
Terrestrial Ecology	Andrew Husted Rudolph Greffrath	The Biodiversity Company
Visual	Lourens du Plessis	LoGIS
Agricultural potential	Johann Lanz	Private Consultant
Heritage (incl. Archaeology and Palaeontology)	Jenna Lavin	CTS Heritage (Cedar Tower Services (Pty) Ltd)

1.5.1 Independence

The amended 2014 EIA Regulations pursuant to NEMA, provide general requirements for EAPs and specialists with the intention of reducing the potential for bias in the environmental process. The first requirement is that the EAP should be independent (Regulation 13(1)(a) of GN R982, as amended). Neither EnviroAgri nor any of the sub-consultants are subsidiaries of *ACED or Eskom*, nor is *ACED or Eskom* a subsidiary to EnviroAgri. EnviroAgri and the sub-consultants do not have any interests in secondary or downstream developments that may arise out of the authorisation of the proposed project.

1.6 Assumptions, Limitations and Gaps in Knowledge

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

- The information provided by the client is accurate and unbiased, and no information that could change the outcome of the BA process has been withheld.
- The scope of this investigation is limited to assessing the environmental impacts associated with the proposed OHL. The environmental impacts of the substations (and generation infrastructure) which the OHL will connect to has been investigated under separate EIA processes.
- The BA process is based on Best Practice Guidelines which were available at the time of writing this report.
- The final transmission line layout will occur within the footprint of the transmission line corridor that was assessed by the EAP and specialists. This refers to the transmission lines that are illustrated in Figure 1-2, with a buffer of 150m on either side (i.e. a 300m width).

- For the purpose of this assessment, it is assumed the Castle WEFs will be constructed. If the WEF does not reach construction, the associated infrastructure in this application, or parts thereof, may still be constructed the service other generation facilities.
- The requisite permits and consents, including the GA are underway, a Risk Assessment Matric (RAM) has already been undertaken for the majority of the proposed OHL route since.
- Other renewable energy projects in the area propose their own grid connection infrastructure, also connecting into the Hydra MTS. It is assumed that the cumulative impact assessment for this BAR speaks to both the impacts caused by the grid connection infrastructure, as well as the technology (wind or solar) for the projects listed in Annexure I, Cumulative Project within 30km and Figure 3-3.

In undertaking this BAR process, a few gaps in knowledge were evident. These are as follows:

- Specific source of water for the development has not yet been identified
- No indication of commencement date of construction phase, since the proposed development is dependent on the construction timelines of the Castle WEF.
- Lack of precise plan for decommissioning the grid connection infrastructure.
- The kV of the final OHL (between 132kV and 400kV) which depends on Eskom technical considerations regarding consolidation of grid connection infrastructure from Castle WEF and other generation facilities planned in the area.
- Gaps that have been identified by the specialists are provided in their respective reports (Annexure D).

The planning for the proposed project is at a feasibility level and its design is conceptual – but near final, subject to feedback received during the PPP. Importantly, the assessment of the transmission lines in this report have focused on a 300m (150m each side of the centre line) buffer to allow for micro-siting of pylons during construction and to enable on site mitigation measures to be undertaken based on alignment of project components within this buffer area. Given that the OHL will be constructed within the corridor micro-sitting with specialist input will still be required since no fine detail planning has gone into the corridor. These details will be included into the EMPr. The DFFE, and other authorities, will be requested to issue their comments to allow for the type of refinements that typically occur during project design. These assumptions, limitations and gaps in knowledge will not affect the EAPs assessment or findings of the proposed OHL.

2 LEGAL AND PLANNING CONTEXT

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

2.1 Relevant Legislation

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

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

Legal Requirements		
Legislation considered	**Relevant Organ of State / authority**	**Aspect of Project**
National Environmental Management Act, Act No. 107 of 1998 (NEMA), as amended	Department of Forestry, Fisheries, and the Environment (DFFE)	Several listed activities in terms of NEMA GN No R983, R984 and R985 in the Government Gazette of 4 December 2014 (as amended on 7 April 2017), have been triggered and need to be authorised for the proposed OHL (also see Table 2-2). Based on the listed activities triggered, the application for environmental authorisation will follow the BA process as set out in Regulations 19-20 of GN R982. Note: The proposed development site is located within the Electricity Grid Infrastructure Central Strategic Transmission Corridor as per Government Notice 113, National Environmental Management Act, 1998 (Act No. 107 of 1998). In terms of GN 350, 13 April 2017 of NEMA, 1998 (Act 107 of 1998), the proposed development falls within the Central Strategic Transmission Corridor. The basic assessment procedure contemplated in Regulation 19 and 20 of the EIA Regulations, 2014 to obtain environmental authorisation, as required in terms of the Act is being followed. The timeframe for decision-making as contained in the EIA Regulations, 2014 for purposes of this application for EA, as contemplated in GN 350 of NEMA (Act No. 107 of 1998) is 57 days.
National Environmental Management: Biodiversity Act, Act No. 10 of 2004 (NEMBA)	Department of Forestry, Fisheries, and the Environment (DFFE)	The act calls for the management of all biodiversity within South Africa. All indigenous fauna is protected under the NCNCA (refer further below in this table). Wetland conservation is driven by the South African National Biodiversity Institute (SANBI), a requirement under NEMBA and the study area has been mapped as Very High sensitivity related to presence of wetlands and Freshwater Ecosystem Priority Areas (NFEPA). Site investigation by the freshwater ecologist has however indicated that the large-scale riverine floodplain is not a wetland (as per National Wetland Inventory V5.2 (2020) based on 2007 land cover data) but rather an alluvial system.
Environmental Conservation Act, Act No. 73 of 1989 (ECA)	Department of Forestry, Fisheries, and the Environment (DFFE)	Noise impacts associated with OHLs are generally confined to the construction phase and low level noise "humming" during operation. In terms of section 25 of the ECA, the national Noise Control Regulations (GN R154 in Government Gazette No. 13717 dated 10 January 1992) (NCR) was promulgated. The NCRs were revised under Government Notice Number R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations. Currently, no provincial or local regulations exist in the Northern

		Cape and no approval is required. Mitigation measures, are included in the BAR and EMPr.
National Water Act, Act No. 36 of 1998 (NWA)	Department of Water Affairs and Sanitation (DWS)	Section 21 of the NWA recognises water uses that require authorisation by DWS before they commence. Construction of infrastructure within drainage lines could be required for the associated roads and authorisation is therefore required in terms of Section 21 (c) and (i) in the form of either a General Authorisation or Water Use License Application (WULA). The information required by the DWS for this application has been included in the aquatic ecology assessment in Annexure D. However, this application will only be submitted if the associated Castle WEF project attains financial closure. No water use may begin without the appropriate authorisation.
National Heritage Resources Act, Act No. 25 of 1999 (NHRA)	South African Heritage Resources Agency (SAHRA), and Northern Cape Provincial Heritage Resources Authority Ngwao Boswa Kapa Bokone (NBKB)	The proposed OHL and associated roads will exceed 300 m in length and cross over more than three properties. Therefore, Section 38 of the NHRA is applicable. As such, a Heritage Impact Assessment and Palaeontological Desktop Assessment has been undertaken as required by the NHRA. Comment on the project will be obtained from NBKB and SAHRA during the PPP and appropriate mitigation measures have been included in the BAR and EMPr.
Aviation Act, Act No 74 of 1962	Civil Aviation Authority (CAA)	OHL may potentially interfere with radio navigation equipment. Transmission lines stations are also considered to be potential physical obstacles and may need to be fitted with aviation warning lights if required by the CAA. Application for approval will been submitted to the CAA by the Proponent. Considering that most of the line will run within a proclaimed Eskom transmission corridor and about half of it will entail upgrading of an existing OHL the potential interference in terms of CAA considerations are deemed very low.
Conservation of Agricultural Resources Act, Act No. 43 of 1983 (CARA)	Northern Cape Department of Agriculture and Rural Development	The purpose of this Act is to ensure that natural agricultural resources of South Africa are conserved through maintaining the production potential of land, combating and preventing erosion, preventing the weakening or destruction of water sources, protecting vegetation, and combating weeds and invader plants. As such, as part of the BA process, recommendations will be made to ensure that measures are implemented to maintain the agricultural production of land, prevent soil erosion, and protect any water bodies and natural vegetation on site. The holder of the EA with the relevant farmers should also ensure the control of any undesired aliens, declared weeds, and plant invaders listed in the regulation that may pose a problem because of the proposed project.
National Road Traffic Act, Act No. 93 of 1996 (NRTA)	Department of Transport, Northern Cape	Certain vehicles and loads cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed in the Regulations of the NRTA. Due to the large size of some of the OHL components they will need to be transported via "abnormal loads". As such, the Northern Cape Department of Transport will be provided with an opportunity to review and comment on this BA process.

The National Energy Act, Act No. 34 of 2008	Department of Energy (DoE)	One of the purposes of which The National Energy Act is to promote sustainable development of renewable energy infrastructure for which the transmission lines will form part of.
Northern Cape Nature Conservation Act Act No. 9 of 2009 (NCNCA)	Northern Cape Department: Agriculture, Environmental Affairs, Rural Development and Land Reform	Numerous sections (specifically sections 50-51) under NCNCA deal with indigenous and protected plants. The protected status of various species that may be located on the site requires a permit under NCNCA in order for the plants to be removed or destroyed i.e. a permit is required before development may commence.
Astronomy Geographic Advantage Act, Act No. 21 of 2007 (AGA), and associated Regulations	Department of Science and Innovation (DSI)	In terms of Schedule D of the Regulations on the Protection of the Karoo Central Astronomy Advantage Areas (KCAAA)(GN 1411 of 15 December 2017), transmission lines located more than 50km away from the SKA Infrastructure Territory are exempt from requiring a permit from the DSI unless the operation of such infrastructure are found to cause interference with the SKA. The proposed infrastructure is more than 50km away from the SKA Infrastructure Territory and is thus exempt from the AGA permitting requirements. Specific KCAAA requirements for transmission of power include: 5. Additional conditions for distribution or transmission power systems (1) In addition to the conditions in regulation 3 of these regulations, no person may construct or install any new overhead distribution or transmission power systems with a voltage rating – (2) (a) equal or greater to sixty-six thousand Volts (66 000 V) within sixteen km of SKA Infrastructure Territory; and (b) less than sixty-six thousand Volts (66 000 V) within six km of SKA Infrastructure Territories. Despite compliance with sub-regulation (1), the distribution or transmission power system may not cause electromagnetic interference to SKA Infrastructure Territories which exceeds the protection levels prescribed in the Radio Astronomy Protection Levels Regulations, 2012. No potential red flags for RFI or EMI exists within the development area and no sensitivity has been identified by the DFFE screening tool report (2022/04/28). Therefore, the EAP has not included this assessment as part of the application process. However, SKA will be provided an opportunity to comment on the BAR.

2.2 Listed Activities in terms of NEMA

NEMA is the primary legislation tasked with the management of environmental resources and, accordingly, identifies activities that require authorisation prior to commencement. Such activities listed in the amended 2014 EIA Regulations (GN R982, as amended) are detailed in Table 2-2.

Table 2-2: Listed activities triggered by the proposed OHL.

Activity No(s):	Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 1 of the EIA Regulations, 2014 as amended (LN 1 GN R327)	Describe the portion of the proposed project to which the applicable listed activity relates.
GN R983 Activity 11	"The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts".	The temporary bypass OHL of 12,4km will be 132kV required for the upgrade of the Section B. Section C will also be 132kV. See Figure 1-3 for Locality map indicating Sections A, B and C.
GN R983 Activity 12	The development of – (ii) infrastructure or structures with a physical footprint of 100 m^2 or more; Where such development occurs – (a) within a watercourse; (c) if no development setback exists, within 32 m of a water course, measured from the edge of a watercourse;	Several drainage lines will be crossed by the proposed construction roads and transmission lines. Several pylon structures will be in or within 32 m of watercourses.
GN R983 Activity 19	The infilling or depositing of any material of more than 10 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 m^3 from a watercourse;	Access roads (service tracks) and transmission line pylons (to be avoided as far as possible) will be located within a watercourse (drainage line) which would therefore trigger this activity.
GN R983 Activity 28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 1 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 ha.	The transmission line will amount to an area of greater than 1 hectare being cleared within an area utilised for agricultural purposes (i.e. outside an urban area).
GN R983 Activity 47	The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.	Section B of the proposed OHL will be up to 400kV (up from 132kV) and the development footprint will increase if the existing pylon structures are replaced with larger pylon structures to accommodate the up to 400kV OHL.
GN R983 Activity 48	The expansion of- Infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs- (a) within a watercourse; (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.	Existing infrastructure such as roads and bridges within 32 m of a watercourse will require expansion. The footprint of the proposed development expansion within 32 m of a watercourse will exceed 100 square metres.
Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 3 of the EIA Regulations, 2014 as amended (LN 3 GN R324)**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
GN R985 Activity 4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. g. Northern Cape ii. Outside urban areas:	The transmission line roads will cross areas mapped as CBAs according to the Northern Cape Biodiversity Spatial Plan (Oosthuysen & Holness 2016). Although roads will be approximately 4m

	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	or less some sections will exceed the 4m threshold.
GN R985 **Activity 12**	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. g. Northern Cape ii. Within critical biodiversity areas identified in bioregional plans;	Vegetation exceeding the threshold of 300m^2 will be cleared where roads associated with the transmission lines cross areas identified as CBAs according to the Northern Cape Biodiversity Spatial Plan (Oosthuysen & Holness 2016).
GN R985 **Activity 14**	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; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; (g) Northern Cape ii. 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	Roads associated with the transmission lines will be constructed within 32 m of a watercourse. The proposed site lies outside of an urban area and the transmission lines traverses CBAs.
GN R985 **Activity 18**	The widening of a road by more than 4 m, or the lengthening of a road by more than 1 km. (g) Northern Cape (ii) Outside urban areas: (ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.	Access tracks for the proposed development, which will include extensions of existing farm tracks will be lengthened by more than 1 km within 100m from the edge of a watercourse. Existing roads would be used as far as practically possible and feasible. Some of these roads will traverse drainage lines or fall within 100 m from the edge of a watercourse or wetland.
GN R985 **Activity 23**	The expansion of— (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs— (a) within a watercourse; (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; (g) Northern Cape i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas;	The expansion of existing infrastructure such as roads that are located within 32 m of a watercourse, within an CBAs will be undertaken.

	(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	
Activity No(s):	**Provide the relevant Basic Assessment Activity(ies) as set out in Listing Notice 2 of the EIA Regulations, 2014 as amended (LN 2 GN R325)**	**Describe the portion of the proposed project to which the applicable listed activity relates.**
GN R983 **Activity 9**	The development of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex	Authorisation is required for an up to 400kV transmission line to connect to the national grid.

2.2.1 DFFE Screening Tool

Government Notice 960, gazetted on 05 July 2019, in accordance with the NEMA EIA Regulations 2014 (as amended) requires that a national web based environmental screening tool is used to produce a report that should be submitted with an EA application to the DEA[4] from 05 October 2019 and onwards (i.e., 90 days following the date of publication of this notice).

The downloaded report is appended in Annexure E. This report shows, on a high level, the site's sensitivity to OHL development based on different environmental themes (including, inter alia, aquatic ecology, terrestrial ecology, avifauna, heritage) and identifies assessment protocols that must be undertaken depending on the environmental theme's sensitivity rating within the development site.

Assessment protocols that set out the "procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes in terms of section 24(5)(a) and (h) of the national environmental management act, 1998, when applying for environmental authorisation" were Gazetted on 20 March 2020. These protocols in terms of reporting of identified environmental themes were met in terms NEMA.

2.3 Relevant Policies

South Africa's Constitution (1997), together with the three policies indicated, have been key in developing South Africa's renewable energy industry. These policies include:

- White paper in the Energy Policy of the Republic of South Africa (1998)
- White Paper on Renewable Energy (2003)
- National climate Change Response Policy White Paper

2.4 Relevant Guidelines

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

- EIA Guideline for Renewable Energy Projects (DEA, 2015).
- Integrated Environmental Information Management (IEIM), Information Series 5: Companion to the NEMA EIA Regulations of 2010 (DEA, 2010).
- IEIM, Information Series 2: Scoping (Department of Environmental Affairs and Tourism (DEAT), 2002).
- IEIM, Information Series 3: Stakeholder Engagement (DEAT, 2002).
- IEIM, Information Series 4: Specialist Studies (DEAT, 2002).

[4] DEA is now referred to as DFFE effective 1 April 2021.

- IEIM, Information Series 11: Criteria for determining Alternatives in EIA (DEAT, 2004).
- IEIM, Information Series 12: Environmental Management Plans (DEAT, 2004).
- IEM Guideline Series 7: Public Participation in the Environmental Impact Assessment Process (DEA, 2012)
- Birds and Wind-Energy Best-Practice Guidelines: Third Edition (BirdLife SA and EWT, 2015).
- Environmental, Health, and Safety Guidelines for Wind Energy (World Bank Group, 2015).

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

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

3 EIA METHODOLOGY

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

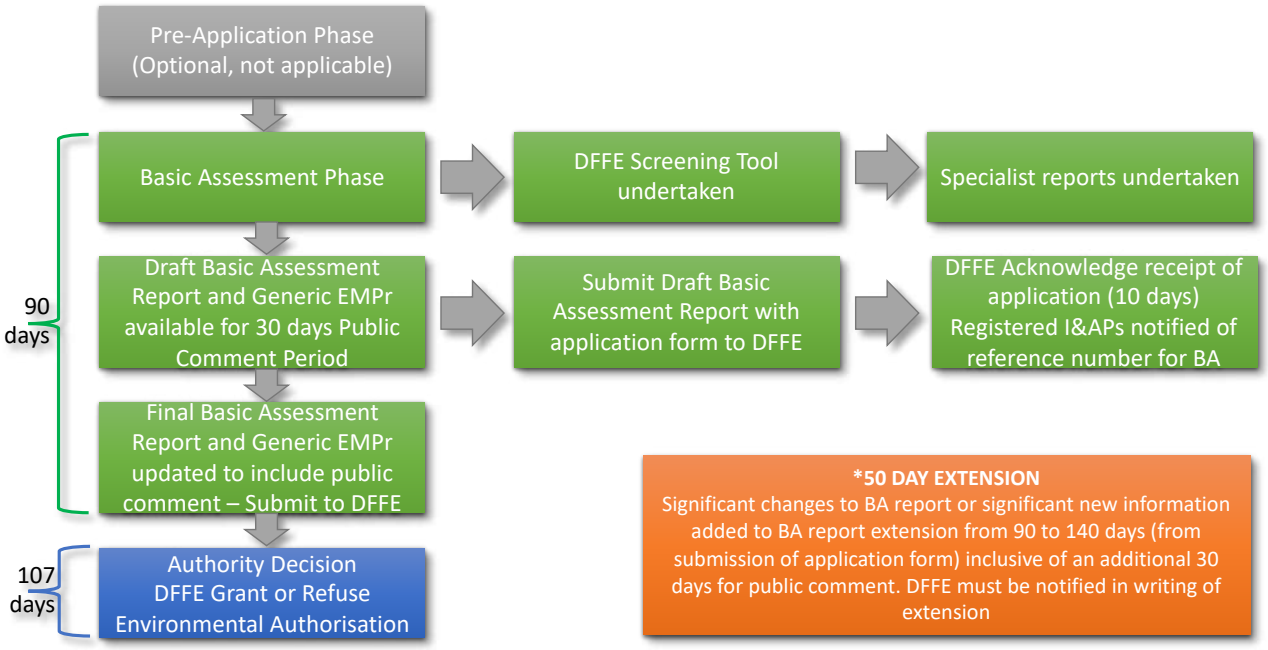


Figure 3-1: The BA process in terms of NEMA.

As illustrated in Figure 3-1, only one stage of public participation is included in the BA process, i.e. comment period on the draft BAR. More information on the Public Participation Process (PPP) is included in Section 3.4.

3.1 The Pre-Application Phase

No official pre-application phase was undertaken since the proposed project site has largely been subjected to previous BA process[5] for a similar transmission line development in 2021 and the rest of the site falls within the area assessed for the authorised Castle WEF[6] and authorised Castle OHL[7]. Typically, the pre-application phase would include a meeting with DFFE and the release of a consultation/pre-application BAR. These were deemed not to be necessary in context of the proposed developments given that the proposed OHL will largely fall within the parameters of the recently assessed OHL corridor. Most of the properties in question have been subject to rigorous specialist investigations and environmental application which provide a notable amount of baseline information to be called on in this draft BAR.

Note: All COVID-19 Disaster Management Regulations, relevant to the BA process have been repealed effective 4 April 2022.

[5] Up to 400kV De Aar 2 South Transmission Line and Switching Station, DFFE Ref: 14/12/16/3/3/1/2330
[6] Castle WEF and associated infrastructure, DFFE Ref: 14/12/16/3/3/2/278, 8 May 2015.
[7] OHL from Castle to the Hydra MTS, DFFE Ref: 14/12/16/3/3/1/1351, 5 October 2018.

3.2 BAR Phase

A site visit was undertaken to familiarise the EAP and the specialists with the site and to allow for a rapid site survey, identifying potential areas of concern or opportunity. Site visits by an EAP were undertaken at inception of the BAR phase on 21 April 2022 on which day site notices were also placed.

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

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

complies with and responds to the policy and legislative context;

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

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

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

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

ii) the degree to which these impacts -

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

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

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

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

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

- Previous EIA and BA process undertaken for the Castle WEF and OHL, De Aar South OHL;
- Collection of information specific to the project, as provided by the Proponent;
- Project description;
- Basic methodology for construction of the various project components;
- Basic methodology during operations and decommissioning;
- Expected timeframe for project development;
- Maps and figures, outlining the proposed facilities;
- Technical information relating to design;
- Other relevant BARs/ EIRs prepared for BAs/EIAs undertaken in the area;
- Environmental baseline literature and desktop spatial surveys for this site and surrounding areas;
- Environmental baseline surveys for this site and surrounding areas from site visits by specialists;
- Consultation with the project team (including specialists); and
- Consultation with I&APs, including authorities.

An application form for the project will be submitted to DFFE (in order to register the project on the Department's databases) along with the draft BAR which will be circulated for a 32-day public comment period. All comments received will recorded and responded to in a Comments and Response section within the Public Participation Report (Annexure C), and the BAR will be updated to address I&AP comments, where appropriate. The final BARs will be submitted to DFFE for decision making, with the final BAR being submitted no later than 90 days from the receipt of the application form. The competent authority must then, within **57 days**[8] of receipt of the final BAR and generic EMPr, in writing –

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

(b) Refuse environmental authorisation.

Summary of the key dates of the BAR process:

- Site visit - 21 April 2022 (Complete)
- Placement of Site notices -21 April 2022 (Complete)
- Advertisement in De Aar Echo Newspaper - 27 May 2022
- Lodging of Draft BAR at De Aar Public Library and on Dropbox - 1 June 2022
- Notification of I&APs and state departments of availability of draft BAR – 1 June 2022
- PPP officially starts on 2 June 2022
- Last day to submit comment on draft BAR – 4 July 2022
- Submit Final BAR to DFFE – 7 July 2022
- DFFE provide decision on application (57 days) – prior to 2 September 2022
- Notification of registered I&APs of DFFE decision and appeal process – upon receipt of DFFE decision

3.3 Methodology

3.3.1 Specialist Assessments

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

- Undertake a site investigation to determine the status quo and identify any sensitive features or no-go areas;
- Provide shapefiles of all sensitive features;
- Assess all proposed site alternatives within a 300m buffer[9] associated with the proposed grid connection infrastructure;
- Make use of the EnviroAgri Impact Assessment Methodology (explained below in Section 3.2.2) when assessing impacts for all alternatives proposed as part of the proposed OHL, as well as cumulative impacts (detailed below in Section 3.2.3);

[8] The proposed development site is located within the Electricity Grid Infrastructure Central Strategic Transmission Corridor as per Government Notice 113, National Environmental Management Act, 1998 (Act No. 107 of 1998). In terms of GN 350, 13 April 2017 of NEMA, 1998 (Act 107 of 1998), the proposed development falls within the Central Strategic Transmission Corridor. The basic assessment procedure contemplated in Regulation 19 and 20 of the EIA Regulations, 2014 to obtain environmental authorisation, as required in terms of the Act is being followed. The timeframe for decision-making as contained in the EIA Regulations, 2014 for purposes of this application for EA, as contemplated in GN 350 of NEMA (Act No. 107 of 1998) is **57 days**.

[9] A 300m buffer area was assessed by the EAP and specialists to allow for micro-sitting of infrastructure prior to construction.

- Provide a detailed description of appropriate mitigation measures that can be adopted to reduce or avoid negative impacts and improve positive impacts for each phase of the project. Indicate the level of significance of impacts pre- and post-mitigation;
- Provide a summary of succinct and practical recommendations based on mitigation measures identified to form the basis of environmental authorisation requirements, should the development be authorised;
- Comply with the content requirements for specialist reports listed in Appendix 6 of the 2014 EIA Regulations (GN R982 of 2014, as amended); and
- Comply with procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the NEMA, 1998, when applying for environmental authorisation (GN R320, of 20 March 2020).

3.3.2 Assessment Methodology

The methodology used by EnviroAgri (Specialists) to undertake the assessment of impacts, i.e. to identify, assess, and rank the impact of the proposed development activities, is based on a culmination of the NEMA 2014, EIA regulations (Appendix 1, as amended Table 3-1), as well as the IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) guide on the production of assessments (IPBES, 2018). The objective of the methodology is to allow the assessor (EAP / Specialists) to undertake an impact assessment which culminates into a full description of the process undertaken to identify, assess and rank the impacts of the proposed development activities and alternatives.

Table 3-1: Appendix 1 of the NEMA 2014, EIA regulations (as amended) which was used as guideline for the assessment methodology, as it relates to the assessment of impacts.

Appendix 1 Basic Assessment Process
Objectives of the basic assessment process

2. The objective of the basic assessment process is to, through a consultative process–

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

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

(ii) the degree to which these impacts—

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated; and

(e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—

(i) identify and motivate a preferred site, activity and technology alternative;

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

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

(h) a full description of the process followed to reach the proposed preferred alternative within the site, including-

(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts-

(aa) can be reversed;

(bb) may cause irreplaceable loss of resources; and

(cc) can be avoided, managed or mitigated;

(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;

(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;

(viii) the possible mitigation measures that could be applied and level of residual risk;

(ix) the outcome of the site selection matrix;

(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and (xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity; (i) a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including- (iv) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (v) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures; (j) an assessment of each identified potentially significant impact and risk, including- (i) cumulative impacts; (ii) the nature, significance and consequences of the impact and risk; (iii) the extent and duration of the impact and risk; (iv) the probability of the impact and risk occurring; (v) the degree to which the impact and risk can be reversed; (vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated.

The impact assessment process, including the criteria applied to establish the likely **significance** and **consequence** of an impact are provided in Table 3-2. For each predicted impact, the EAP/Specialist applies expert judgement in ascribing a numerical rating for each of these criteria respectively as per Table 3-4. The criteria include the sum of **severity** (degree scale); the **duration** (temporal scale); and the **extent** (spatial scale), to calculate the **magnitude** of the impact. To calculate the significance of an impact, the **probability** (or likelihood) that a well-defined outcome will occur in the future, based on expert judgment is considered, therefore **significance** is calculated as the product of **magnitude** and **probability**. Once the significance of an impact occurring without mitigation has been calculated, the EAP/Specialist must apply their expert judgement to assign ratings for the same impact after the proposed mitigation has been implemented. Ultimately, each impact needs to be contextualised in terms of the **consequence** within its extent and the **importance** of the specific impact area or aspect. Therefore, the consequence is calculated as the product of **significance** and **importance**. The impact magnitude, significance and consequence are auto generated by completing a spreadsheet which uses the calculations provided in Table 3-4 the assessor can comment on the generated rating in terms of their reasoned on its accuracy.

Table 3-2: Impact assessment terminology explained.

Extent	The spatial influence (geographical coverage) of the impact or the area that will be affected by the impact
Duration	The period (time) over which the impact will have an effect on the aspect being assessed.
Intensity	The intensity of an impact will to some extent be affected by the sensitivity or resilience (ability to withstand adverse impacts) of the aspect impacted upon.
Magnitude	The measurable change in impact amplitude in terms of intensity, duration and extent of the impact.
Probability	Probabilistic estimates on expert judgment considering available evidence and are described in terms of likelihood of impacts occurring. In making their expert judgement, assessors start at "about as likely as not" and consider whether there is sufficient quantitative information available to assign either a likely or unlikely probability, or more extreme levels of probability. Note that using a likelihood term for a specific outcome implies that alternative outcomes have the inverse likelihood, e.g. if an outcome is very likely (a range of >90%) then that would imply that other outcomes are very unlikely (0 - 89% probability).
Significance	An impact that by its magnitude (in terms of duration, intensity and extent) and probability (likelihood) of occurrence may have a notable effect on the environment.
Importance	A value placed on the aspect impacted upon though expert judgement and/or science-based criteria. Considers resource-irreplaceability and/or value.
Consequence	A value placed on the change by different affected parties, i.e. level of acceptability. It is an anthropocentric concept, which makes use of value judgements and science-based criteria, i.e. biophysical, social and economic.

Further to the core impact assessment there are several parameters which provide supplementary information on the impact including the: i. project phase; ii. nature (type), iii. mitigatability; iv. reversibility; v. resource irreplaceability and vi. confidence (Table 3-3). The outcome of an impact assessment is underpinned by the quality and quantity of evidence associated with impacts and scientific agreement thereof. Therefore, assessors need to make qualitative assessments of confidence pertaining their expert estimates on impact consequence Figure 3-2. Confidence should not be confused with probability of an outcome, e.g. the probability of an impact occurring might be very low and the assessor might be virtually certain thereof in his/her rating, the fact that the assessor is confident in his/her assessment should not influence the significance or consequence thereof.

Table 3-3: Impact assessment supplementary information terms explained.

CRITERIA	CATEGORY	DESCRIPTION
Project phase	Construction	From commencement of activity to the start of production / operation
	Operation	From start of production /operation
	Decommissioning	Make inoperative and dismantle of infrastructure
Nature (Type)	Positive	Where positive attributes of impact outweigh negative attributes
	Negative	Where negative attributes of impact outweigh positive attributes
Mitigatability	Low	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts
	Medium	Mitigation exists and will notably reduce significance of impacts
	High	Mitigation exists and will considerably reduce the significance of impacts
Reversibility	Low	The affected environment will not be able to recover from the impact - permanently modified
	Medium	The affected environment will only recover from the impact with significant intervention
	High	The affected environmental will be able to recover from the impact
Confidence	Deficient	Judgement is made with limited support data or specialist knowledge
	Inconclusive	Judgement is based on intuition or some support data
	Unresolved / Established but incomplete	Determination is based on common sense and general knowledge, but there are factors that are unresolved or incomplete.
	Well established	Substantive supportive data and or experience exists to verify the assessment
	Virtually certain	Empirical evidence supportive data exists to verify the assessment

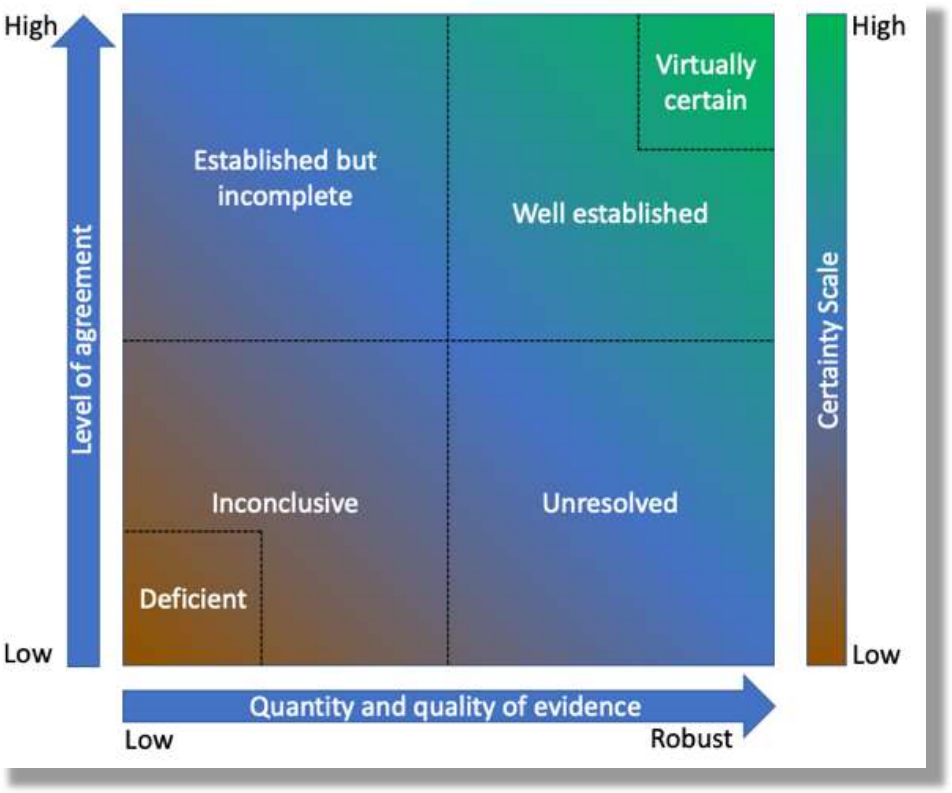
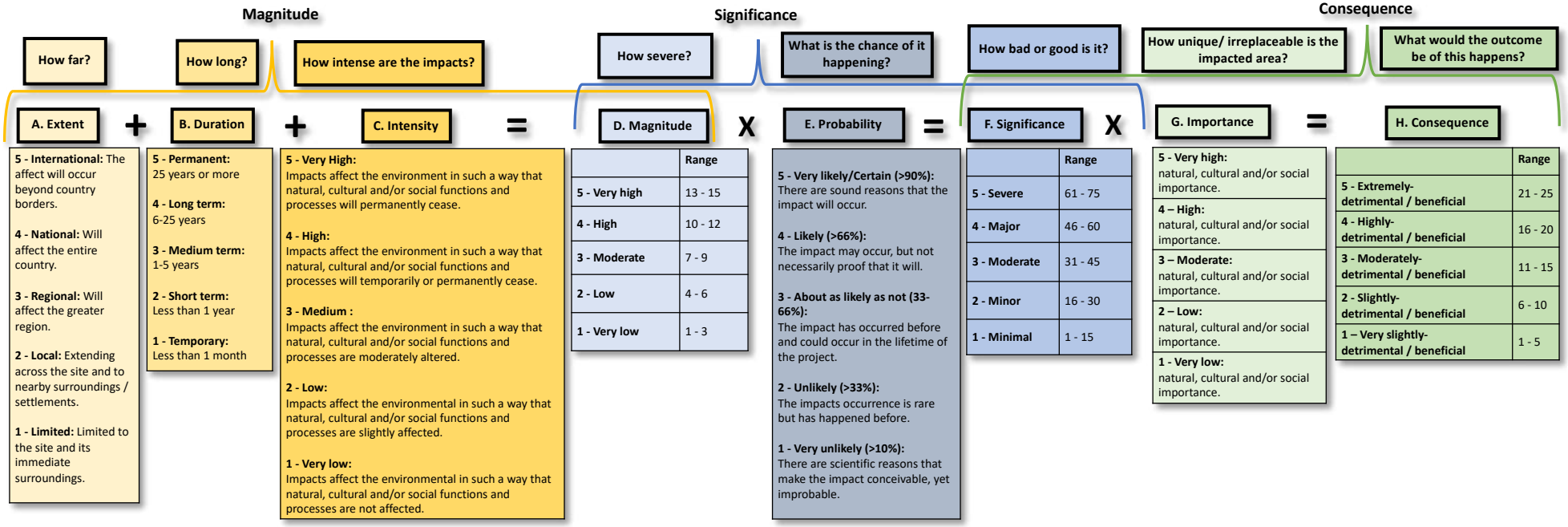


Figure 3-2: The six-box model for the qualitative communication of confidence (Source: Adopted from IPBES, 2018).

Table 3-4: Calculation of impact magnitude "D" (sum of impact extent "A", duration "B" and intensity "C"), significance "F" (product of impact magnitude "D" and probability "E"), and consequence "H" (product of impact significance "F" and importance "G").



Even though impacts are considered both qualitatively and quantitatively, the assessment of the predicted significance of impacts is inherently uncertain. To manage this uncertainty, this standardised methodology has been developed. This methodology will be applied to assess the consequence of the environmental impacts. Since the rationalisation of impacts within any context will ultimately be prejudiced by the assessor, there can be no wholly objective measure by which to judge the components of consequence, let alone how they are integrated into a single comparable measure.

To facilitate informed decision-making, environmental assessments must endeavour to come to terms with the potential consequence of the environmental impacts associated with activities. Recognising this, the assessor has attempted to address potential subjectivity in the assessment process as follows:

- Being explicit about the difficulty of being completely objective in the determination of consequence, as outlined above;
- Developing an explicit methodology for assigning consequence to impacts and outlining this methodology in detail.
  - Having an explicit methodology not only forces the assessor to come to terms with the various facets contributing towards the determination of consequence, thereby avoiding arbitrary assignment,
  - Provides the reader with a clear summary of how the specialist derived the assigned consequence and their confidence in these assessments;

Although these measures may not eliminate subjectivity, they provide an explicit and repeatable context within which to review the assessment of impacts.

3.3.3 Assessment of Cumulative Effects

Cumulative effects are commonly understood to be impacts from different projects that combine to result in significant change, which could be larger than the sum of all the individual impacts. The assessment of cumulative effects will therefore be considered for all developments within a 30km radius of the proposed site in particular renewable energy (wind and solar) and their associated grid connections (Figure 3-3). The projects considered in the cumulative assessment are those projects that have received environmental authorisation, including those projects currently under construction and where construction has not yet commenced.

The relevant projects with potential associated cumulative impacts have been identified as detailed in Annexure I, Cumulative Project within 30km. Cumulative effects have been assessed by each of the specialist studies as part of their assessments. The cumulative assessments are included in Section 6.

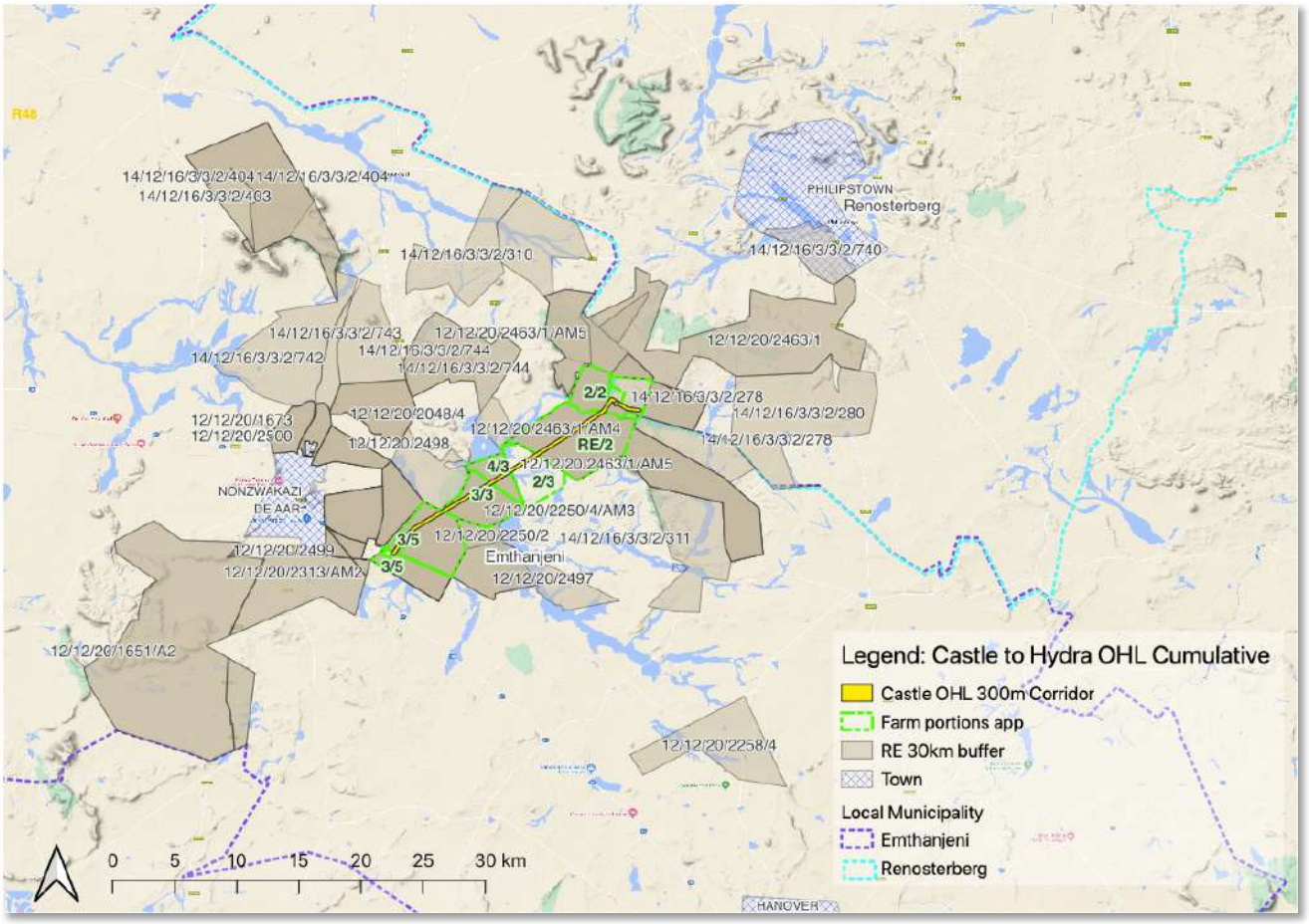


Figure 3-3: Developments within a 30km radius of the proposed site in particular renewable energy (wind and solar) and their associated grid connections (REEA: Q4, 2021, released 2022/02/28).

3.4 Public Participation

The aim of stakeholder engagement differs at different stages of the project lifecycle. During the BA process, the aim is to provide an opportunity for stakeholders to be informed of projects occurring in their area and that may affect them directly or indirectly. It also aims to provide an accessible and meaningful opportunity for people to ask questions, raise concerns or grievances and to ensure that these are used to guide the new development, and ongoing operations, in a responsible manner that complements the local socio-economic environment and enhances the benefit of a given project.

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

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

3.4.1 Stages of the Public Participation Process

The PPP for this project is illustrated in Figure 3-4 below.

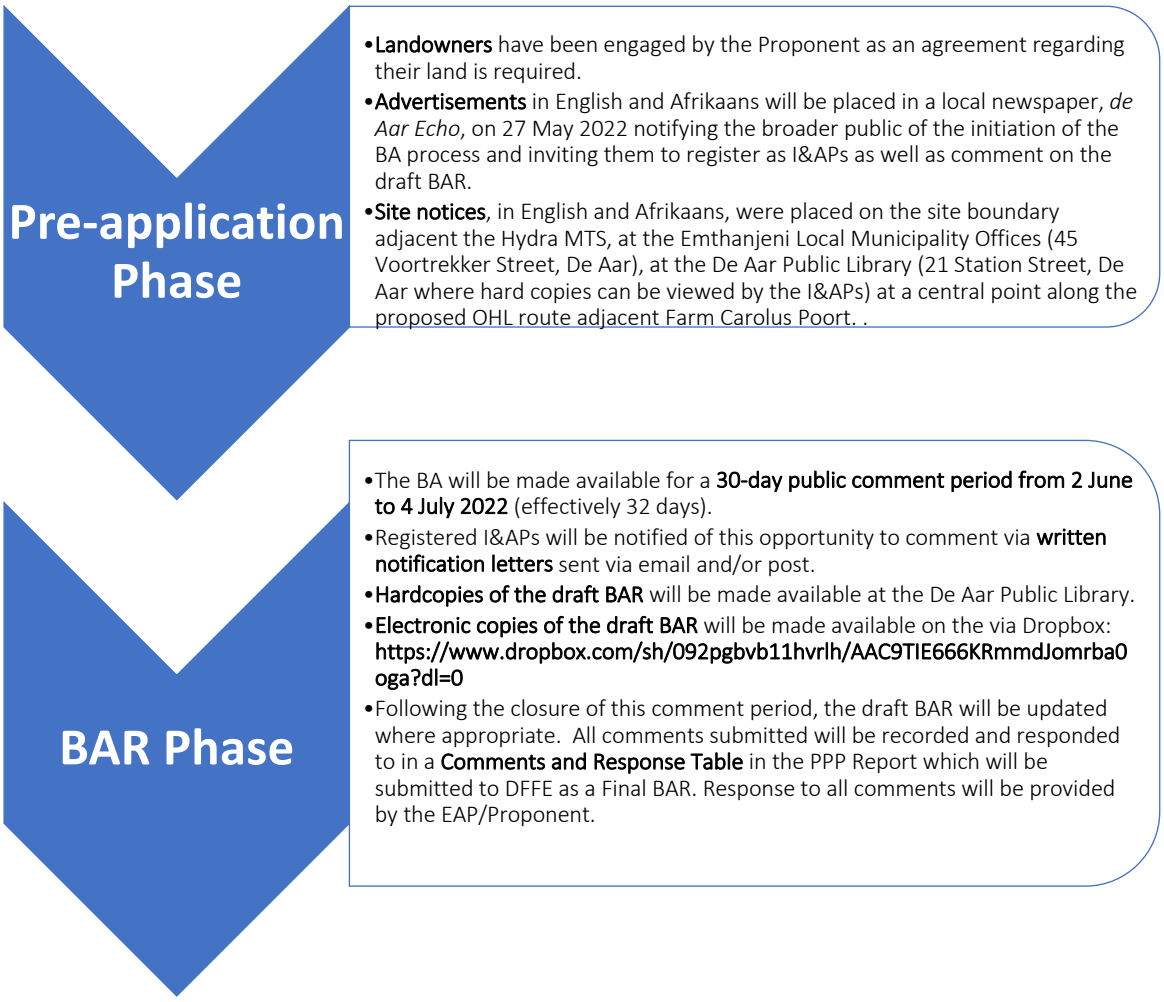


Figure 3-4: Public participation in the BAR process.

3.4.2 Identification of Stakeholders

The database from the previously undertaken BAs and EIAs in the area including the Castle OHL BA process and Castle WEF EIA was used to provide baseline information, i.e. landowners, adjacent landowners, relevant district and local municipalities, relevant national government officials and organisations in the area. The PPP databases of other Basic Assessments undertaken on the same properties have also been consulted. The database will be augmented via chain referral during the BA process and will be updated as new I&APs are identified throughout the project life cycle.

This database was initiated by including the details of the following affected parties:

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

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

3.5 Authority involvement

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

- Provincial and local authorities, and parastatal organisations:
  - Pixley ka Seme District Municipality (DM);
  - Emthanjeni Local Municipality;
  - Renosterberg Local Municipality
  - Northern Cape Provincial Heritage: Boswa ya Kapa Bokone;
  - Eskom Generation;
  - Northern Cape Department of Agriculture, Environmental Affairs, Land Reform & Rural Development;
  - Northern Cape Department of Roads and Public Works; and
  - Northern Cape Department of Economic Development and Tourism.
- National departments and organisations:
  - Department of Human Settlement, Water and Sanitation;
  - Department of Agriculture, Land Reform and Rural Development.
  - Department of Transport;
  - Department of Mineral Resources & Energy;
  - Department of Environmental Affairs: Integrated Environmental Management;
  - Department of Environmental Affairs: Biodiversity Conservation;
  - South African National Roads Agency Limited;
  - South African Heritage Resources Agency;
  - South African National Defence Force;
  - National Energy Regulator of South Africa;
  - Civil Aviation Authority;
  - BirdLife South Africa;
  - Square Kilometre Array (SKA);
  - South African Radio Astronomy Observatory (SARAO)
  - South African Weather Services; and
  - Conservation agencies: WESSA.
- Other national/ provincial departments, where deemed necessary

3.6 Summary of Comments and Responses

All comments will be added to and responded to in the Comments and Response Report and will be added to the Final BAR.

4 DESCRIPTION OF PROPOSED PROJECT

The proposed OHL will form a critical component of the authorised Castle WEF to connect to the national Eskom electricity grid at the Hydra MTS and may in future also serve other generation facilities in locality. The following subsections provide more information on the project context, location, components, activities, and alternatives.

4.1 Project Overview

The proposed development entails the construction of an OHL required to connect the Castle WEF to the national Eskom electricity grid at the Hydra MTS (Figure 2 and Figure 3). The Proponent (or their successor in title) proposes to develop the grid connection infrastructure under a Self- Build agreement with Eskom. It is anticipated that construction would commence within 5 years of the date of authorisation (if granted), and the construction phase would last approximately 6-18 months. Once construction of the grid connection infrastructure is complete, it is envisaged that the infrastructure (and the associated Environmental Authorisation, if granted) will be ceded to Eskom as per Eskom's requirements. Eskom is thus expected to be the eventual owner of the infrastructure and will be responsible for the long-term operation and maintenance of the grid connection infrastructure. Alternately, pending confirmation from Eskom, part or all of the grid connection infrastructure will be owned and maintained by the Proponent instead of Eskom (i.e. Own-Build agreement).

The proposed infrastructure is expected to be permanent and will remain in place for the duration of the lifespan of the associated Castle WEF (20 years or more). Note that the construction of the proposed grid connection infrastructure is dependent on the construction timelines of the associated Castle WEF, which are not yet known. If/when the WEF are decommissioned at some point in the future, the grid connection infrastructure may also be decommissioned. The owner of the grid connection infrastructure (Eskom, or their successor in title) would be responsible for the decommissioning phase.

4.2 Project details and extent

The site of the Castle WEF which the proposed OHL will connect to is located approximately 26 kilometres (km) east of De Aar and the existing Hydra MTS is approximately 7km southeast of De Aar, in the Northern Cape Province (Figure 1). The site is bordered in the west by the N10 from where access to can be gained through unsurfaced roads and jeep tracks. The entire proposed OHL is situated in the Pixley ka Seme District Municipality and the majority of within Emthanjeni Local Municipality (Ward 6) although a small section of the proposed eastern section of the OHL falls within the Renosterberg Local Municipality (Ward 1). The OHL will cross over several farm portions as provided in Table 1. A selection of site photos has been included in Annexure H as additional information to the context and location of the proposed project. Approximate coordinates at start, end and bend points are provided for the OHL in Annexure F.

4.3 Components and Activities

4.3.1 Transmission line infrastructure

The infrastructure considered for the 132kV-400kV transmission line includes the structure (pylon) that will hold up the transmission lines, the foundations required for the pylons and the access roads and servitude areas. In addition, to reduce the potential negative impacts on avifauna in the area, Bird Flight Diverters may be required to be installed on the power line.

Table 4-1: Technical details for the Castle to Hydra OHL.

Component	Description
Overhead Powerline (OHL)	132kV to 400kV single- or double-circuit Extending from the authorised Castle WEF collector substation to the Eskom Hydra MTS. OHL will be located within a servitude of up to 32m wide to be positioned within a 300m wide corridor (a 300m wide corridor assessed as part of this BA to allow micro-siting). Total Length ≈25,8km (+12.4km temporary) • Section A≈13,1km new OHL • Section B ≈12,4km upgrading existing 132kV OHL from the De Aar South WEF to an up to 400kV maximum capacity. – Temporary 132kV OHL bypass of ≈12,4km to be constructed alongside the existing De Aar South OHL to be upgraded (along Section B ≈18month lifespan). • Section C ≈300m from Section A to the proposed De Aar 2 South Switching Station
OHL Pylons	Up to 45m in height (most structures will be up to 32m tall, only increasing to up to 45m when crossing the railway line, existing overhead transmission line and public road (all adjacent the Hydra MTS), depending on the minimum clearance specified by the road, OHL and rail authorities). Monopole (Self-supporting or stayed, 132kV) and/or lattice (400kV) may be used. Disturbance footprint per pylon of up to 10m by 10m (100m^2)
OHL footprint	Length ≈25,8km+12.4km temporary = 36,2km Construction road / service track (jeep track) width ≈4m (or less) OHL footprint ≈14,48ha (25,8km x 4m), (consideration must be given that part of this road will use existing farm roads and/or WEF roads) Approximate number of pylons (based on average 150m average between pylons) ≈242 Pylon's disturbance footprint ~2,42ha (172 x 100m^2)
Laydown Areas	Temporary laydown area of ≈5000m^2 will be required (authorised Castle WEF Laydown areas to be utilised).
Site Access	The existing approved access roads to the Castle WEF substation will be used to access the proposed Section A adjacent the authorised Castle WEF. Section A and C may require a service track (jeep track) along the OHL route for construction and maintenance purposes. Section B (upgrade section) and the bypass OHL will use existing tracks as far as possible.

Table 4-2: Farm details for the proposed Castle to Hydra OHL.

Erf number	21-digit SG code	Name of farm	Farm Size (ha)
Portion 13 of Farm 165	C03000000000016500013	Vendussie Kuil	152,18
Portion 12 of Farm 165	C03000000000016500012	Vendussie Kuil	758,19
Portion 3 of Farm 5	C03000000000000500003	Wagt en Bittje (Hydra)	179,77
Portion 1 of Farm 5	C03000000000000500001	Wagt en Bittje	21,72
Remainder of Farm 5	C03000000000000500000	Wagt en Bittje	2425,42
Remainder of Farm 144	C03000000000014400000	Hydra	37,84
Portion 3 of Farm 3	C03000000000000300003	Carolus Poort	1807,06
Portion 4 of Farm 3	C03000000000000300004	Carolus Poort	888,49
Portion 2 of Farm 3	C03000000000000300002	Carolus Poort	1724,89
Remainder of Farm 2	C03000000000000200000	Slingers Hoek	4209,31
Portion 2 of Farm 2	C03000000000000200002	Slingers Hoek	1273,11

4.3.2 Pylon structures

A single or double-circuit 132kV-400kV overhead transmission line will be used for the proposed OHL, in consultation with Eskom Standards[10]. The 132kV sections a self-supporting monopole structures and/or stayed/ suspension monopoles (Figure 4-1) are proposed along the straight sections of the transmission line, while guyed intermediate structures or guyed suspension structures, angle strain structures (Figure 4-2). Lattice structures (Figure 4-3) will be used for the 400kV sections and for lower kV sections (below 400kV) at bend or strain points in the transmission line alignment. The monopoles may be constructed of wood, steel or concrete and vary in height, but may be up to 45 m tall. The size of the footprint depends on the type of structure, i.e. whether it is a self-supporting, guyed suspension or an angle strain pole structure. A typical monopole footprint ranges from approximately 0.6 x 0.6m (self-supporting monopole) to approximately 1.5 x 1.5m, with the larger footprint associated with the guyed suspension and angle strain pole used as bend/strain structures. Lattice structures (400kV) may have a footprint of up to 6 x 6m. During construction, the disturbance footprint may be up to 10 x 10m, but this would be rehabilitated down to the minimum footprint of the actual pylon structure after construction. The average span between two pylons is 150m but can vary between 150m and 375m depending on the ground profile (topography) and the terrain to be spanned. The final tower sizes and positions will only be determined once the project has received Environmental Authorisation, and detailed geotechnical assessments and site walk-throughs completed. Pylon structures will be selected and installed in accordance with the latest industry standards and Eskom's technical requirements at the time of construction, and within the parameters of this assessment.

Figure 4-1: Example of a Self-supporting Monopole.

Figure 4-2: Example of a Guyed-suspension.

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

Figure 4-3: Example of a lattice structures.

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

4.3.3 Pylon foundations

The pylons are anchored to the soil through a suitable foundation system. A soil investigation through a geo-technical assessment must be performed prior to construction, at which point the prevailing soil or rock type classification is confirmed, and a suitable foundation system is designed for the various types of structure.

Foundations are designed according to the following geotechnical classification:

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

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

4.3.4 Pylon placement and servitudes

The pylons will be placed during a pre-construction walk through that will determine the micro-sited location. All pylons will be placed within the 300m wide assessed corridor.

Beyond the footprint of each pylon, a linear servitude would be required for the overhead line. This would need to remain for the lifespan of the transmission line. The standard servitude width as specified by Eskom for a 132kV transmission line is 31m, with a distance of 15,5m on either side of the centre line of the transmission line and 400kV, is 55m i.e. 25,5m either side. It is proposed to position most of the transmission line as close to the existing OHL lines as technically feasible. The transmission line will however need to deviate from the as the transmission line approaches Hydra MTS, and to avoid existing or approved OHLs feeding into the Hydra MTS. A transmission line corridor of 300m will be assessed by the specialists and considered in the BAR. The assessment of a servitude within an assessment corridor will allow for minor servitude alignment deviations within the corridor should sensitive features be identified, or unsuitable founding conditions be discovered during the detailed design phase. The final pylon positions will therefore take into consideration the sensitive areas and/or no-go areas.

4.3.5 Access and service roads

Access roads would run the length of the proposed servitudes and would be directly below the OHL. Therefore, the access roads are not displayed on the maps. The roads/ tracks will be required for construction purposes and would remain in place for the operational lifespan of the infrastructure. Existing roads must be used as far as possible and upgraded only if necessary. New access tracks (unsurfaced “jeep tracks” approximately 4m wide) will only be developed where no access road/track currently exists. A substantial portion of the proposed OHL will run alongside existing farm tracks and the proposed access roads and these access roads can be utilised to access and service the proposed OHL. The access network would be negotiated with all respective landowners to ensure that servitude agreements are in place, and security measures (such as access gates) are agreed upon. A strict no-go policy will be in place in terms of use of access and construction roads. All roads used will be signed off by the contractor and ECO, all areas outside the access roads and pylon footprints will be considered no-go areas. No driving in the field will be permissible unless it forms part of the authorised access road sign off by the ECO and demarcated by the contractor prior to any construction related activities commencing, which includes surveying.

4.3.6 Temporary laydown areas and site camps

During construction, temporary laydown and site camp areas will be required. These areas will be utilised for the temporary storage of materials, equipment and waste and will also serve as a logistical centre for construction activities. Eating and ablution areas may be provided for labourers. The authorised Castle WEF laydown areas and construction camp will be used in consultation with the Environmental Control Officer (ECO), as per the requirements of the Castle WEF Environmental Management Programme (EMPr). The temporary construction camp areas will be rehabilitated once construction is complete. No laydown areas form part of this application.

4.3.7 Provision of services required during construction

4.3.7.1 Labour required

The construction phase would be up to 18 months, however this would vary depending on the seasonal and environmental conditions at the time of construction. Up to 75 temporary employees will be required, with 25 of the employment opportunities being unskilled, 40 semi-skilled and 10 highly skilled. The unskilled labourers are generally trained by the contractors and sourced from local communities.

4.3.7.2 Water supply

The entire Greater Karoo has been experiencing an extreme water crisis over the last decade with many boreholes running dry over the last couple years and the drought only broken in 2021. Water will be required during the construction phase for concrete mixing to cast pylon foundations, for sundry construction purposes, and drinking water for the construction workers. Water will be sourced from an onsite borehole on 30°34'09"S 24°18'14"E (Portion 12 of Vendussie Kuil). An application for GA to authorise abstraction and storage for the construction and operations of both Castle WEF and Castle to Hydra OHL is underway.

4.3.7.3 Waste

Solid waste and effluent associated with the construction phase is anticipated to be of minimal volume and would be disposed of via the municipal waste streams. An application for municipal waste collection and treatment has been lodged. Non-recyclable waste solid waste and hazardous waste will be disposed at appropriately licenced waste disposal sites within the Emthanjeni Local Municipality. Wastewater and effluent will be disposed at appropriately licenced sewage treatment plants within the Emthanjeni Local Municipality.

During the construction phase, the construction contractor (potential via or sub-contractors or service that the local municipality renders) will be responsible for collecting and disposing of waste at an appropriate disposal site. Where possible, waste will be diverted for recycling or reuse rather than disposal. During the operational phase, Eskom will take ownership of the grid connection infrastructure and will be responsible for disposing of the minimal amounts of waste generated during servicing/ maintenance operations.

4.3.7.4 Maintenance during the operational phase

The estimated lifetime of the transmission lines is a minimum of 20 years and will require intermittent maintenance and repair work. Eskom staff and contractors will undertake all maintenance and repair work.

4.4 Project Phases

A summary of activities associated with project phases are provided in Figure 4-4.

Figure 4-4: Summary of activities associated with project phases.

4.4.1 Pre-Construction

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

During this period, the site layout will be confirmed on site through a micro-siting process. The footprint boundaries will be demarcated, and no-go areas will be identified. Site clearance will occur for the formal pylon footprints and access routes (no clearance for laydown areas, construction camps and switching station form part of this application). Storage areas for materials and spoil and topsoil piles should be identified.

Within the formal laydown area/s, a maintenance and storage building along with a guard cabin will be established for the duration of the construction period. The components of the pylons will be placed on the laydown area.

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

4.4.2 Construction Phase Activities

The construction period for the OHL is anticipated to last approximately 18 months. The Castle WEF construction camp will be used which include a site office, storage areas as well as areas for the management of dangerous and hazardous substances such as fuel.

At the start of the construction period, access roads to the site and between the pylons will need to be established. Where possible, existing farm roads will be used and upgraded. The roads will be up to 4 m wide and largely unimproved jeep tracks unless specific sections require minor cut or fill improvements. No major cut and fill operations are envisaged where the proposed OHL rises to the top of the plateau where the Castle WEF will be situated since an existing access road has already been constructed. At each pylon site, an approximate area of ≈10m X 10m will need to be cleared (only brush cut where possible) to allow for the pylon foundations to be cast.

Potential waste streams during construction will include general site waste and spoil (some of which can be reused). Bins will be placed at suitable locations within the construction camp and a waste management hierarchy (reduce, reuse, recycle) will be required as a condition of the EMPr. Waste mitigation measures are detailed in the EMPr.

Rehabilitation during the construction phase will be undertaken in a phased approach and will continue into the operational phase. The construction phase period will provide employment opportunities to the local community, mostly in the low and semi-skilled level. Most of these employment opportunities are likely to be accrued by the historically disadvantaged.

Most of the low and semi-skilled employment opportunities will be available to residents in the area, specifically residents from De Aar and other nearby settlements. Most of the beneficiaries are likely to be historically disadvantaged members of the community. This would represent a significant positive social benefit in an area with limited employment opportunities. To maximise the potential benefits, the developer should commit to employing local community members to fill the low and medium skilled jobs, as far as possible but not lure away those that have permanent employment for short term gains, i.e. farm labourers.

4.4.3 Operational Phase Activities

Transmission lines are designed to run on low maintenance requirements as such few job opportunities will be available and limited to Eskom staff which will undertake the maintenance of the infrastructure.

During the operational phase, the site will remain available to the farmers as rangeland or retained as wilderness area. The areas disturbed during the construction phase will be rehabilitated in a phased approach during this operational phase. The temporary bypass OHL in Section B will be completely decommissioned and access road (jeep track) rehabilitated where not required by the landowner.

Approximately 25% of the operational employment opportunities would be for low- or semi-skilled people. The remainder of the positions are likely to be highly skilled, and it's unlikely that these skills will be available in the local community.

4.4.4 Decommissioning Phase Activities

The decommissioning of the grid infrastructure is expected to take between 3-6 months. After disconnecting the infrastructure from the electricity network, the components of the facility would be disassembled, removed and reused or recycled as far as possible. The rehabilitation of the disturbed areas would form part of the decommissioning phase. The aim would be to restore the land to its original substratum characteristics (or as near as possible). The decommissioning phase will comply with the applicable legislation in effect at the time.

4.5 Project Need and Desirability

The need for energy in South Africa is well documented and supported by the numerous policies and legislation described in Chapter 2. To evacuate energy from generation plants reliable and efficient grid infrastructure is required. Therefore, the proposed OHL must be seen in context of the authorised Castle WEF, existing generation facilities and transmission infrastructure in the vicinity of De Aar; and the numerous proposed RE generation facilities and related infrastructure in the area. Moreover, a previous OHL for evacuating energy from the Castle WEF to the Hydra Main Transmission Substation has been approved, yet as previously described this route is no longer feasible due to technical constraints owing to RE developments on the properties in question. Table 4-3 below provides project specific answers to questions included in the Needs and Desirability Guideline[11].

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

Need and Desirability	
Need (Timing)	
Question	Response
1. Is the activity permitted in terms of the property's existing land use rights?	Yes. The properties are zoned for Agricultural Use or Agricultural Use with a special use for renewable energy and associated infrastructure. Most of Section A will run an existing Eskom servitude whilst Section B will constitute the upgrade of an existing OHL, i.e. within an existing servitude as well. A small part of Section A and Section C will require a new servitude proclaimed. No servitude will be required for the temporary bypass adjacent Section B. The proponent has concluded high level agreements with all affected land owners for the necessary servitude. The current agricultural practices will continue once the transmission lines have been constructed.
2. Will the activity be in line with the following? (a) Provincial Spatial Development Framework (PSDF)	The Northern Cape Provincial Spatial Development Framework (PSDF) promotes the provision of electricity to all and supports economic development through sustainable green initiatives on a national scale. The PSDF also identifies the need to promote renewable energy, awareness on biodiversity and improvement through Public Participation. This is to be realised through a diverse range of clean energy options and to accelerate the construction of new electricity generation capacity, in accordance with the IRP2019, to meet the needs of the economy and address historical imbalances. The proposed construction of the OHL will allow electricity, generated through renewable technology, to be evacuated from the Castle WEF to the national grid.
(b) Urban edge / Edge of Built environment for the area	N/A - The proposed grid connection infrastructure fall outside of the urban edge.

[11] DEA&DP. 2011. Needs and Desirability Guideline.

(c) Integrated Development Plan (IDP) and Spatial Development Framework (SDF) of the Local Municipality (e.g. would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	The proposed development aligns with the Emthanjeni and Renosterberg Local Municipality IDPs as well as Pixley Ka Seme District Municipality SDF and IDP. Emthanjeni Local Municipality IDP 2021-2022 • The municipal sited areas for improvement to be electricity supply. Electricity supply constraints lead to negative municipal GDP growth of 2% during 2014 and 2015. • As part of National Development Plan, Emthanjeni Local Municipality were able to be a centre of renewable energy and lately possibility of manufacturing and the Hub for different activities. • The Municipality is convinced that the Renewable Energy projects, and possibility of new Warehouse Hub and Manufacturing project (related to RE developments) for further development planned for the area would grow the economy enormously. As a result of Transnet scaling down its activities as well as smaller businesses closing down from time to time, economic activity in the area is stagnating. Renosterberg Local Municipality IDP 2018/2019 • Little motivation is made for or against RE projects and associated infrastructure. Pixley Ka Seme District Municipality IDP 2021-2022 • According to the REIPPPP focus on Northern Cape Provincial Report Volume 1, March 2018, by successfully attracting a share of the IPPPP portfolio investment, Emthanjeni and Renosterberg, is benefitting from substantial socio-economic development (SED) and Enterprise development (ED) contributions leveraged by the IPPPP commitments. • The SED and ED contributions provide an opportunity for the identification of viable projects that will promote the economic development. • The IDP specifically mentions the municipalities aim to contribute to RE by 2030. Pixley Ka Seme District Municipality SDF 2013-2018 • The SDF specifically mentions how a range of renewable energy projects can secure a bright future for the region and its residents. • Biophysical Sustainability, aims to use renewable resources in preference to non-renewable resources. • Potential opportunities presented by the identified renewable energy hub in the region. • Renewable Energy Hub is being proposed for the Northern Cape as per the map below stretching from the west coast right up to the De Aar region. This Hub can accommodate special economic development within the zone as earmarked and entails a 100km wide zone as indicated below.

	• The SDF also recognises Eskom's strategic needs in terms of their Transmission Development Plans (TDPs), Master Plans (MPs) as well as Network Development Plans (NDPs) to expand, strengthen and maintain the existing network to cater for future demands. • Eskom's largest sub-stations (Hydra) near De Aar, which supply high voltage power especially to the Western Cape and surrounding rural areas is of significance. Pixley Ka Seme District Municipality Draft Land Use Scheme 2022 • Renewable Energy structures and infrastructure compatibility with Agriculture Zone I properties
(d) Approved Structure Plan of the Municipality	The proposed project entails transmission line infrastructure, which is compatible with the Pixley Ka Seme District Municipality Strategic Planning 2019 which promotes infrastructure support, sharing and maintenance in addition to job creation and skills development.
(e) An Environmental Management Framework (EMF) adopted by the Department (e.g. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	The District and local municipalities do not have an approved EMF. However, the approval of this application will not compromise the integrity of the existing environmental management priorities for the area. The proposed OHL can be justified in terms of sustainability considerations, i.e. the generation of renewable energy which in context of the authorised Castle WEF and associated infrastructure can be viewed as sustainable over a 20 year period.
(f) Any other Plans (e.g. Guide Plan)	Emthanjeni Local Municipality Land Use Scheme 2022, references the renewable energy infrastructure use areas.
3. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (i.e. is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	Refer to 2C above.
4. Does the community/area need the activity and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (e.g. development is a national priority, but within a specific local context it could be inappropriate.)	Yes. The construction of the transmission line would facilitate the connection of the authourised Castle WEF to the national grid. Without the proposed grid connection infrastructure, energy could not be evacuated from the WEFs and the development of the WEFs would not be able to proceed. The biophysical environment is typical of the arid environment that stretches across the Northern Cape. Through the many specialist assessments (Annexure D) very few environmental aspects were deemed to be considered sensitive. Furthermore, these sensitive areas

	were avoided (as far as possible) during the detailed layout undertaken by the design engineers.
5. Are the necessary services with adequate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	Yes. No municipal services (water, sewerage, electricity) will be required at the site, as the project contractor or appointed sub-contractor/s will be responsible for providing the necessary services to the site during the construction and decommissioning phases. The owner of the infrastructure (Eskom) will be responsible for supplying the necessary services during the operational/maintenance period, and may sub-contract these services to appropriate private service providers as needed.. Waste produced at the site will be collected and taken to an appropriate facility with sufficient capacity to accept the waste, for recycling, re-use, treatment or disposal (as appropriate). No municipal waste collection will be required at the site. Approximately 50m^3 of waste will be produced per month during the construction phase. Negligible volumes of waste are expected during the operational phase. Should any need for other services arise the relevant authority will be communicated with, and the necessary approvals/ agreements obtained before proceeding.
6. Is this development provided for in the infrastructure planning of the municipality, and if not what will the implication be on the infrastructure planning of the municipality (priority and placement of services and opportunity costs)?	No additional services are required once the OHL is operational – there will thus be no impact on infrastructure planning. Water, sanitation and electrical services required for the construction of the proposed grid connection infrastructure will be provided by the appointed contractor, and additional municipal services are not expected to be required for the proposed development (e.g. potable water will be trucked to site, waste water will be collected in conservancy tanks and transported to an appropriate wastewater treatment site, on-site generators will be utilised etc.).
7. Is this project part of a national programme to address an issue of national concern or importance?	Yes. The establishment of the proposed OHL would strengthen the existing electricity grid for the area. Moreover, given that the development is an essential component of the Castle WEFs, the project would contribute towards meeting the national energy targets as set by the DoE in the 2019 IRP, of a share of all new power generation being derived from IPPs. The Industrial Policy Action Plan (IPAP, 2018/19 – 2020/21) recommends a sector focussed approach identifying key sectors with potential to be developed. The sectors identified in the IPAP document include green energy saving industries especially renewables. The proposed transmission line thus further facilitates the realisation of this development objective. The 2019 Integrated Resource Plan (IRP) developed by the DoE aims to achieve a balance between an affordable electricity price to support a globally competitive economy, a more sustainable and efficient economy, the creation of local jobs, the demand on scarce resources such as water and the need to meet nationally appropriate emission

	targets in line with global commitments". The final IRP (2019) provides for an additional 14 400MW wind energy in the electricity mix in South Africa by 2030.
8. Do location factors favour this land use (associated with the activity applied for) at this place? (This relates to the contextualisation of the proposed land use on this site within its broader context.)	Yes. The proposed grid connection infrastructure provides the critical link from the authrorised Castle WEFs to the national grid. The environment affected by the proposed transmission line holds little environmental aspects that were considered sensitive, and in most cases these areas have been avoided by the layout.
9. Is the development the best practicable environmental option for this land/site?	Yes. The proposed transmission line transverses mostly farmland which is predominantly used for grazing. Once the transmission line is constructed, the land can be returned to grazing and due to the relatively small footprint of the pylons, the grazing capacity of the land will not be reduced significantly. The site has generally low environmental sensitivity, and is suitable for development. In addition, a number of existing transmission lines currently enter and exit the Hydra MTS. Therefore, the current proposal would not be out of place in the existing landscape.
10. Will the benefits of the proposed land use/development outweigh the negative impacts of it?	Yes. The negative impacts for the proposed development are of very low to medium magnitude, local extent and long term and very low to low (-) significance with mitigation. Therefore, the proposed developments impacts with mitigation measures are reduced and are considered to be acceptable. The proposed development would also enable positive impacts to be realised, largely through the support of the Castle WEF through job creation, clean energy production, and reduction in reliance on fossil fuels. These positive impacts would be of low-medium (+) significance, without mitigation measures and low-high (+) significance with mitigation measures.
11. Will the proposed land use/development set a precedent for similar activities in the area (local municipality)?	No. The Helios MTS and numerous other powerlines in the vicinity have already set a precedent for this type of development in the area, among many others in the Northern Cape Province. The area surrounding De Aar has been targeted as an area for renewable energy developments, limited only by the connection capacity at the existing Eskom Hydra MTS. The area is generally suitable for these projects as the environmental sensitivity of the area, as well as the existing socio-economic benefits are considered low. This therefore reduces the opportunity cost. It is also noted that the project itself is unlikely to attract future similar development to the area – rather it is the excellent solar and wind resources of the area that may attract further similar renewable energy developments.
12. Will any person's rights be negatively affected by the proposed	No. No juristic or person's right will be adversely affected as land use agreements have been negotiated with the relevant landowners.

activity/ies?	
13. Will the proposed activity/ies compromise the "urban edge" as defined by the local municipality?	No. The proposed development occurs outside the urban edge, therefore the urban edge will not be compromised.
14. Will the proposed activity/ies contribute to any of the 17 Strategic Integrated Projects (SIPS)?	Indirectly, as the grid connection infrastructure will support the realisation of the Castle WEF. The proposed projects will align with the following SIPS: SIP 8: Green Energy in support of the South African economy • The proposed WEF is seen as a sustainable green energy initiative diversifying the range of clean energy options on a national scale. SIP 9: Electricity generation to support socio-economic development • The proposed transmission line will extend the benefits felt by the proposed WEFs by distributing the power to the national grid. SIP 10: Electricity transmission and distribution for all • The proposed transmission line will contribute to expanding the transmission network.
15. What will the benefits be to society in general and to the local communities?	The Northern Cape is an arid area, the towns are generally small and many residents operate on a survival socio-economic level. The construction of the grid connection infrastructure will result in the creation of an estimated 75 temporary employment opportunities, with the majority of unskilled (≈25) and semi-skilled (≈40) opportunities being available to members from the local community.
16. Any other need and desirability considerations related to the proposed activity?	It is important to highlight that there are few areas in South Africa that hold such low levels of both biophysical sensitivity and minimal sensitive human receptors. If the proposed OHL is not constructed, the Castle WEF will not be able to connect to the national grid, the need for additional electricity supply will not decrease and a more sensitive part of the country's land and people could be negatively impacted.
17. How does the project fit into the National Development Plan for 2030?	The National Development Plan for 2030 aims to create jobs, develop and expand infrastructure, transition to a low carbon economy and unify South Africa. This project, along with the construction of the authorised Castle WEF and other RE developments in the area, will fit into the National Development Plan as follows: <u>Create jobs:</u> • The proposed OHL will result in jobs for the construction phase and the operational phase. • Indirect opportunities for small businesses would be generated such as accommodation, food and service industries through the increased number of people travelling to the proposed area.

	• Many indirect jobs, such as the hospitality industry, transportation industry and manufacturing industry would also be created. <u>Infrastructure development and expansion:</u> • The proposed OHL will assist in increasing the supply of electricity and thereby facilitate further expansion of the electrical network through additional capacity to help meet South Africa's current and future electricity demands. <u>Transition to a low-carbon economy:</u> • This OHL will connect renewable energy project (S) to the national grid and will result in the expansion of South Africa's renewable generation capacity. • The construction of the transmission line will assist in diversifying South Africa's energy portfolio. <u>Transformation and unity:</u> • Employment equity will be met through the Operation and Maintenance Project Company and the contractors responsible for the construction of the transmission lines.
18. Please describe how the general objectives of Integrated Environmental Management as set out in section 23 of NEMA have been taken into account.	The purpose of section 23 of NEMA is to promote the application of appropriate management tools in order to ensure the integrated environmental management of activities. Table 4-4 below lists the general objectives of integrated management and provides a motivation as to how the proposed development has taken the objectives into account.

Table 4-4: Consideration of NEMA objectives.

Section 23(2) of NEMA: The general objective of integrated environmental management is to:	Description as to how the proposed development has taken these general objectives into account.
(a) promote the integration of the principles of environmental management set out in section 2 of NEMA into the making of all decisions which may have a significant effect on the environment;	The underlying principle of this Basic Assessment process is to ensure that the development is socially, environmentally, and economically sustainable. This has guided the assessment of impacts of the project by Specialists to ensure that the project will be undertaken in an environmentally responsible manner. In recognition that social responsibility is something which needs to be actively developed, a public participation process (PPP) will be undertaken. This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information.
(b) identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and	This BAR includes the list of potential impacts associated with this project. Each aspect was evaluated to determine the significance of the impact and

consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management set out in section 2;	mitigation measures have been proposed to reduce negative impacts and to enhance positive impacts. The generic Environmental Management Programme (EMPr) has been updated to include the recommendations from the respective specialists to guide the construction and operational phases in an environmentally and socially sound manner (Refer to Annexure G).
(c) ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them.	Specialist studies were commissioned to ensure that specific impacts are adequately assessed and appropriate mitigation measures are proposed.
(d) ensure adequate and appropriate opportunity for public participation in decisions that may affect the environment.	The PPP that will be undertaken for the proposed grid infrastructure is described in detail in Section 4. The PPP will be done in accordance with Regulation 41 of the 2014 EIA Regulations (GN R982, as amended) and the applicable best practise guidelines.
(e) ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment.	The areas of environmental sensitivity (illustrated in a map in Figure 7-1 to Figure 7-4 have been avoided in the layout determination. Micro-sitting prior to construction will be undertaken along with the Heritage specialists and ECO.
(f) identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in section 2.	Recommendations and mitigation/ enhancement measures for each of the impacts identified in Section 6 have been included in the Generic EMPr in Annexure G. The purpose of these recommendations is to minimise the disturbance to the environment, and enhance possible opportunities associated with locating the proposed development at this particular site. Where negative impacts are unavoidable, strict management and rehabilitation is recommended to minimise the potential negative impacts.
19. Please describe how the principles of environmental management as set out in section 2 of NEMA have been taken into account.	Section 2 of NEMA lists a number of principles that underpin the role of Sustainable Development and the consideration of environmental impact within the Act. These principles are critical to achieve Sustainable Development as it is important to find the balance between the competing demands for resources from the Economic system, the Social system, and the Ecological system. These principles are applicable to the "actions of all organs of state that may significantly affect the environment" and it is therefore crucial to apply them to the proposed development, for decision-makers to be confident that their decision to allow a development, promotes Sustainable Development. The underlying principle of this BA process is to ensure that the development is socially, environmentally, and economically sustainable.

	This has guided the assessment of impacts of the project to ensure that the project will be undertaken in an environmentally responsible manner. Recognising that social responsibility is something that needs to be actively developed, PPP will be undertaken (as detailed above in Section 3.3). This process will be undertaken in such a manner to promote active participation and foster a clear understanding of the project and transparent sharing of information. Knowledge from I&APs will be included in all forms, including traditional or ordinary knowledge. The PPP and consultation with the directly affected landowners will also aim to improve environmental awareness in the area (Section 2(4)(h) of NEMA). Key organs of state that may have interest in the project have been proactively identified, and an effort has been made to promote intergovernmental coordination as far as possible to reduce the potential for conflicts of interest, caused by lack of information or inappropriate communication channels. Proof of this correspondence is detailed in Section 3.3 and Annexure C. Environmental management has been considered to place people and their needs at the forefront of its concern, aiming to serve their physical, psychological, developmental, cultural and social interests equitably (Section 2(2) of NEMA). However, it is crucial that ecological considerations are also considered through this process and avoidance, minimising or rehabilitating measures are detailed for the disturbance of ecosystems and loss of biodiversity, pollution and degradation of the environment, disturbance of landscapes, and sites that constitute the nation's cultural heritage, waste, and the use and exploration of non-renewable natural resources (Section 2(4)(a)(i-v) of NEMA). Where a negative impact is unavoidable, measures have been considered to remedy the disturbance and address the effects (Section 2(4)(p) of NEMA). Fortunately, this proposed development, are located in an area that is not highly sensitive, vulnerable, highly dynamic, or overly stressed (Section 2(4)(r)). The nature of this BA process has been undertaken in a risk-averse and cautious approach, and where relevant the worst case scenario has been assessed. Each specialist has detailed their methodology as well as their assumptions and limitations about their assessments, and these reports have been included in full in Annexure D. The specialists undertook their site visits between in April and May 2022 the findings of their investigations have been considered in determining the proposed layout of the OHL for this application. The findings of these assessments have been amalgamated into this BAR which has not only assessed the impact of this proposed development, but also the cumulative impacts of the other similar developments authorised within a ≈30km radius (Section 2(4)(a)(vii & viii) and 2(4)(b)).

	Should this BAR be granted a positive environmental authorisation, approximately 18 months of construction will be required to build the proposed grid connection infrastructure. During this construction period (and also the rest of the lifecycle of this project), stringent environmental health and safety standards will be required. It will also acknowledge the right of workers to refuse work that is harmful to human health, or the environment, and be informed of any potential dangers (Section 2(4)(e & j). In addition, this process been undertaken in a manner that meets the principles and objectives of the South African legislation, and also meets global and international responsibilities relating to the environment by contributing to the renewable energy targets, and reducing the reliance on carbon heavy energy sources using fossil fuels (Section 2(4)(n)).

5 CONSIDERATION OF ALTERNATIVES

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

The DEA&DP Guideline on Alternatives (2011)[12] states that: "every EIA process must identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives were found, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not proceeding, is required during the assessment phase. What would, however, have to be provided to the Department in this instance is proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the preferred option and the no-go option exist."

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

(a) property on which or location where the activity is proposed to be undertaken;

(b) type of activity to be undertaken;

(c) design or layout of the activity;

(d) technology to be used in the activity;

(e) operational aspects of the activity; and

(f) includes the option of not implementing the activity ("No-Go" alternative).

These OHL routes will have been assessed by the EAP and specialists within a 300m wide corridor for each alternative (i.e. 150m either side of the proposed centreline of the OHL). This allows for minor realignment adjustments to be made based on sensitive features and areas that were identified as no-go areas and based on underlying geo-technical considerations during the detail design (pre-construction) & micro-siting phase. The design of the route has been determined by considering the proposed transmission infrastructure and the sensitive areas (or features) as identified by specialists, as well as the location of existing transmission lines and other infrastructure. Geotechnical considerations for pylon (tower) positions would require a final survey and profiling to be undertaken for the authorised routing during the detail design phase. As such, the final location of pylon positions would only be finalised during the detail design phase and would be dependent on approval as required by Eskom but will be restricted to within the 300m assessment corridor. Within the route corridor, only one servitude (31m-55m) for the proposed OHL would be required (single or double circuit).

The proposed infrastructure will be constructed in accordance with the relevant standards for such infrastructure, and in accordance with Eskom's technical requirements. Pylon structures (stayed and self-supporting monopoles, with possible lattice structures at bend/ strain points) will be selected and installed in accordance with the latest industry standards and Eskom's technical requirements at the time of construction, and within the parameters of this assessment. The final pylon structures to be utilised will also be informed by the local geotechnical and topographical conditions on site, which will be confirmed during the detailed design phase. Note that the transmission line may be constructed as a single or double circuit, but the worst-case scenario (being double circuit, 400kV) will be assessed in the BAR.

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

5.1 Location Alternatives

The location for the OHL is directly associated to the authorised Castle WEFs and existing Hydra MTS. Thus, the start and end points of the OHL is known and its matter of finding an optimal route to connect these two points. Consequently, there are no pertinent location alternatives as such. Moreover, the proposed OHL largely aligns with existing OHLs and Eskom transmission corridor thus from a technical perspective it cannot be better placed.

5.2 Routing Alternative for transmission lines

The OHL will be used to evacuate the power from the authorised Castle WEF into the national grid at the Hydra MTS. Considerations for transmission line routing include:

- Reducing the transmission line length as far as possible;
- Aligning it with existing infrastructure such as OHLs and roads;
- Aligning it with property borders to reduce fragmentation;
- Combining routes to different RE developments to share pylon infrastructure;
- Visual impacts of the proposed lines;
- Avoidance of sensitive environmental features;
- Potential interference with RE infrastructure; and
- Maintaining necessary setbacks between grid connection infrastructure and the transmission lines.

Construction and maintenance roads will align with the OHL and will be designed to make use of existing OHL roads, farm tracks and WEF roads as far as possible, while minimising total road length and avoiding environmental sensitivities as far as possible. During the assessment, specialists were commissioned to assist through the identification of sensitive features and/or constraints. This provided input into the design process, allowing the proponent to avoid and or minimise potential impacts by aligning the layout to avoid impacts prior to finalising the design. This layout refinement and optimisation approach was used in place of alternatives assessment, and thus only a "no go" alternative has been assessed. The optimised OHL within a 300m buffer (150m each side of the centre line) considering all the above features and requirements have been assessed in this BAR.

5.3 No-Go Alternative

The assessment of alternatives must always include the "no-go" option as a baseline against which all other alternatives must be measured. The no-go option represents the *status quo* which normally presents the option of not implementing the activity. However, the no-go in this instance would be the currently authorised transmission line grid infrastructure for the Castle WEF. This design is no longer feasible given the constraints by other RE developments. The no-go alternative (i.e. using the currently authorised grid connection solution) would require other RE developments to amend their layouts to less optimal configurations. The no-go alternative would thus suggest that either the energy from the Castle WEF could not be exported to the national grid, or the other RE development layouts would need to be amended to accommodate the existing sub-optimal grid connection, which would impact RE energy production and efficiency.

6 BASELINE ENVIRONMENT AND ENVIRONMENTAL IMPACT ASSESSMENT

The description of the affected environment provided below draws on existing knowledge from published data, previous studies, site visits to the site and surround area, specialist studies and discussions with various role players. The high-level identification of potential impacts which may occur as a result of the proposed activities as described in Section 4 above is broad and covers the four phases of the project (i.e. pre-construction, construction, operation and decommissioning). Cumulative impacts form existing infrastructure, proposed projects (renewable including associated infrastructure) have been assessed per environmental aspect in the BAR and by specialists. Impacts of negligible significance have been screened out, to ensure that the BA is focused on the potentially significant impacts only. The following environmental aspects are further discussed in this chapter below:

- Climate (Baseline)
- Socio-economic aspects (Baseline)
- Nuisance (Noise, Dust and Traffic) (Baseline)
- Agricultural production, potential and soils (Impact Assessment)
- Terrestrial ecology (Impact Assessment)
- Aquatic ecology (Impact Assessment)
- Avifauna (Impact Assessment)
- Heritage and archaeology (Impact Assessment)
- Palaeontology (Impact Assessment)
- Visual landscape (Impact Assessment)

A baseline description of the project area climate, socio-economic aspects and potential nuisance factors typically associated with OHL projects are provided for context. Whereas the impacts of the rest of the aspects as listed above are formally assessed.

6.1 Climate

6.1.1 Description of Climate

The following graphs describe the climatic parameters based on 30 years of hourly weather model simulations from a central point in De Aar[13]. Figure 6-1 illustrates the average temperatures and precipitation levels over a calendar year. The solid red and blue lines indicate the mean daily maximum and minimum respectively per month. The dashed red and blue lines show the average hottest day and coldest night of each month for the last 30 years. Precipitation falls throughout the year, with most falling in the winter months.

[13] Meteoblue. 2022. Climate De Aar (Northern Cape, South Africa, 30.65°S 24.01°E, 1247m asl). (Online). https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/de-aar_south-africa_1011632 [Accessed 13 May 2022].

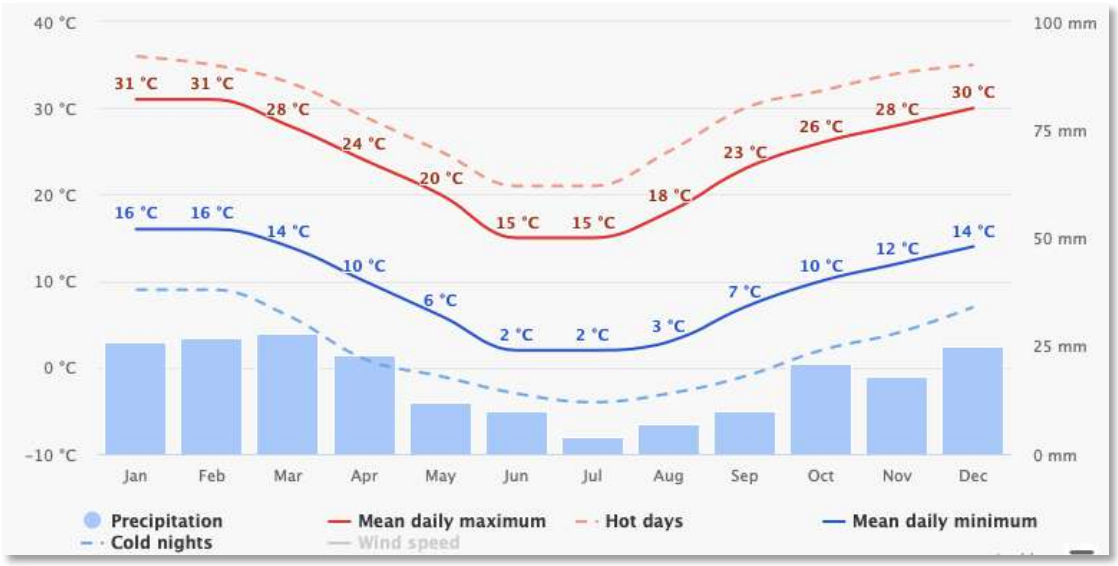


Figure 6-1: Average temperature and rainfall for De Aar.[14]

The mean maximum temperature in summer is a hot at ≈31°C, the mean minimum temperature in summer is ≈16°C. The mean maximum temperature in winter is ≈15°C, the mean minimum temperature in winter is a near freezing ≈2°C. This monthly distribution is illustrated below in Figure 6-2.

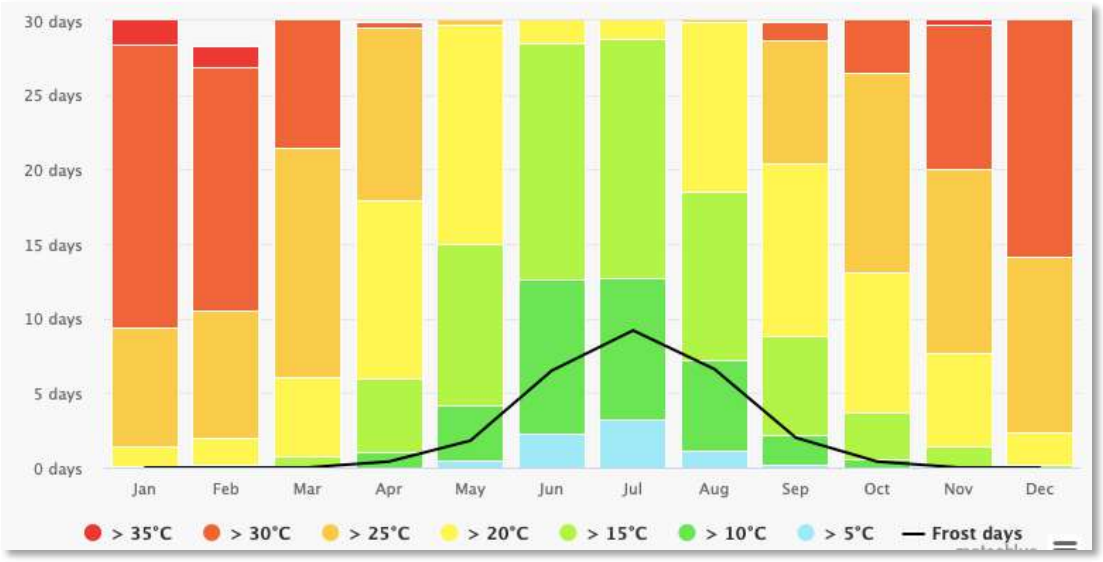


Figure 6-2: Monthly maximum temperature for De Aar.[15]

Precipitation in De Aar region comes mostly through summer rainfall as illustrated in Figure 6-3. Rainfall peaks in February with the least amount of precipitation between the winter months of May and August.

[14] Meteoblue. 2022. Climate De Aar (Northern Cape, South Africa, 30.65°S 24.01°E, 1247m asl). (Online). https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/de-aar_south-africa_1011632 [Accessed 13 May 2022].
[15] Meteoblue. 2022. Climate De Aar (Northern Cape, South Africa, 30.65°S 24.01°E, 1247m asl). (Online). https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/de-aar_south-africa_1011632 [Accessed 13 May 2022].

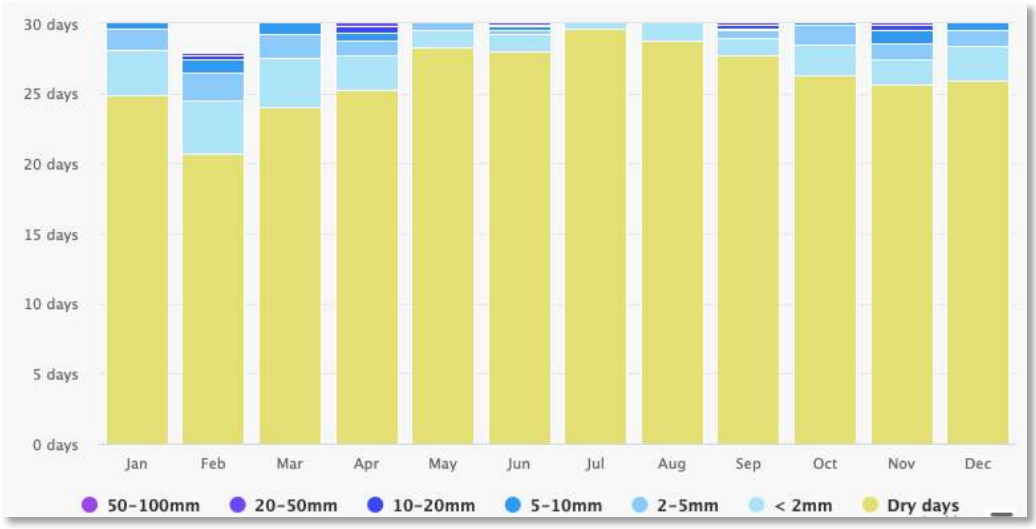


Figure 6-3: The precipitation diagram for De Aar shows on how many days per month, certain precipitation amounts are reached.[16]

Wind in the area is greatest in spring reaching average speeds of 19 to 38 km/h. Figure 6-4 illustrates how these wind speeds are spread per month over a calendar year. In the graph, September to November (spring) have days where exceptionally high wind speeds occur of higher than 38 km/h. Figure 6-5 illustrates that the dominant wind direction is from the east southeast and west. The wind rose shows how many hours per year the wind blows in a particular direction.

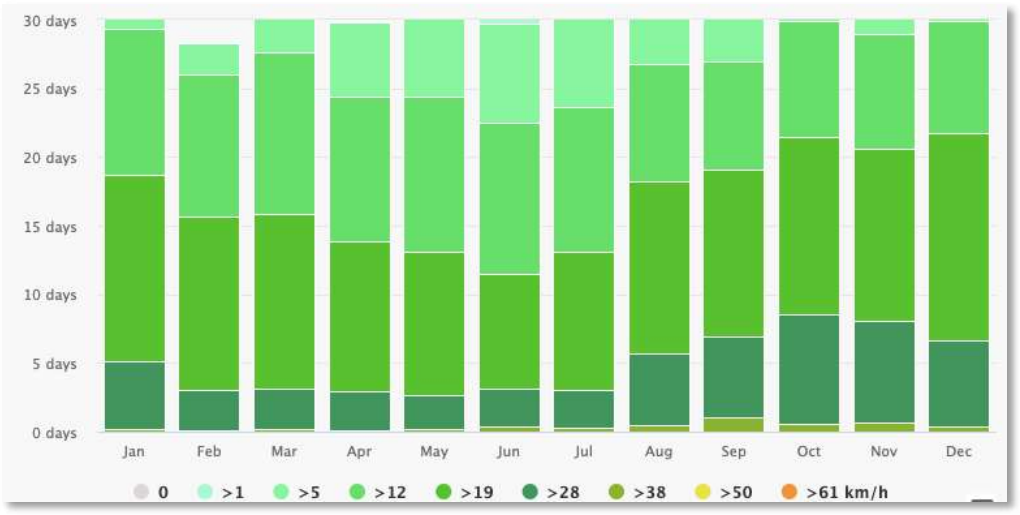


Figure 6-4: Monthly average wind speeds.[17]

[16] Meteoblue. 2022. Climate De Aar (Northern Cape, South Africa, 30.65°S 24.01°E, 1247m asl). (Online). https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/de-aar_south-africa_1011632 [Accessed 13 May 2022].
[17] Meteoblue. 2022. Climate De Aar (Northern Cape, South Africa, 30.65°S 24.01°E, 1247m asl). (Online). https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/de-aar_south-africa_1011632 [Accessed 13 May 2022].

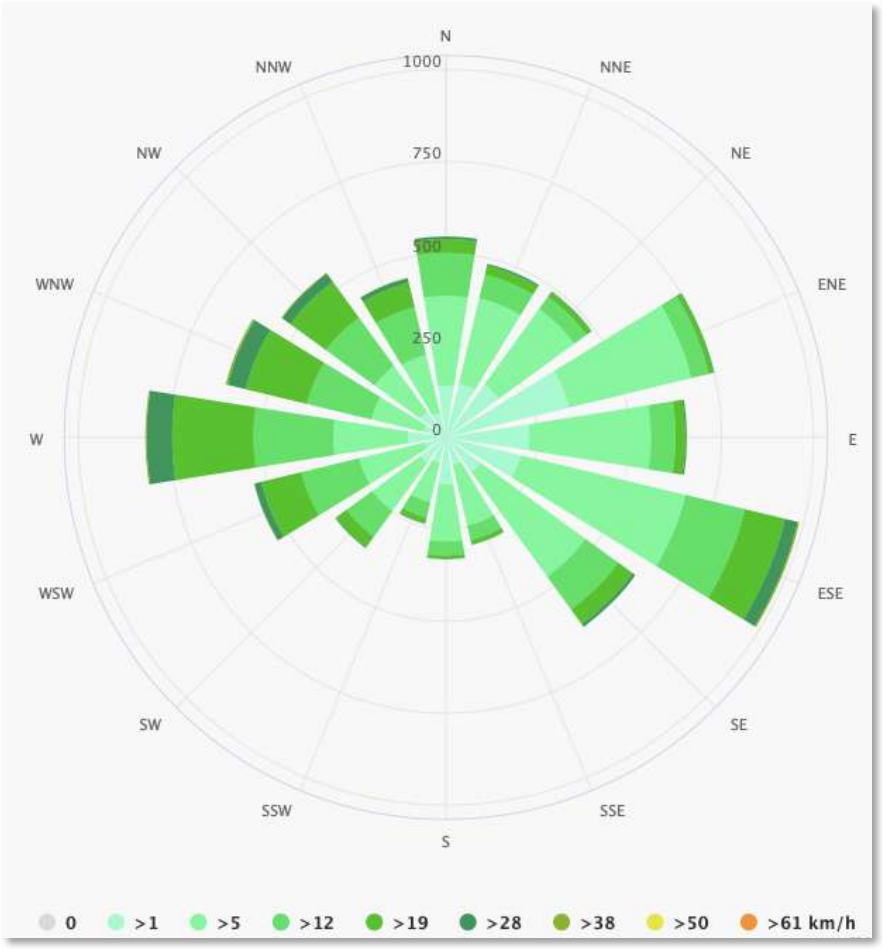


Figure 6-5: Wind rose for De Aar.[18]

[18]Meteoblue. 2022. Climate De Aar (Northern Cape, South Africa, 30.65°S 24.01°E, 1247m asl). (Online). https://www.meteoblue.com/en/weather/historyclimate/climatemodelled/de-aar_south-africa_1011632 [Accessed 13 May 2022].

6.2 Socio-economic context

This section provides a basic summary of the socio-economic context of the locality in which the proposed OHL will be constructed. The proposed OHL must be contextualised in terms of the Castle WEF which the proposed OHL will connect to the national grid, as well as other generation facilities and associated infrastructure in the area. The socio-economic impact is not explicitly assessed in this section, but it is required to contextualise impact being discussed and assessed in the following sections[19]. The population and communities affected by this project will contribute to whether this project is a success or failure. The information in this section has been sourced from the Pixley Ka Seme District Municipality 2022-2027 IDP, Emthanjeni Local Municipality 2021 IDP and StatsSA data obtained from the 2011 National census and 2016 community survey.

6.2.1 Baseline Description

Pixley Ka Seme District Municipality (DM) lies in the south-east of the Northern Cape Province, the largest province in South Africa, and shares its borders with the Free State to the east, the Eastern Cape to the south-east and Western Cape to the southwest. Although the largest province of South Africa, the Northern Cape is the least populous[20]. The Pixley Ka Seme DM is one of the five DMs in the Northern Cape. It is the second largest of these DMs and consists of eight category B (Local) municipalities (Figure 6-6). The composition of the Pixley Ka Seme DM is provided in Table 6-1. The Emthanjeni Local Municipality (LM) is situated in the central south of the Pixley Ka Seme DM where most of the OHL development will take place although a small section will be in the Renosterberg LM (the Castle WEF infrastructure is however largely in the Renosterberg LM). De Aar the largest town in the Emthanjeni Local Municipality and is situated just northwest of the proposed development. Key data underpinning the socio-economic status of Emthanjeni LM and De Aar town are provided in Table 6-2. Both De Aar and Emthanjeni derive their names from the underground water resources, i.e. Emthanjeni name from isiXhosa meaning a "vein" and De Aar referring to a vein (Dutch: aar) or subterranean watercourse located there.

Figure 6-6: Location of the Emthanjeni LM within the Pixley ka Seme DM (source: Emthanjeni IDP, 2022).

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

[20] The 2011 South African Census, population calculated a sum of 1 193 780 people

Table 6-1: Pixley Kaseme DM high-level composition in numbers (source: Emthanjeni IDP, 2022).

Total municipal area	103 410km^2	Demographics (Stats SA estimates 2019)			
		Population	203 788	Households	58 975
Selected Statistics					
Total population intercensal growth rate (2011-2016)	1,05%	Population density (persons/km^2)		1,9	
Matrict pass rate 2018	73,3% (Northern Cape) 70,2% (District)	Proportion of households earning less than R4500 per annum in 2016		11%	
Access to basic services-minimum service level					
Water	99%	Sanitation	89%	Electricity	89,8%
Education					
Persons aged +20 years who have completed grade 12		34 929	Higher education		5,4%
Economy			Labour market in 2011		
GDPR Northern Cape 2011		2,2%	Unemployment rate		28%
GDPR South Africa 2011		3,5%	Youth Unemployment rate (15-34)		34,4%
Largest sectors (using relative size of the provincial economy by industry)					
Finance and business	Mining	Government services		Wholesale, retail and motor trade, catering and accommodation	
11,6%	26,7%	12,8%		9,9%	
Health in the Pixley Ka Seme District					
Health care facilities (hospitals/clinics/hospice)		Immunisation rate %	HIV prevalence rates	Teenage pregnancies – delivery rate to women U/18	
44		73,4%	2,9%	19,9%	

Table 6-2: Emthanjeni Local Municipality and De Aar Town key number[21] (DD: Data Deficient) (Source StatsSA:2022).

Component	Emthanjeni Local Municipality	De Aar Town
Total population	42,356	23,760
Young (0-14)	31,7%	32%
Working Age (15-64)	62,5%	62,5%
Elderly (65+)	5,8%	5,5%
Dependency ratio	60,1	60
Sex ratio	95,8	96,6
Growth rate	1,69% (2001-2011)	DD
Population density	3 persons/km^2	282 persons/km^2
Unemployment rate	28%	DD
Youth unemployment rate	37,2%	DD
No schooling aged 20+	11%	9,5%
Higher education aged 20+	6,6%	7,5%
Matric aged 20+	24,7%	27,8%

[21] StatsSA https://www.statssa.gov.za/?page_id=4286&id=6950 Accessed 2022-05-19

Component	Emthanjeni Local Municipality	De Aar Town
Number of households	10,457	5,356
Number of Agricultural households	1,307	DD
Average household size	3,9	4,3
Female headed households	39,4%	39,7%
Formal dwellings	95,4%	95,8%
Housing owned/paying off	60,3%	67%
Flush toilet connected to sewerage	79,6%	95,9%
Weekly refuse removal	83,3%	94,2%
Piped water inside dwelling	59,8%	73,1%
Electricity for lighting	92,6%	95,6%

People

The Emthanjeni LM has the highest population proportion in the Pixley Kaseme district, with an average household size of 4,1 persons per household. Housing owned/paid off stands at 60,3%, and 39,4% of households are headed by females. Afrikaans and Xhosa are the most spoken languages. Of the population, 14 209 people have primary education, 3 099 have no education, 1 1519 have some secondary education, 6 924 completed matric and 1 166 have higher qualifications. Emthanjeni LM population groups (race) and sex and age distribution are provided in Figure 6-7.

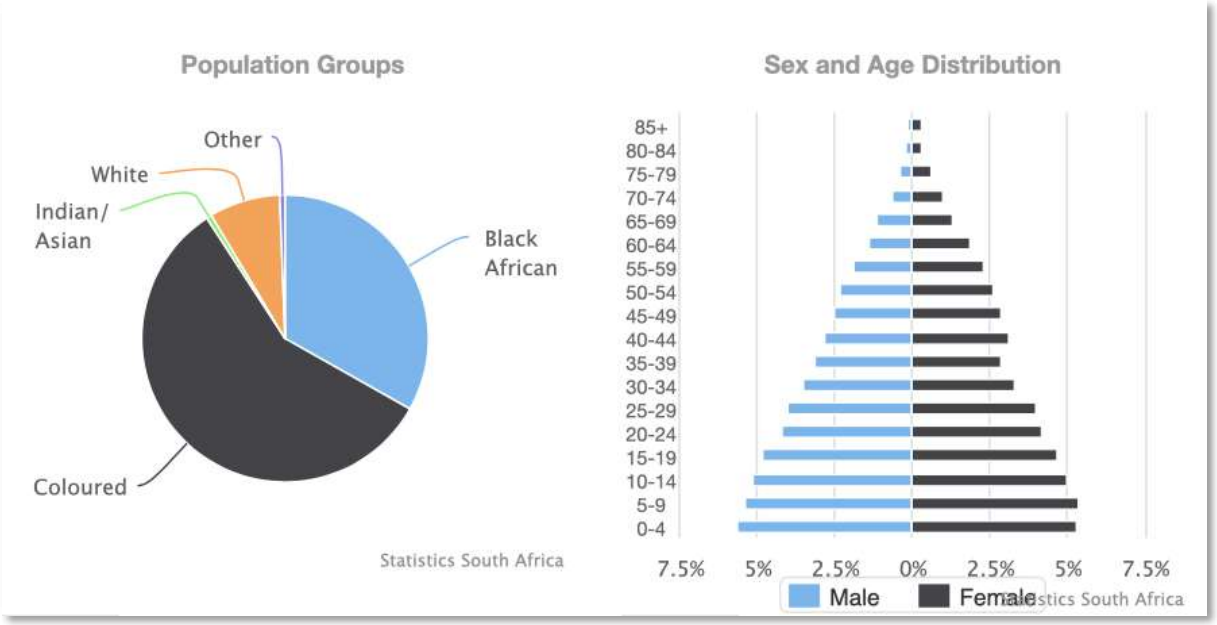


Figure 6-7: Emthanjeni LM population groups (left) and sex and age distribution (right) (Source StatsSA:2022).

Living conditions and Employment

Overall unemployment in the Emthanjeni LM stands at 28,0%, with youth unemployment at 37,2%. There are 16212 with no income and those that do earn an income range from R400–R204 801, with the majority earning between R1 601–R3 200 (Figure 6-8). The formal sector employs 6 660 people, 1 832 are employed in the

informal sector, while 1 238 are employed in private households. Emthanjeni LM highest education levels (schooling) are proved in Figure 6-9 and is generally perceived to be very low considering that nearly 50% only have some primary education. Settlement types (urban, traditional and farm) are provided in Figure 6-9 indicting the majority of people live in urban setting and when referring to Table 6-2 it's clear that more than half the LM populations stays within the town of De Aar.

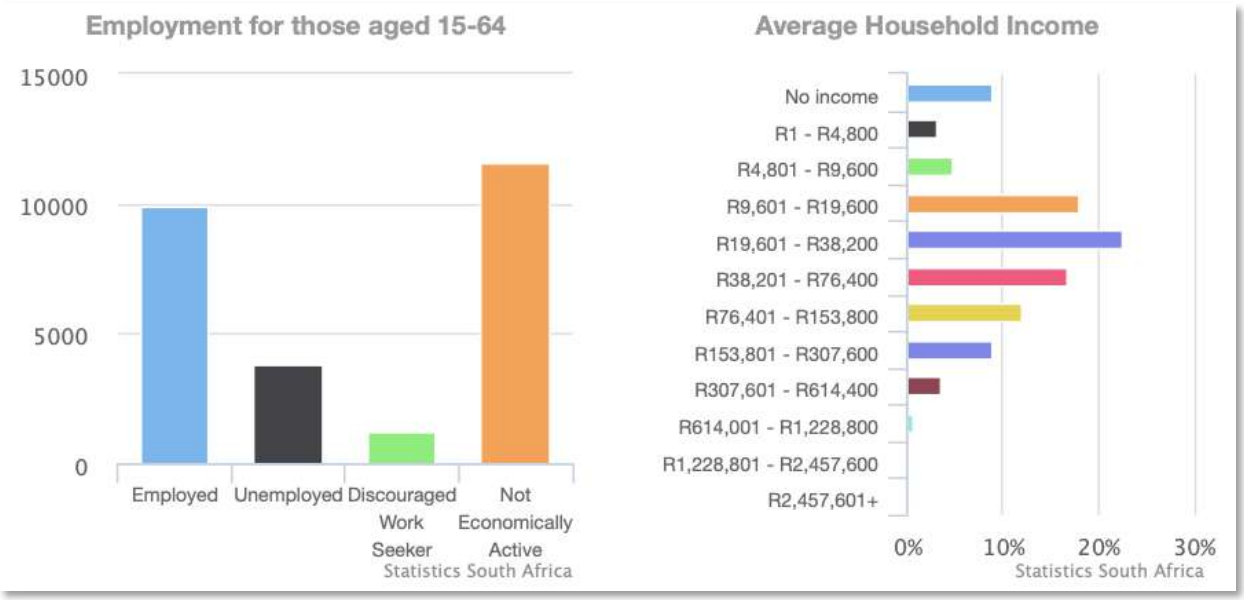


Figure 6-8: Employment for those aged 15-64 and average household incomes (Source StatsSA:2022).

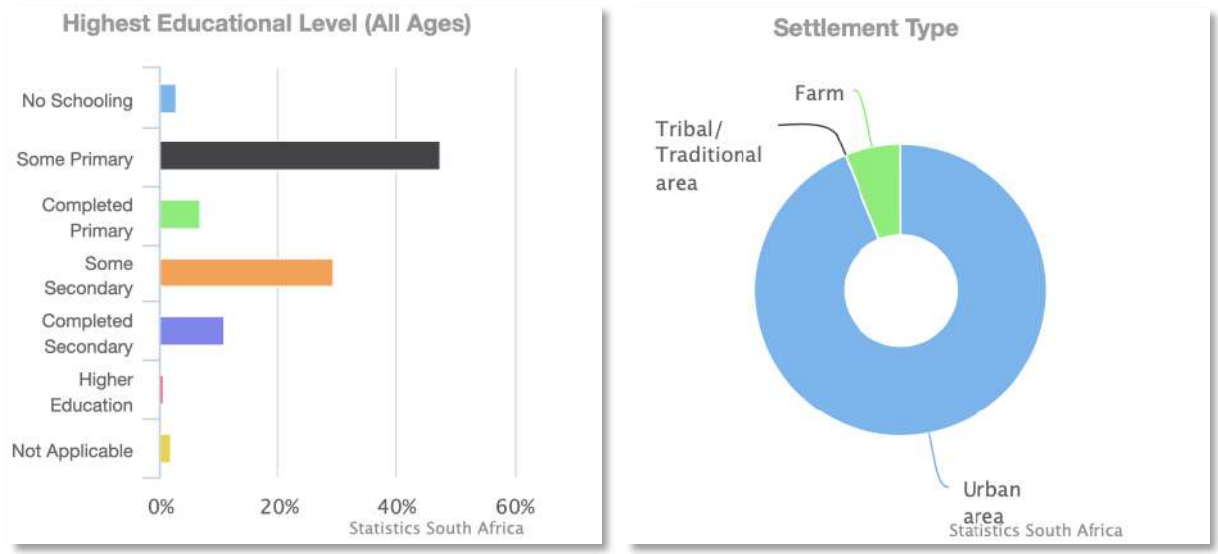


Figure 6-9: Emthanjeni LM highest education levels (left) and settlement types (right) (Source StatsSA:2022).

In the Pixley ka Seme District Municipality the number of people that are of working age is ≈132 000 of a population of ≈207 000. The balance includes those of age 0 - 19 (youth) or 65 and up (pensioners) are part of the non-working age population. Out of the working age group, 52.0% are participating in the labour force, meaning 68 700 residents of the district municipality currently form part of the economically active population. Comparing this with the non-economically active population of the DM e.g. fulltime students at tertiary institutions, disabled people, and those choosing not to work, sum to 63 300 people with unemployment at ±34.1%. In Pixley ka Seme DM the economic sectors that employed the most people in 2018 were the

community services sector at 29.8% and agriculture at 17.7%. In 2018 the 309 people where formally employed by the electricity sector in the Pixley ka Seme DM.

In the Emthanjeni LM agriculture forms the backbone of economy and accounts for the largest labour/ employment contributor. Of the population, 9 866 are employed, 3 833 are unemployed, 1 203 are classified as discouraged work seekers, and 11 561 are not economically active. However, employment has increased as there are a number of developments in the district e.g. the building of the new hospital and the solar programme.

The socio-economics of renewable energy

Contextualising the proposed transmission line infrastructure in terms of South Africa's renewable energy targets are important. Renewable energy targets and production of low carbon energy to the national grid will assist South Africa with its development objectives and aid with the transition to a low carbon economy. The country is also faced with a high level of poverty, inequality and underdevelopment and needs economic upliftment which is constrained by the availability of reliable energy which is currently highly constrained. The harm to the country's economy due to load shedding is well documented and it's widely acknowledged that it discourages investment. The government's latest 2019 Integrated Resource Plan (IRP2019), which has more wind energy planned between now and 2030 than any other energy source. In the medium term (beyond 2030), the coal power stations will need to be replaced with low carbon options, which will likely continue to include renewables. Eskom, the applicant, recognises that "*it is crucial that the private sector plays a role in addressing the future electricity needs of the country. This will reduce the funding burden on Government, relieve the borrowing requirements of Eskom and introduce generation technologies that Eskom may not consider part of its core function*" (Eskom, Guide to Independent Power Producer (IPP) processes, 2019).

Solar and wind energy are not without disadvantages. They are not consistent baseload power producers because the sun does not always shine, and the wind does not always blow. These facilities therefore produce variable power and often not at peak times when its most needed. These problems can be somewhat mitigated, firstly through storage (chemical batteries, pump storage schemes, or other mechanisms) to level variations and secondly by spreading out the renewable facilities across the country to ensure facilities are located at different resource locations. To this end there are several Renewable Energy Facilities constructed, proposed and under construction in the study area as well as several OHL feeding into the Hydra MTS. The area has become a hub for RE developments over the last decade with much attention drawn to it due to availability of solar and wind resources, developable land and grid infrastructure to evacuate electricity into the national grid. Whilst the need for diverse location to generate RE consolidating grid infrastructure, specifically OHLs will mitigate the spread of what can only be described as a spiderweb of OHLs feeding into MTS. The proposed OHL proposes to do just that by consolidating parts of existing OHLs form existing RE facilities with new OHLs from new RE facilities.

South Africa commitments to combat climate change should also be considered. The countries electricity sector is based on old, emission-intensive coal-fired power. It's the world's 14th largest emitter of greenhouse gases (GHGs) (Timperley & McSweeney, 2018) and the second highest CO_2 emitter per capita when compared with the BRICS countries (Our World in Data, 2017). The move away from conventional fossil fuel-based energy generation to renewable energy, including wind and solar, provide a lower impact alternative to the conventional coal-based electricity generation methods, as far as the climate change is concerned. Moreover, the Emthanjeni LM recognises its role in respect of climate response and the critical role it can play to reduce climate change and greenhouse gas emissions since the LM has been hard hit by impact of changing weather patterns and the need to manage resources due to potential future cost implications (IDP 2022).

6.2.2 Potential Impacts

Several impacts are associated with the proposed development are listed below. The EAP is of the opinion that the proposed OHL is likely to contribute little to the negative impacts, due to the scale of the project, however they remain pertinent and relevant and are therefore elaborated upon.

Construction Phase Impacts

The following potential construction phase impacts have been identified:

- Creation of local employment (positive)
- Impact of construction workers on local communities (negative):
- Influx of job seekers (negative)
- Risk to safety, livestock and farm infrastructure (negative)
- Increased risk of grass fires (negative)
- Impacts associated with movement of heavy vehicles and on-site construction related activities (negative)

Operational Phase

The following potential construction phase impacts have been identified:

- Evacuation of renewable energy into the national grid (positive)
- Creation of employment (positive)

Cumulative

The establishment of the proposed grid infrastructure associated with the Castle WEF and other renewable energy projects in the area has the potential to create several cumulative socio-economic opportunities within the local and district municipality, which, in turn, will result in a positive social benefit. The positive cumulative impacts include creation of employment, skills development and training opportunities, creation of downstream business opportunities.

No-Go Alternative

The go-go option would represent a lost opportunity to supplement national, provincial on municipal energy needs with clean, renewable energy. Given South Africa's current energy crisis and position as one of the highest per capita producers of carbon emissions in the world, this would represent a negative social cost. The socio-economic benefits for the local communities in the municipality would be forgone and would therefore represent a negative socio-economic impact for the local area.

6.3 Nuisance impacts

Several nuisance impacts may be created by the construction of the proposed grid connection infrastructure. These impacts include an increase in dust, noise and an increase in traffic. The receptors to these impacts may be anyone who enters the local area in the vicinity of the proposed development. Given the low intensity farming practices and limited traffic in the area, there is very little, if any, noise generated by humans. Whilst little noise would be generated by the grid connection infrastructure during the operational phase, an increase in noise would be created by the construction related activities. During the construction phase, noise will be generated from the construction activities. However, these impacts are anticipated be site-specific. The proposed development will be too far from the Castle WEF and RE facilities for cumulative noise impacts to be of concern.

Dust

The geology and soils are generally uniform across the site. The sandiness of the soils, together with the dry climate areas create the potential for dust on site. It is anticipated that the generation of dust will increase with

construction activities, due to an increase in vehicles and site clearing/ excavation activities associated with the development.

Noise

The area surrounding the proposed site consists predominantly of agricultural lands dominated by sheep and game farming activities and very little cultivation. Existing land use activities are not expected to impact on the ambient sound levels. The N10 passes about 2,2km west of the Hydra MTS. The local community uses the existing Hydra access road which is partly tared up to the Hydra MTS (informally referred to as the Hydra access road). This road turns to a gravel road where it crosses the Transnet rail line towards farmlands to the east. There will be increased traffic on the Hydra Road associated with construction of the Castle WEFs as well as the future construction of other renewable projects in the area. Elevated ambient noise levels can be expected around the Hydra MTS typified by a low continuously radiated audible humming noise emitted through transformers.

The increase in noise pollution[22] from the operation of heavy machinery, as well as increased traffic during the construction phase of the proposed development would include:

- Various construction activities taking place simultaneously during the day will increase ambient sound levels due noise.
- Various construction activities taking place simultaneously at night will increase ambient sound levels. Such an increase in noise will be highly audible (ambient night time noise levels in rural areas are always lower than daytime levels), potentially disturbing during the very quiet night-time periods.
- Construction of roads during the day may slightly and temporarily increase ambient sound levels.
- Various construction vehicles passing close to potential noise-sensitive receptors may increase ambient sound levels and create disturbing noises.
- Noise impact on game, livestock and wild animals, which is generally seen as temporary and the animals will return once the source of disturbance is removed.

The only significant noise impacts associated with the OHL will be the impact on people living in close proximity to access roads.

Traffic

The traffic volumes associated with proposed development will have three distinct patterns, particularly for the construction, operation and de-commissioning stages of the project. The primary road of concern is the Hydra access road that branches from the N10 approximately 6km outside of De Aar.

The area surrounding the proposed grid connection infrastructure consists predominantly of large farms used for low intensity livestock grazing and game farming. During the construction phase of the proposed grid connection infrastructure, there will be an increase in regular traffic to and from the site. The increased traffic will be noticeable locally.

An application for wayleaves and permits should be made to Transnet prior to of construction. Special safety measures might be required to protect drivers especially considering overall increased traffic flow along this route for the prosed RE projects. Height clearances need to physically be verified, especially in the vicinity of overhead power supply at the railway crossing.

[22] It is assumed that no blasting will be required during construction.

The trips associated with the construction phase are primarily the transport of machinery, materials and people to the site. The primary impact of heavy vehicle and abnormal vehicle transportation is the increased rate of road degradation. This will be at its highest intensity during the construction phase of the project. It is expected that the roads in and around the site can accommodate the increased loading, however the degradation will be sped up; consequently, affecting any plans for routine maintenance. Abnormal vehicles also present an increased risk to other road users and specific safety protocols must be followed. Warnings and safety instructions should be communicated to the public on the main access road, i.e. Hydra roads. The operational phase impact of traffic associated with the transmission lines will be negligible.

Cumulative impacts

The cumulative effect of traffic (both regular back and forth to site, as well as the transport of abnormal loads) may have a noticeable impact on people living in proximity of the road during construction especially if timelines of several RE facilities and associated infrastructure overlap. This could mean increased noise, increased dust, deterioration of road surface and increased prevalence of traffic on the access road which might be particularly noticeable during nighttime.

Dust generation would slightly increase when cumulative construction projects are undertaken simultaneously. If the projects undertake responsibility for dust control on a site-specific basis the cumulative impact should not be any greater (or less).

Cumulative noise pollution from construction activates may slightly increase when cumulative construction projects are undertaken simultaneously. However, given the few noise-sensitive receptors in the construction area the cumulative impact should not be any greater (or less).

6.4 Agricultural Production, Potential and Soils

Soil Scientist, Johann Lanz, completed a site sensitivity verification and agricultural compliance statement for proposed Castle to Hydra OHL. Key findings concluded that the loss of future agricultural production potential resulting from the proposed development is totally insignificant in the context of the agricultural environment. This is because an insignificantly small amount of land will be excluded from agricultural production and that land has very limited production potential, anyway. Therefore, the impact on the agricultural production capability of the site is acceptable. The only potential source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and easily mitigated through generic mitigation measures.

A summary of the of the findings on agricultural production, potential and soils are provided below. The site sensitivity verification and agricultural compliance statement is attached as Annexure D1.

6.4.1 Baseline Description

The agricultural production potential of the site is completely constrained by the aridity of the climate, specifically the low rainfall of approximately 285 mm per annum and high evaporation of approximately 1,500 mm per annum (Schulz, 2009). As a result, the agricultural land use is limited to grazing. Grazing of both sheep and game is the dominant agricultural land use in the area (Figure 6-10). Grazing capacity of the site is low at 20 hectares per large stock unit (DAFF, 2018). There is no cultivation in the corridor. In the surrounding area the little cultivation that there is, is confined to small, isolated patches of pasture or fodder crops around farmsteads.

Figure 6-10: A melange of photos typifying the agricultural landscape of the study area including game and livestock as well as agricultural infrastructure such as wind pumps and sheep troughs.

6.4.2 Site Sensitivity

In terms of the gazetted agricultural protocol, a site sensitivity verification must be submitted that:

1. confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as new developments or infrastructure, the change in vegetation cover or status etc.; and
2. contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity.

However, the verification of agricultural sensitivity of the power line route has very little relevance to this assessment because the agricultural impacts of a power line are insignificant in such an agricultural environment, regardless of the level of agricultural sensitivity of the land which it traverses.

Agricultural sensitivity, as used in the national web-based environmental screening tool, is a direct function of the capability of the land for agricultural production. The general assessment of agricultural sensitivity that is employed in the national web-based environmental screening tool, identifies all arable land that can support viable crop production, as high (or very high) sensitivity. This is because there is a scarcity of arable production land in South Africa and its conservation for agricultural use is therefore a priority. Land which cannot support viable crop production is much less of a priority to conserve for agricultural use and is rated as medium or low agricultural sensitivity.

It is important to recognise that the agricultural sensitivity of land, in terms of a particular development, is not only a function of the screening tool sensitivity but is also a function of the severity of the impact which that development poses to agriculture. This is not recognised in the screening tool classification of sensitivity. So, for example, the sensitivity of an agricultural environment to overhead power lines is not what the screening tool classifies the sensitivity as, because most agricultural environments have a very low sensitivity to overhead power lines because these have negligible agricultural impact, regardless of the agricultural production potential of the land that they cross (see Section 9). Therefore, in the context of the development of overhead power lines, almost no land can be considered to have high sensitivity for impacts on agricultural resources.

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

The screening tool sensitivity categories in terms of land capability are based upon the Department of Agriculture's updated and refined, country-wide land capability mapping, released in 2016. The data is generated by GIS modelling. Land capability is defined as the combination of soil, climate and terrain suitability factors for supporting rain fed agricultural production. It is an indication of what level and type of agricultural production can sustainably be achieved on any land, based on its soil, climate and terrain. The higher land capability values (≥8 to 15) are likely to be suitable as arable land for crop production, while lower values are only likely to be suitable as non-arable grazing land.

A map of the proposed substation and power line, overlaid on the screening tool sensitivity, is given in Figure 6-11. As noted above, the screening tool sensitivity of the power line corridors is irrelevant to agricultural impact. Because none of the land is classified as cropland, agricultural sensitivity is purely a function of land capability. The land capability of the corridor on the screening tool is predominantly 5, which translates to a low agricultural sensitivity, but it varies from 1 (low sensitivity) to 7 (medium sensitivity) (Table 6-3).

The predominantly low agricultural sensitivity, as identified by the screening tool, is confirmed by this assessment. The motivation for confirming the sensitivity is that the climate data (low rainfall of approximately 285 mm per annum and high evaporation of approximately 1,500 mm per annum) proves the area to be arid,

and therefore of limited land capability. A land capability of 5 and consequent low agricultural sensitivity is entirely appropriate for this land which is totally unsuitable for dryland crop production.

This site sensitivity verification verifies the entire site as being of less than high agricultural sensitivity and predominantly of low agricultural sensitivity. The required level of agricultural assessment is therefore confirmed as an Agricultural Compliance Statement.

Table 6-3: Description of different agricultural sensitivity classes that occur in the study area.

Sensitivity category	Cultivation status	Land capability evaluation values	General description
Low	Uncultivated	3 to 5	Constrained by aridity. Also constrained by shallow, sandy soils on underlying rock or hard-pan carbonate.
Medium	Uncultivated	6 to 7	Constrained by aridity. Also constrained by shallow, sandy soils on underlying rock or hard-pan carbonate.

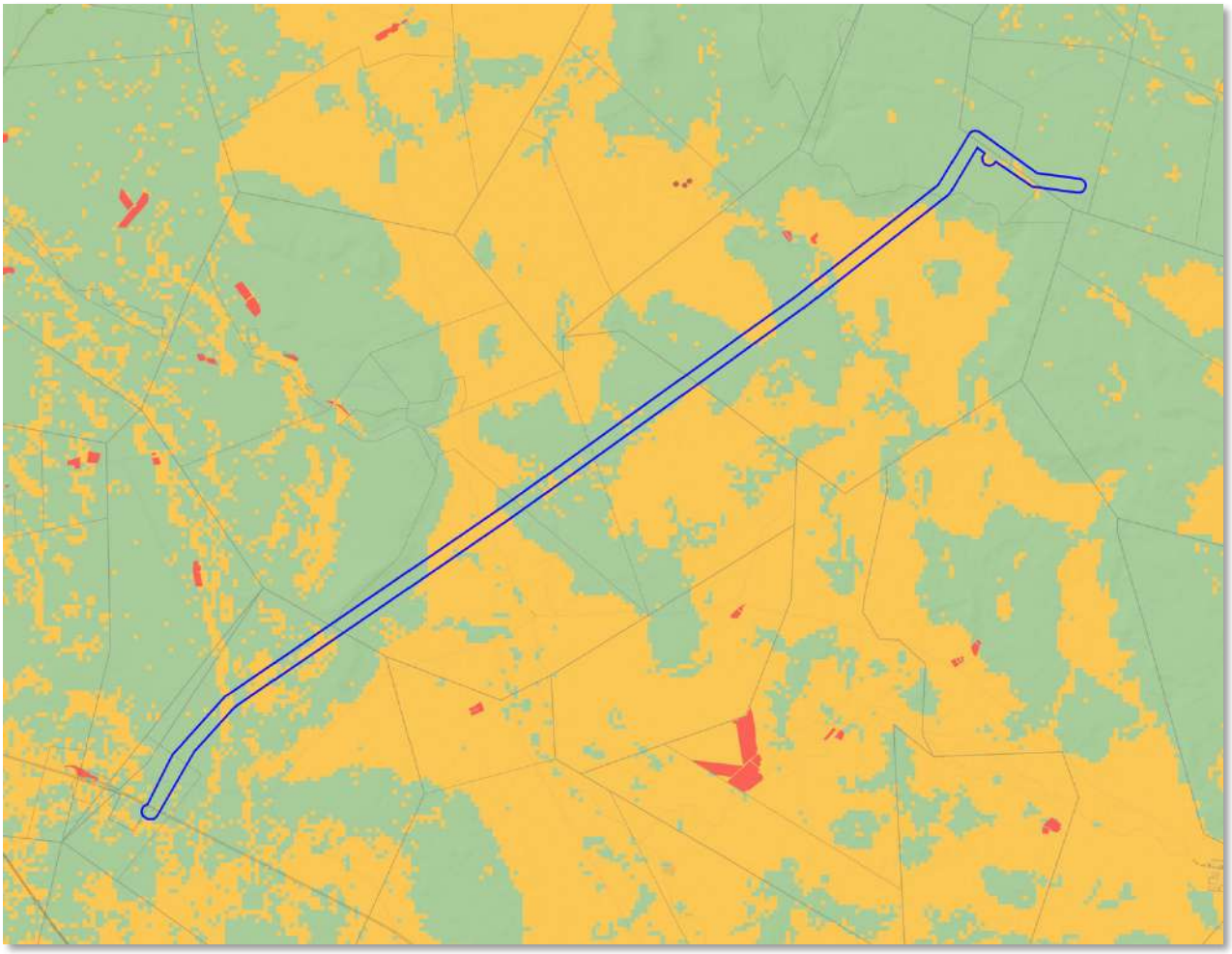


Figure 6-11: The proposed corridor (dark blue outline) overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high (Not applicable)).

6.4.3 Impact assessment

6.4.3.1 General

An agricultural impact is a temporary or permanent change to the future production potential of land. The significance of the agricultural impact is directly proportional to the extent of the change in production potential. If a development will not change the future production potential of the land, then there is no agricultural impact.

The proposed electrical grid infrastructure has insignificant agricultural impact for two reasons:

- There is no loss of future agricultural production potential under transmission lines because all agricultural activities that are viable in this environment, can continue completely unhindered underneath transmission lines. The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture, including a service track below the lines, is insignificantly small within an agricultural environment of large farms with low density grazing.
- The affected land has very limited agricultural production potential, anyway.

The only source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and easily mitigated through generic mitigation measures, included in the EMPr. However, farmers frequently complain that these impacts occur because the EMPr is not adequately implemented and therefore a functional grieving mechanism must be initiated prior to construction commencing. A common complaint from farmers is that gates are left open by contractors. There is likely to be some nuisance disturbance to agricultural activities during construction. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact.

Table 6-4: Agricultural impact rating table.

No.	1	Alternative 1		
Project phase	Construction, Operation & Decommissioning			
Impact title	Impact on Agriculture			
Impact description	Impact on Agricultural Production, Potential and Soils			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Limited	Limited to the site and its immediate surroundings.	Limited	Limited to the site and its immediate surroundings.
Duration	Temporary	Impact will last less than 1 month.	Temporary	Impact will last less than 1 month.
Intensity	Very low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are not affected.	Very low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are not affected.
Magnitude	Very low - negative		Very low - negative	
Probability	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.
Significance	Minimal - negative		Minimal - negative	
Importance	Very low	Very low	Very low	Very low
Consequence	Very slightly-detrimental		Very slightly-detrimental	
Confidence	Virtually certain		Virtually certain	

Reversibility	**High**	The affected environment may be able to recover from the impact.
Mitigatability	**Low**	Mitigation does not exist; or mitigation may only slightly reduce the significance of impacts.
Potential mitigation	The only source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and easily mitigated through generic mitigation measures included in the EMPr. However, farmers frequently complain that these impacts occur because the EMPr is not adequately implemented and therefore a functional grieving mechanism must be initiated prior to construction commencing. A common complaint from farmers is that gates are left open by contractors. There is likely to be some nuisance disturbance to agricultural activities during construction. However, nuisance disturbances are highly unlikely to translate into a change in agricultural production and therefore do not constitute an agricultural impact as defined in the first paragraph of this section.	
Comment on ratings	Ratings concluded by EAP based on Agricultural specialist input. The lowest significance rating possible has been ascribed i.e. minimal negative which makes the impact conceivable, yet improbable and considering the context insignificant.	

6.4.3.2 Cumulative impact

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

The most important concept related to a cumulative impact is that of an acceptable level of change to an environment. A cumulative impact only becomes relevant when the impact of the proposed development will lead directly to the sum of impacts of all developments causing an acceptable level of change to be exceeded in the surrounding area. If the impact of the development being assessed does not cause that level to be exceeded, then the cumulative impact associated with that development is not significant.

The potential cumulative agricultural impact of importance is a regional loss of future agricultural production potential. The defining question for assessing the cumulative agricultural impact is this: *What level of loss of future agricultural production potential is acceptable in the area, and will the loss associated with the proposed development, when considered in the context of all past, present or reasonably foreseeable future impacts, cause that level in the area to be exceeded?*

There are several renewable energy developments that are leading to loss of agricultural grazing land in the area. However, because this overhead line itself leads to insignificant agricultural land loss, its cumulative impact must also logically be insignificant. It therefore does not make sense to conduct a more formal assessment of the development's cumulative impacts as per DFFE requirements for cumulative impacts. Many times, more electricity grid infrastructure than currently exists, or is currently proposed, can be accommodated before acceptable levels of change in terms of loss of production potential are exceeded. The landscape in this environment could be covered with power lines and agricultural production potential would not be affected.

Due to the considerations discussed above, the cumulative impact of loss of future agricultural production potential can confidently be assessed as not having an unacceptable negative impact on the area. In terms of cumulative impact, the proposed development is therefore acceptable, and it is therefore recommended that it be approved.

6.4.3.3 No-go alternative

The no-go alternative considers impacts that will occur to the agricultural environment in the absence of the proposed development. There is no agricultural impact of the no-go option. Therefore, the extent to which the development (insignificant impact) and the no-go alternative will impact agricultural production are equal, which results in there being, from an agricultural impact perspective only, no preferred alternative between the development and the no-go. However, the no-go option would prevent the proposed development from contributing to the environmental, social and economic benefits associated with the development of renewable energy in South Africa.

6.4.3.4 Micro-siting to minimize fragmentation and disturbance of agricultural activities

The agricultural protocol requires confirmation that all reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities. However, the agricultural uniformity and low agricultural potential of the environment, means that the exact positions of all infrastructure will make no material difference to agricultural impacts and disturbance.

6.4.3.5 Confirmation of linear activity impact

The protocol requires confirmation in the case of a linear activity, that the land can be returned to the current state within two years of completion of the construction phase. It is hereby confirmed that the land under the overhead power line route can be returned to the current state within two years of construction.

6.4.3.6 Conclusion and Recommendations

The conclusion of the agricultural assessment is that the proposed development will have insignificant agricultural impact and will therefore be acceptable in terms of its impact on the agricultural production capability of the site. This is substantiated by the facts that the loss of agricultural production potential resulting from the development is insignificant because of the insignificant amount of land excluded from agricultural production and because of the land's very limited production potential. The only sources of impact minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and easily mitigated through generic mitigation measures. From an agricultural impact point of view, it is recommended that the development be approved. The conclusion of this assessment on the acceptability of the proposed development and the recommendation for its approval is not subject to any conditions.

6.5 Terrestrial Ecology

Ecologist, Rudolph Greffrath and Andrew Husted, completed a Terrestrial Ecology Baseline and Impact Assessment for the proposed Castle to Hydra OHL. Key findings concluded that mitigation measures can be implemented to reduce the significance of the risk but there is still a possibility of impacts on ecology. Considering that parts of the area has been identified as being of significance for biodiversity maintenance and ecological processes (Critical Biodiversity Areas, CBAs), development may proceed but with caution and only with the implementation of mitigation measures. Development within the high sensitivity areas is not regarded as a fatal flaw for the project. However, these areas should not be considered for the pylon placements. It is the opinion of the specialists that the project may be favourably considered, on condition all prescribed mitigation measures and supporting recommendations be implemented correctly and timeously.

A summary of the of the findings on terrestrial ecology are provided below. The Terrestrial Impact Assessment Report is attached as Annexure D2.

6.5.1 Baseline Description

6.5.1.1 Ecologically Important Landscape Features

6.5.1.1.1 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 project overlaps with a LC ecosystem (Figure 6-12).

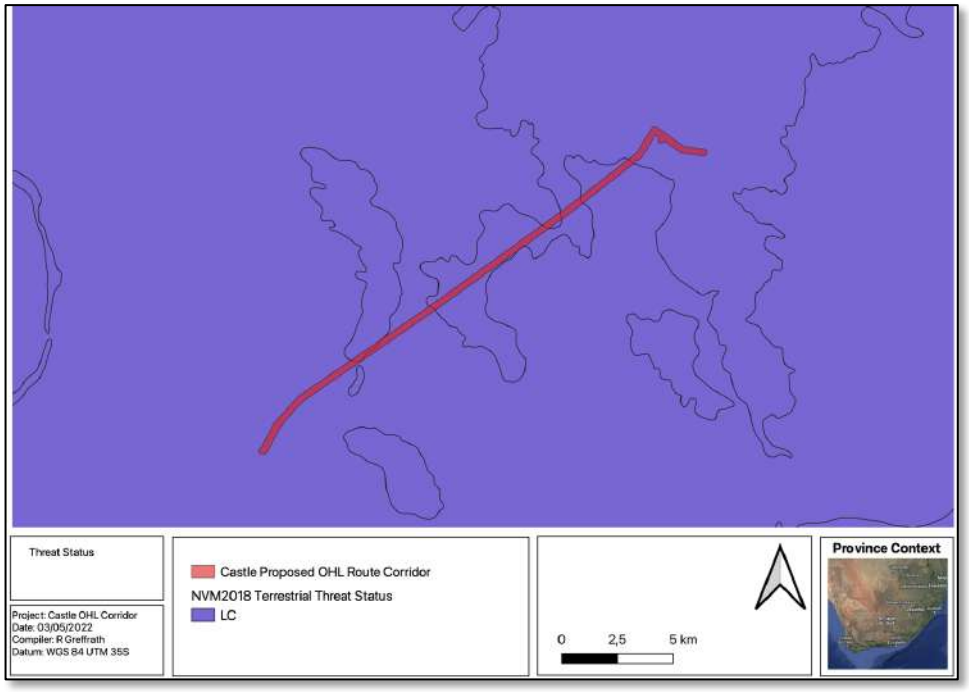


Figure 6-12: Map illustrating the ecosystem threat status associated with the project area.

6.5.1.1.2 Ecosystem Protection Level

This is an 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. NP, PP or MP ecosystem types are collectively referred to as under-protected ecosystems. The proposed project overlaps with PP and NP ecosystems (Figure 6-13).

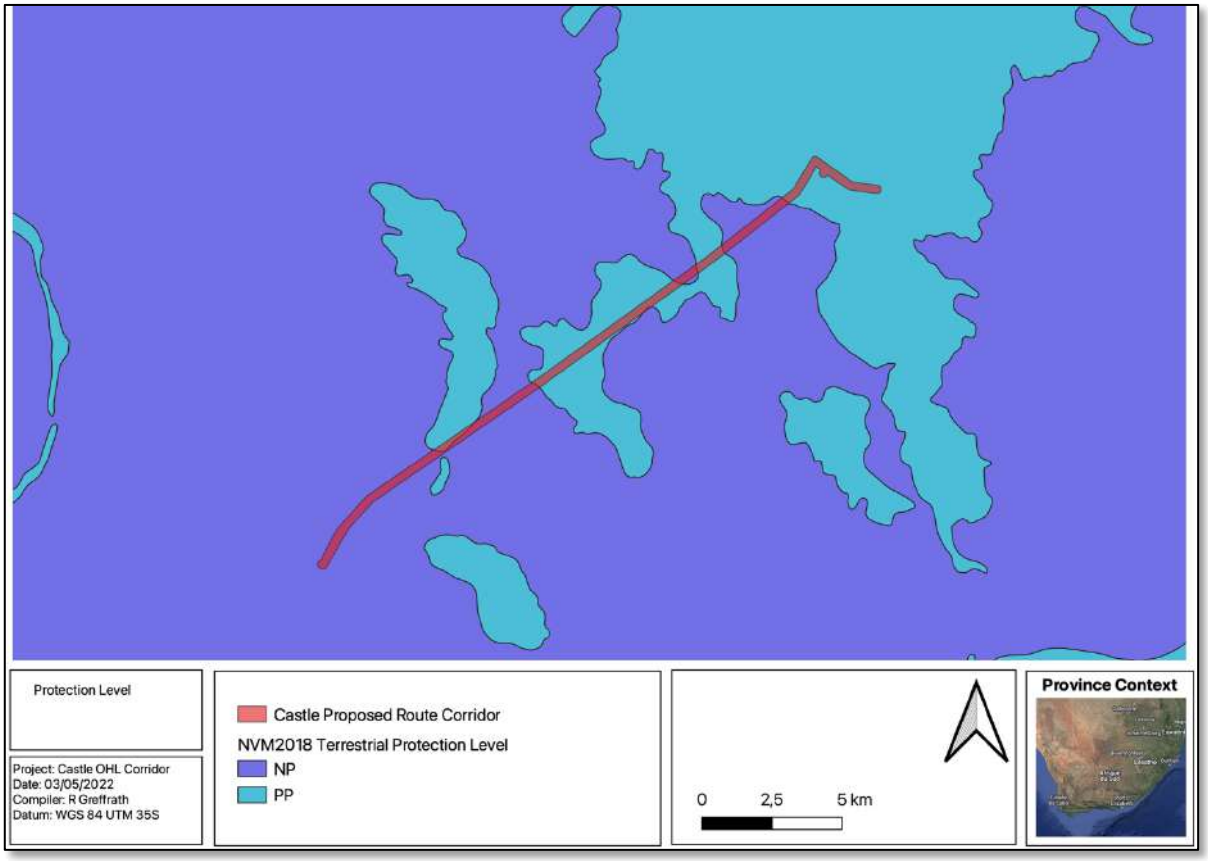


Figure 6-13: Map illustrating the ecosystem protection level associated with the project area.

6.5.1.1.3 National Protected Area Expansion Strategy (NPAES)

National Protected Area Expansion Strategy 2010 (NPAES) 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 project area's northern section overlaps with the Senqu NPAES area as can be seen below.

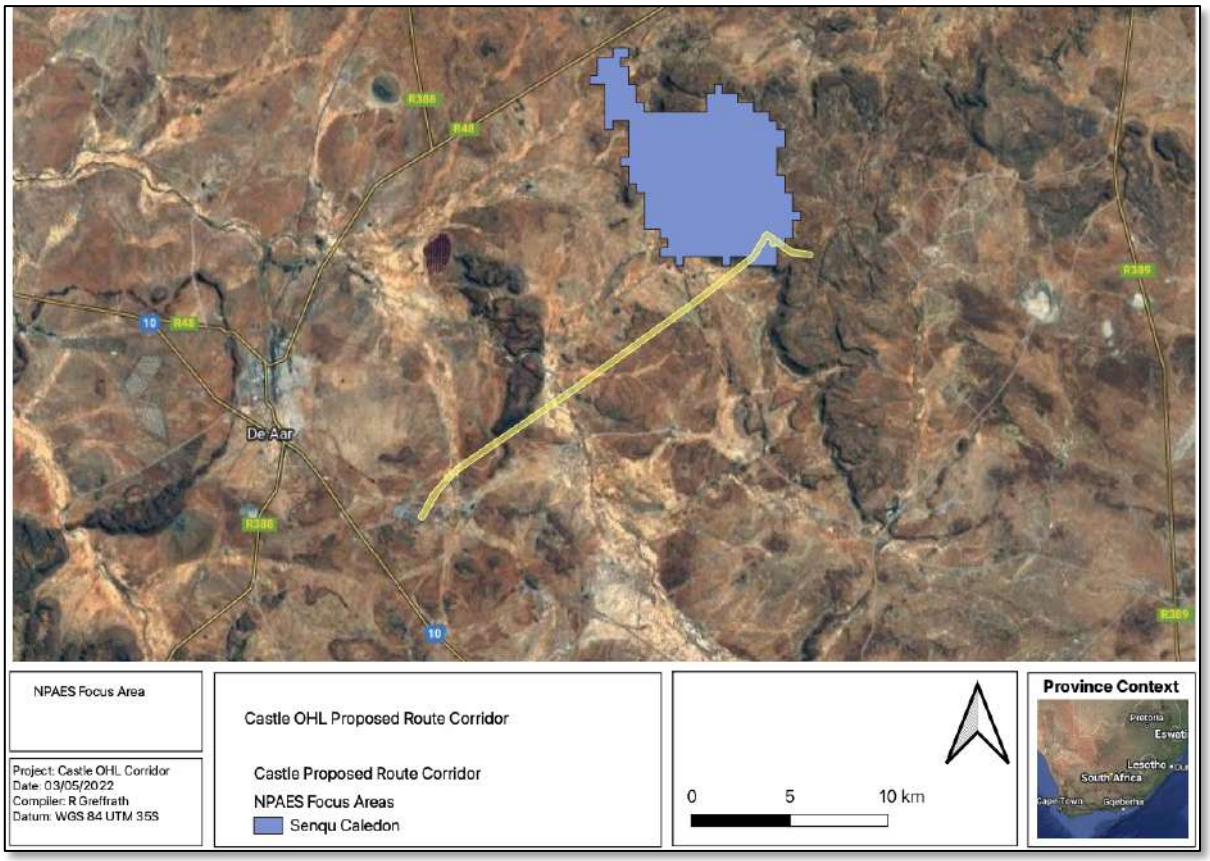


Figure 6-14: NPAES focus area.

6.5.1.1.4 Critical Biodiversity Areas and Ecological Support Areas

The key output of a systematic biodiversity plan is a map of biodiversity priority areas. The CBA map delineates Critical Biodiversity Areas (CBAs), Ecological Support Areas (ESAs), Other Natural Areas (ONAs), Protected Areas (PAs), and areas that have been irreversibly modified from their natural state.

CBAs are terrestrial and aquatic areas of the landscape that need to be maintained in a natural or near-natural state to ensure the continued existence and functioning of species and ecosystems and the delivery of ecosystem services. CBAs are areas of high biodiversity value and need to be kept in a natural state, with no further loss of habitat or species. Thus, if these areas are not maintained in a natural or near natural state then biodiversity targets cannot be met. Maintaining an area in a natural state can include a variety of biodiversity compatible land uses and resource uses (SANBI-BGIS, 2017).

ESAs are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services. Critical Biodiversity Areas and Ecological Support Areas may be terrestrial or aquatic (SANBI-BGIS, 2017).

ONAs consist of all those areas in good or fair ecological condition that fall outside the protected area network and have not been identified as CBAs or ESAs. A biodiversity sector plan or bioregional plan must not specify the desired state/management objectives for ONAs or provide land-use guidelines for ONAs (SANBI-BGIS, 2017).

Figure 6-15 shows the project area superimposed on the Terrestrial CBA map. The project area overlaps with a CBA1 area.

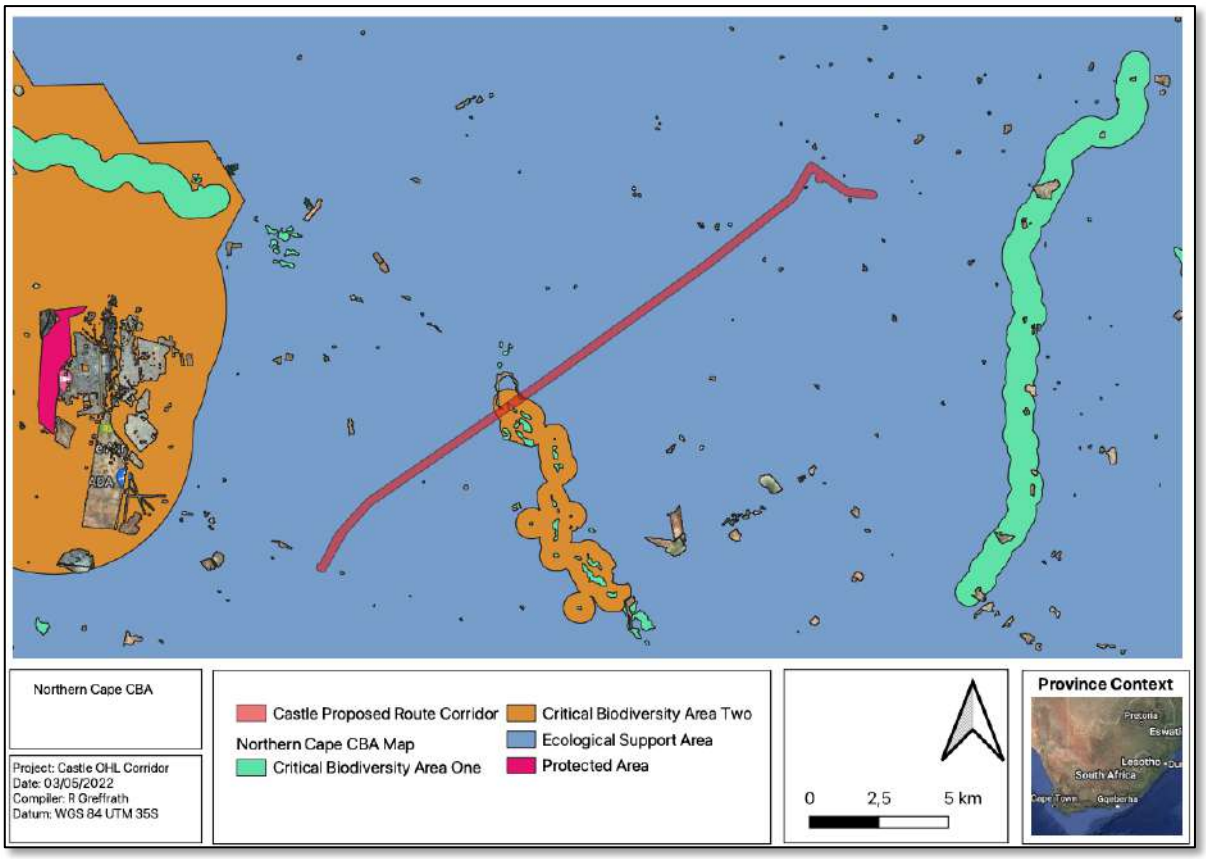


Figure 6-15: Map illustrating the locations of CBAs in the project area.

6.5.1.1.5 Important Bird & Biodiversity Areas[23]

Important Bird & Biodiversity Areas (IBAs) are the sites of international significance for the conservation of the world's birds and other conservation significant species as identified by BirdLife International. These sites are also all Key Biodiversity Areas; sites that contribute significantly to the global persistence of biodiversity (Birdlife, 2017).

According to Birdlife International (2017), the selection of IBAs is achieved through the application of quantitative ornithological criteria, grounded in up-to-date knowledge of the sizes and trends of bird populations. The criteria ensure that the sites selected as IBAs have true significance for the international conservation of bird populations and provide a common currency that all IBAs adhere to, thus creating consistency among, and enabling comparability between, sites at national, continental and global levels. Figure 6-16 shows the project area overlaps with the Platberg-Karoo Conservancy IBA.

Platberg–Karoo Conservancy IBA can be found in the districts of De Aar, Philipstown and Hanover. This IBA falls across two biomes, the Nama Karroo and the Grassland Biome, which contributes to its diversity of species. In total 289 bird species have been recorded here. Threats in this IBA include overgrazing, erosion and encroachment by Karoo shrubs, all of which result in the loss of habitat and a decrease in available food for large terrestrial birds.

[23] Avifauna is discussed here in context of general site ecology. However, a specific avifauna specialist study has been undertaken for the proposed OHL as detailed in Section 6.7.

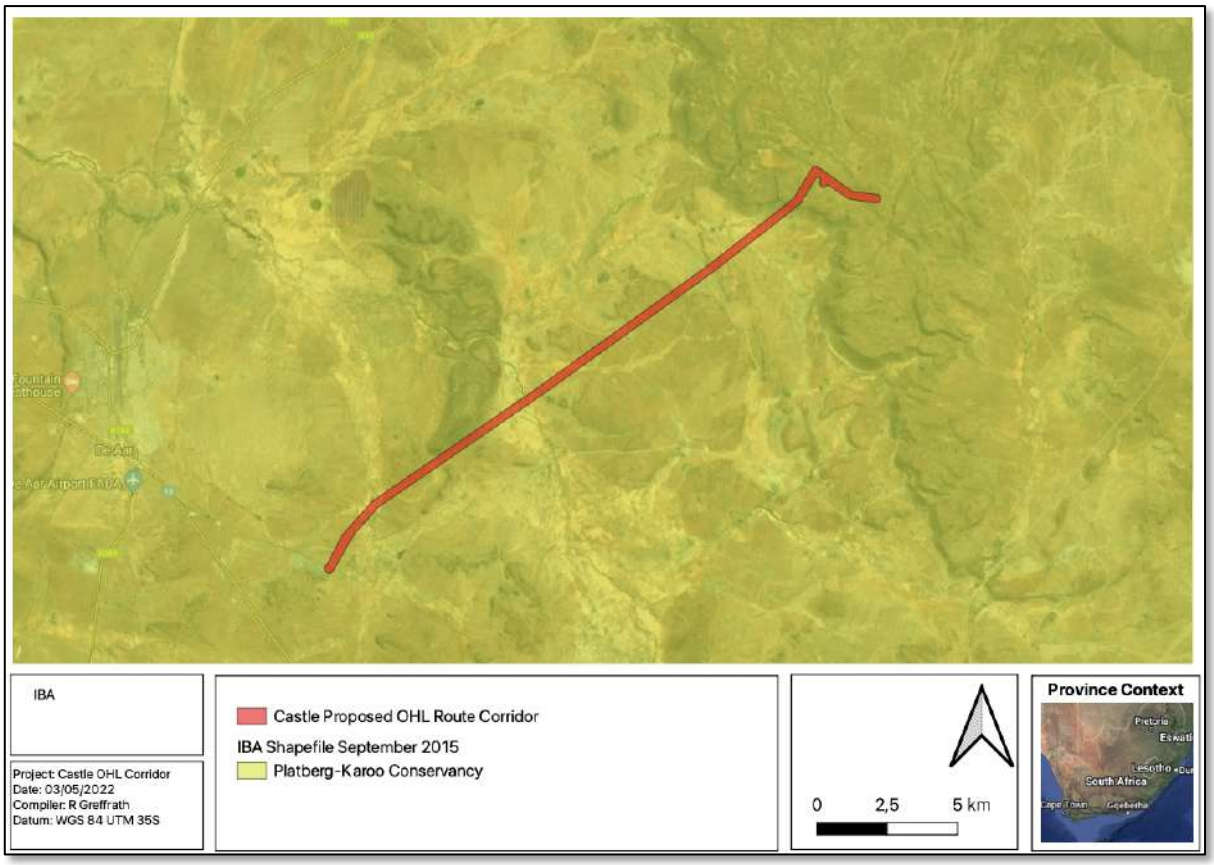


Figure 6-16: Map illustrating the locations of IBAs in the project area.

6.5.1.2 Flora Assessment

6.5.1.2.1 Vegetation Type

A. **Nama Karoo biome.**

This biome is found in the central plateau of the western half of South Africa. The geology underlying the biome is varied, as the distribution of this biome is determined primarily by rainfall. The rain falls in summer and varies between 100 and 520mm per year. This also determines the predominant soil type - over 80% of the area is covered by a lime-rich, weakly developed soil over rock. Although less than 5% of rain reaches the rivers, the high erodibility of soils poses a major problem where overgrazing occurs (SANBI, 2019).

The dominant vegetation is a grassy, dwarf shrubland. Grasses tend to be more common in depressions and on sandy soils, and less abundant on clayey soils. Grazing rapidly increases the relative abundance of shrubs. Most of the grasses are of the C4 type and, like the shrubs, are deciduous in response to rainfall events (SANBI, 2019).

On a fine-scale vegetation type, the project area overlaps with one vegetation type: Northern Upper Karoo (Figure 6-17).

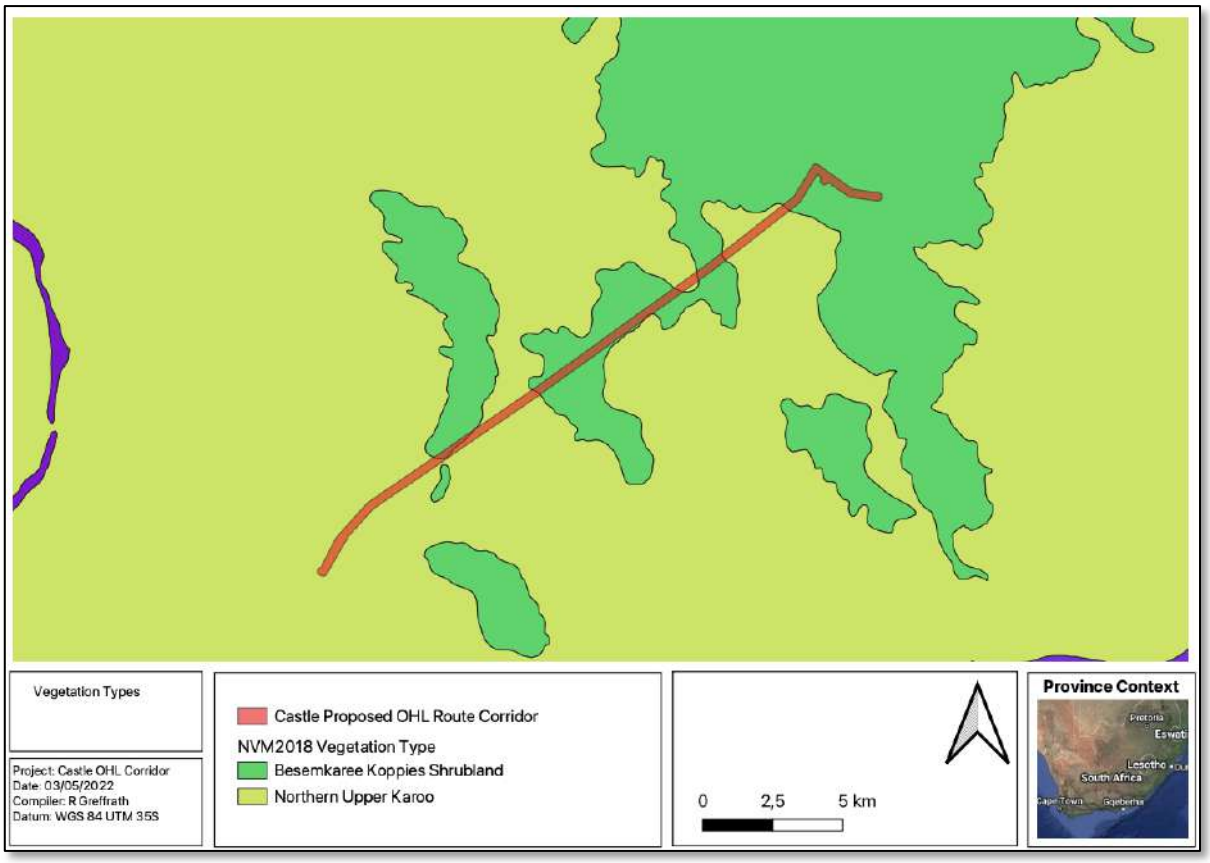


Figure 6-17: Map illustrating the vegetation type associated with the project area.

B. Northern Upper Karoo

This vegetation type is found in the Northern Cape, Eastern Cape and Western Cape Provinces. This vegetation type consists of alluvial shrubland dominated by dwarf microphyllous shrubs, with 'white' grasses of the genera *Aristida* and *Eragrostis* (Mucina & Rutherford, 2006).

Conservation Status of the Vegetation Type

The vegetation type is listed as Least Threatened (SANBI, 2018). Conservation Target 21%. Statutorily conserved in Mountain Zebra and Karoo National Parks as well as in Oviston, Commando Drift, Rolfontein and Gariep Dam Nature Reserves. About 2% of the unit has been transformed, largely due to building of dams (Gariep, Grassridge, Killowen, Kommandodrift, Kriegerspoort, Lake Arthur, Modderpoort, Schuil Hoek, Vanderkloof, Victoria West, Wonderboom and Zoetvlei).

C. Besemkaree Koppies Shrubland

This vegetation type occurs in the Northern Cape, Free State and Eastern Cape Provinces, more specifically on plains of Eastern Upper Karoo (between Richmond and Middelburg in the south and the Orange River) and within dry grasslands of the southern and central Free State. Extensive dolerite-dominated landscapes along the upper Orange River belong to this unit as well. Extends northwards to around Fauresmith in the northwest and to the Wepener District in the northeast. Altitude 1 120–1 680 m.

D. Conservation Status of the Vegetation Type

Least threatened because largely excluded from intensive agricultural activities. Target 28%. About 5% statutorily conserved in the Rolfontein, Tussen Die Riviere, Oviston, Gariep Dam, Caledon and Kalkfontein Dam Nature Reserves. In addition, a small patch is also protected in the private Vulture Conservation Area.

About 3% of the area has been lost through building of dams (Bethulie, Egmont, Gariep, Kalkfontein, Vanderkloof and Welbedacht Dams). Erosion moderate (68%), high (20%) and low (10%).

6.5.1.3 Faunal Assessment

Based on the IUCN Red List Spatial Data and AmphibianMap, 13 amphibian species are expected to occur within the area (Appendix B). One (1) is regarded as threatened, the Giant Bullfrog.

Based on the IUCN Red List Spatial Data and the ReptileMAP database, 35 reptile species are expected to occur within the area (Appendix C). None are regarded as threatened.

The IUCN Red List Spatial Data lists 58 mammal species that could be expected to occur within the area (Appendix D). This list excludes large mammal species that are limited to protected areas. Seven (7) of these expected species are regarded as threatened (Table 6-5), one of these have a low likelihood of occurrence based on the lack of suitable habitat and food sources in the project area.

Table 6-5: Threatened mammal species that are expected to occur within the project area.

Species	Common Name	Conservation Status		Likelihood of occurrence
		Regional (SANBI, 2016)	IUCN (2021)	
Eidolon helvum	African Straw-colored Fruit Bat	LC	NT	Low
Felis nigripes	Black-footed Cat	VU	VU	Moderate
Leptailurus serval	Serval	NT	LC	Moderate
Panthera pardus	Leopard	VU	VU	Moderate
Parahyaena brunnea	Brown Hyaena	NT	NT	Moderate
Parotomys littledalei	Littledale's Whistling Rat	NT	LC	Moderate
Poecilogale albinucha	African Striped Weasel	NT	LC	Moderate

6.5.1.4 Field Assessment

6.5.1.4.1 Indigenous Flora

The species composition of the assessment area was consistent with typical Northern Upper Karoo and Besemkaree Koppies Shrubland vegetation types. Distinctive vegetation communities were observed within these vegetation types and can be classified into degraded shrubland, degraded grassland, rocky areas and drainage lines and washes (alluvial shrubland). The plant species recorded is by no means comprehensive, and repeated surveys during different phenological periods not covered, may likely yield up to 30% additional flora species for the project area. However, floristic analysis conducted to date is however regarded as a sound representation of the local flora for the project area.

The degraded Northern Upper Karoo Shrubland floral community was found in the lowland areas and is characterised by dominant dwarf karoo shrubs scattered grasses and occasional large shrubs typical of the Northern Upper Karoo vegetation type.

Plateau vegetation was typical of Besemkaree Koppies Shrubland vegetation was found on the slopes and flat areas at higher elevations on the project site, and is dominated by abundant grasses, dwarf small-leaved shrubs and taller shrubs. The increased structure provided by woody species such as Searsia and Euclea bush clumps as well as scattered rocks offer habitats for a different suite of animal species to those in the lowland plains.

The drainage areas and washes areas are areas where intermittent steams and drains sporadically flow and exists as well as the plains connected to these areas.

Succulents were ubiquitous throughout the assessment area and occurred within all the communities described above. Geophytes were present and occurred 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.

Figure 6-18: Photographs illustrating some of the flora recorded within the assessment area. Clockwise from the top left. *Geigeria filifolia, Ammocharis coranica* (Protected), *Chrysocoma ciliate, Salsola calluna* (Endemic).

6.5.1.4.2 Invasive Alien Plants

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.

No species were recorded within the project area; however, their absence could not be completely discounted. Any species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b. Category 1b species must be controlled by implementing an IAP Management Programme, in compliance of section 75 of the NEMBA, as stated above.

6.5.1.5 Faunal Assessment

Herpetofauna, avifauna and mammal observations and recordings are discussed in the information below.

6.5.1.5.1 Amphibians and Reptiles

One species of reptile was recorded in the project area during survey period, the Karoo girdled lizard. There is the possibility of more species being present, as certain reptile species are secretive and require long-term surveys to ensure capture. However, there is the possibility of more species being present, as certain reptile species are secretive and require long-term surveys to ensure capture. One amphibian species was recorded during the survey period, this was largely due to the season in which the field survey was carried out as well as the fact that no pitfall trapping was done, surveys relied on opportunistic sightings. The only other method utilised was refuge examinations using visual scanning of terrains to record smaller herpetofauna species that often conceal themselves under rocks, in fallen logs, rotten tree stumps, in leaf litter, rodent burrows, ponds, old termite mounds, this method was also not intensively applied in the field.

6.5.1.5.2 Mammals

Five (5) mammal species were observed during the survey of the project area based on either direct observation or the presence of visual tracks and signs (Figure 6-19). None of the species recorded are regarded as SCCs form an international or national perspective but three are protected provincially.

Figure 6-19: From left, Springbuck, Steenbok and Ground Squirrel observed in the project area.

6.5.1.6 Habitat Assessment and Site Ecological Importance

6.5.1.6.1 Habitat Assessment

The main habitat types identified across the project area were initially identified largely based on aerial imagery. These main habitat types were refined based on the field coverage and data collected during the survey; the delineated habitats can be seen in Figure 6-20. Emphasis was placed on limiting timed meander searches along the proposed project area within the natural habitats and therefore habitats with a higher potential of hosting SCC. The habitats observed, coincide with the vegetation types as described by Mucina & Rutherford in 2006 and SANBI (2019) due to the lack of large-scale transformation, these are discussed in detail in the sections that follow. A summary of habitat types delineated within the project area can be seen in Table 6-6

Table 6-6: Summary of habitat types delineated within the project area.

Habitat Type	Description	Ecosystem Processes and Services	Habitat Sensitivity
Lowland Northern Upper Karoo Shrubland	Semi-natural shrubland, but slightly disturbed due to the grazing by livestock, mismanagement and	Provides grazing for livestock. Assists in filtration of water permeating through the soil into drainage lines. Acts as corridor for fauna dispersion within the landscape. Acts as buffer for high sensitivity areas. The unit acts as a refuge which supports	Medium-High

	also human infringement.	viable plant species populations and is also used for foraging by fauna.	
Plateau Besemkaree Koppies Shrubland	Semi-natural shrubland, but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement.	Provides grazing for livestock. Assists in filtration of water permeating through the soil into lower lying and drainage lines. Acts as refuge for fauna away from more accessible areas the landscape. Acts as buffer for high sensitivity areas. The unit acts as a refuge which supports viable plant species populations and is also used for foraging by fauna.	Medium
Rocky Outcrops	Rocky outcrops ridges occurring from higher lying areas, creating inselburgs in the landscape	Refuge area for fauna and flora species and not easily accessible, also bot suitable for development, and is a refuge from fire.	High
Drainage features and washes (Alluvial Shrubland)	Low to no slope with alluvial soils. Channel through which surface water naturally collates and flows. Ephemeral systems were both considered for this habitat type.	Water Paths, functions as important Water resources. Provides refuge and grazing areas, especially during the dry seasons Provides surface water within the landscape. Aids in trapping sediment and nutrients derived from land runoff.	Deep channels (High) Washes (Medium)

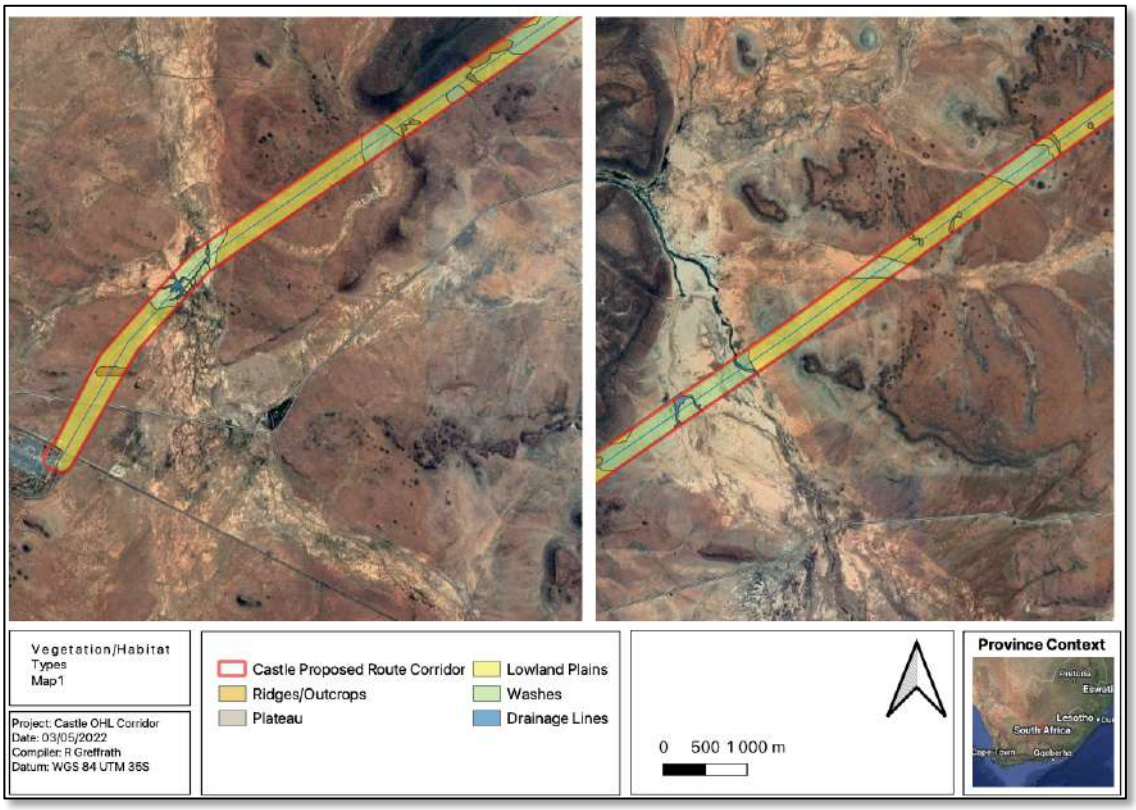


Figure 6-20: Habitats identified in the project area.

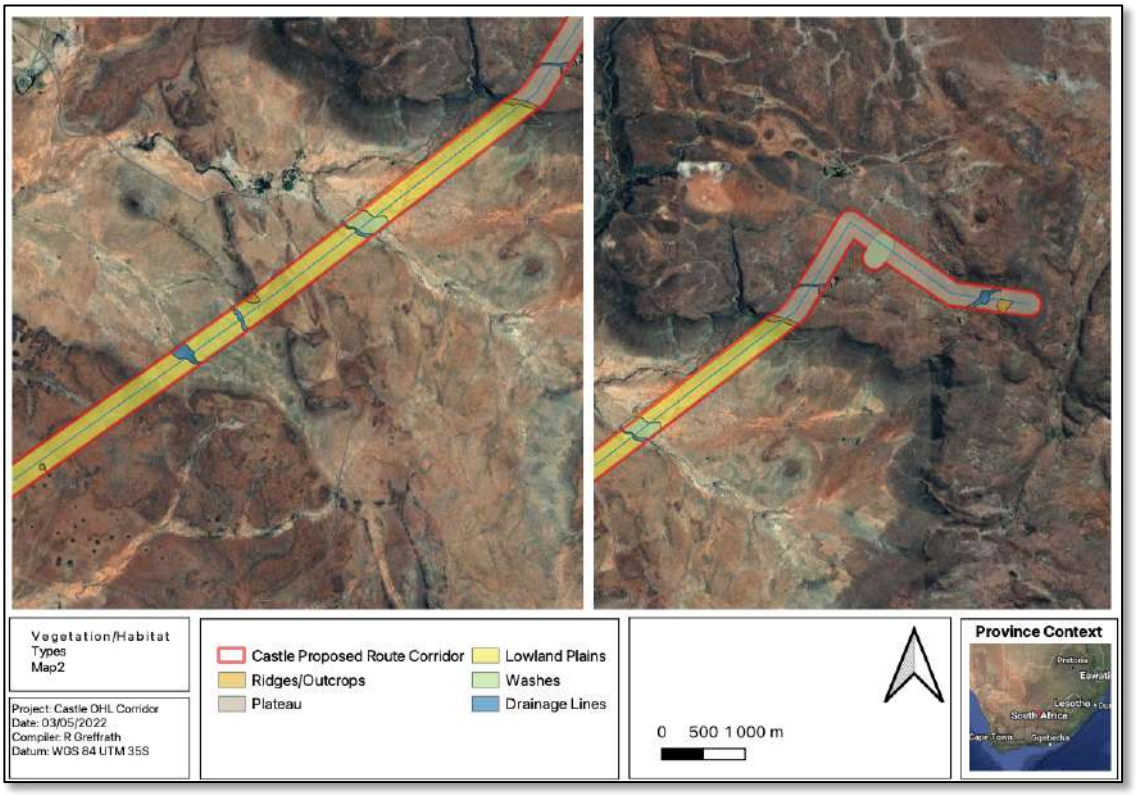


Figure 6-21: Habitats identified in the project area.

A. Lowland Degraded Northern Upper Karoo Shrubland

The lowland areas are dominated by dwarf karoo shrubs scattered grasses and occasional large and was the most widespread and was uniform across the project site, occurring on all the flat plain areas. This habitat type is regarded as semi-natural shrubland, but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement.

Even though this habitat is partly disturbed, it supports largely intact vegetation and has a rehabilitation potential. This habitat type acts as a corridor for fauna dispersion within the landscape as well as a buffer for high sensitivity areas. Its current state is degraded CBA 1, it will however recover if left undisturbed. The unit acts as a refuge which supports viable plant species populations and is also used for foraging by fauna.

Several small wetlands, depressions, temporary pools, vleis and dams are scattered throughout the lowland plains and act as important habitat for numerous species, particularly during the wet season (Figure 6-22). Most of the amphibian species listed in Appendix VII could potentially utilise seasonally inundated areas in these areas. These habitats and microhabitats are widespread in the area and the localised impact associated with the footprint would be negligible if mitigation measures are adhered to.

Figure 6-22: Lowland Degraded Northern Upper Karoo Shrubland, with temporary pool.

B. Plateau Besemkaree Koppies Shrubland

At higher elevations in the northern section of the project area, the slopes and flat areas are dominated by abundant grasses, dwarf small-leaved shrubs and taller shrubs typical of Besemkaree Koppies Shrubland (Figure 6-23). An increase in topological complexity introduces variation in slope and aspect and therefore the available microhabitats for different species. Species such as Grey Rhebok (Near Threatened) and Greater Kudu show preference for these areas, and the scattered rocks provide refuge for many of the species. These habitats and microhabitats are widespread in the area and the localised impact associated with the footprint would be negligible if mitigation measures are adhered to.

Figure 6-23: Plateau Besemkaree Koppies Shrubland.

C. Rocky Outcrops

Cliffs and rocky outcrops are associated areas where bedrock is exposed or where high lying cliffs are not as easily weathered as the surrounding areas (Figure 6-24). They are characterised by the presence of boulders and loose rocks with an open canopy of medium to tall woody shrubs above a sparse layer of grasses. These features provide potential habitat for animals such as Cape Elephant Shrew, Eastern Rock Elephant Shrew, Round-Eared Elephant Shrew, Spectacled Dormouse, Hewitt's Red Rock Hare, Western Rock Elephant Shrew, Cape Dassie, Southern Rock Agama, Western Rock Skink, Karoo Girdled Lizard and Common Banded Gecko amongst others. These habitats and microhabitats are widespread in the area and the localised impact associated with the footprint would be negligible if mitigation measures are adhered to.

Figure 6-24: Rocky Outcrops/Ridges.

D. Drainage features and washes (Alluvial Shrubland)

The project site includes several drainage areas where water is channelled during rainfall events and includes areas with woody shrubs, grass cover, bare areas and erosion gulley's. The drainage lines provide habitat for many animals in such an arid landscape as they provide refuge, shelter and food for extended periods. This habitat is found in areas where intermittent rivers sporadically flow and exists as well as the drainage flats/floodplains connected to these areas. This habitat is shrubland that has been disturbed mainly by the historic and current grazing (Figure 6-26 and Figure 6-25). This habitat type is regarded as semi-natural shrubland, but slightly disturbed due to the grazing by livestock the associated human infringement and use (roads). Current human infringement still occurs throughout, especially in areas close to roads. The current ecological condition of this habitat regarding the main driving forces, are intact, which is evident in the amount of the species recorded in the flora and faunal assessment.

Drainage lines with deeper, looser soils are considered to have a higher sensitivity than those on shallow soils. The areas in and adjacent to drainage lines is particularly important for important species listed above such as Springhare, Black-footed Cat, Giant Bullfrog and potentially Riverine Rabbit. Small farm dams are scattered around the project site and together with various erosion control berms provide additional habitat for species. These habitats are susceptible to impacts associated with erosion and the invasion of alien plant species.

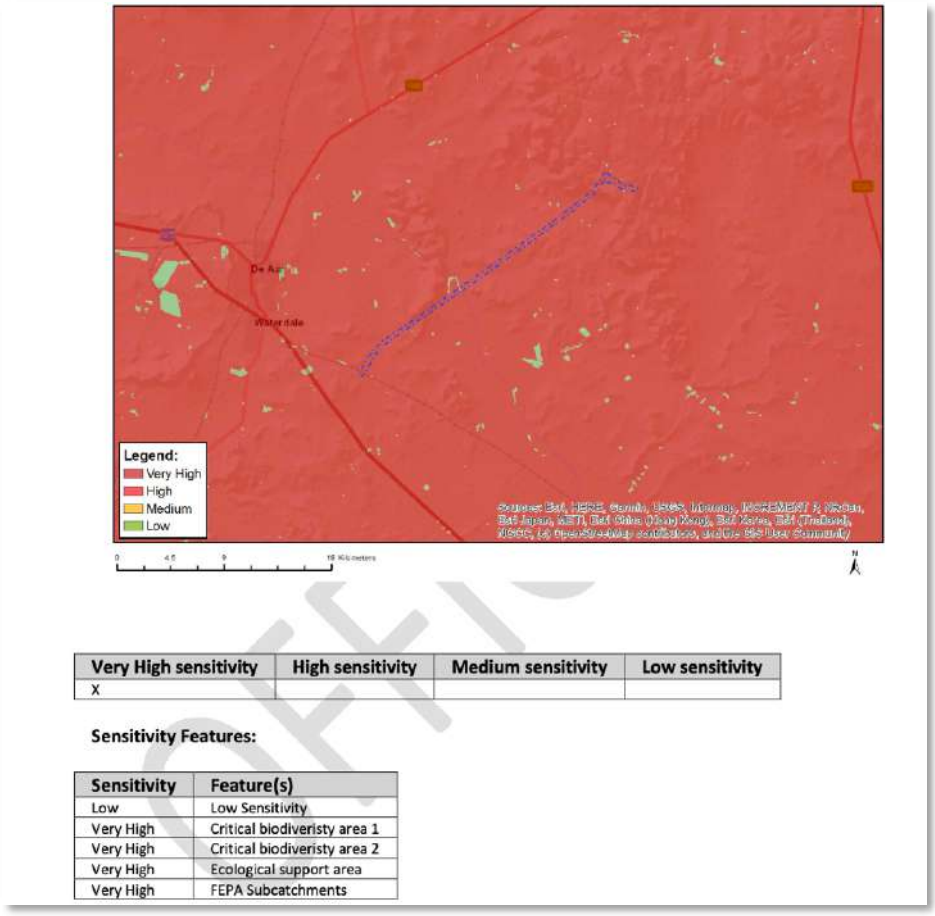
The drainage lines and within the project area can be regarded as non-perennial and possess surface flow only briefly during and following a period of rainfall (ephemeral), which is a feature of semi-arid/arid regions. These seasonal streams create an ecological link between the stream and its surrounding terrestrial landscape and has the same function albeit on a smaller scale than a river. These habitats, jointly, 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.

Figure 6-25: Stream/drainage feature.

Figure 6-26: Washes (Alluvial shrubland).

6.5.2 Site Sensitivity

The biodiversity theme sensitivity, as indicated in the screening report, was derived to be Very High, mainly due to the project area being within an CBA 1, ESA and a FEPA sub-catchment (Figure 6-27).



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	FEPA Subcatchments

Figure 6-27: Terrestrial Biodiversity Theme Sensitivity, National Web based Environmental Screening Tool.

The location and extent of these habitats are illustrated in Figure 6-20. All habitats within the assessment area of the proposed project were allocated a sensitivity category (Table 6-7). The sensitivities of the habitat types delineated are illustrated in Figure 6-28. 'Very High-High Sensitivity' areas are due to the following and the guidelines can be seen in Table 6-8:

- CBA1;
- CBA2
- FEPA sub catchment;
- Ecological Support Area
- Threatened/Protected flora and fauna species were abundant and ubiquitous within the assessment area; and
- A high richness of protected fauna species was present within the assessment area.

Table 6-7: SEI Summary of habitat types delineated within field assessment area of project area.

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Lowland Northern Upper Karoo Shrubland	Low	Medium	Low	Medium	Low
Plateau Besemkaree Koppies Shrubland	Low	Medium	Low	Medium	Low
Rocky Outcrops	Medium	High	Medium	Low	High
Drainage features washes	Low	High	Medium	Medium	Medium
Drainage features deep channels	Medium	High	High	Low	High

Table 6-8: Guidelines for interpreting Site Ecological Importance in the context of the proposed development activities.

Site Ecological Importance	Interpretation in relation to proposed development activities
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.

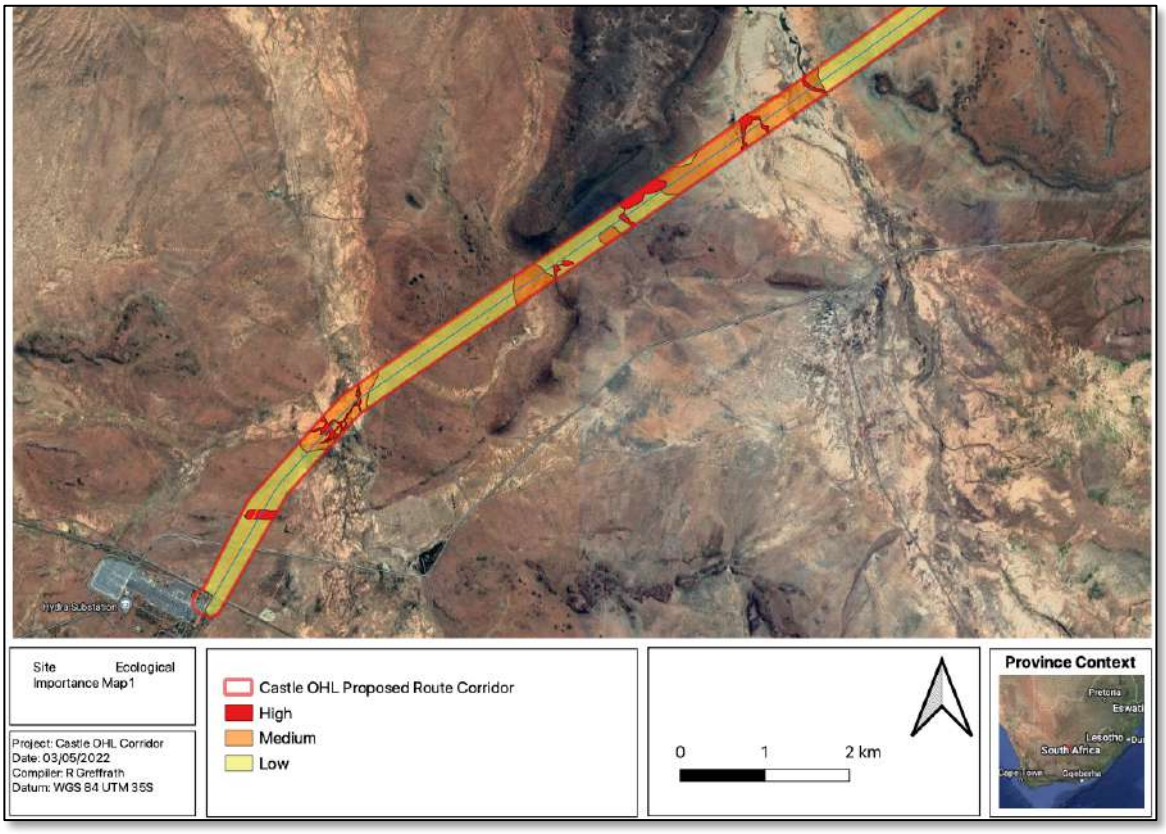


Figure 6-28: Project Area SEI (Part 1).

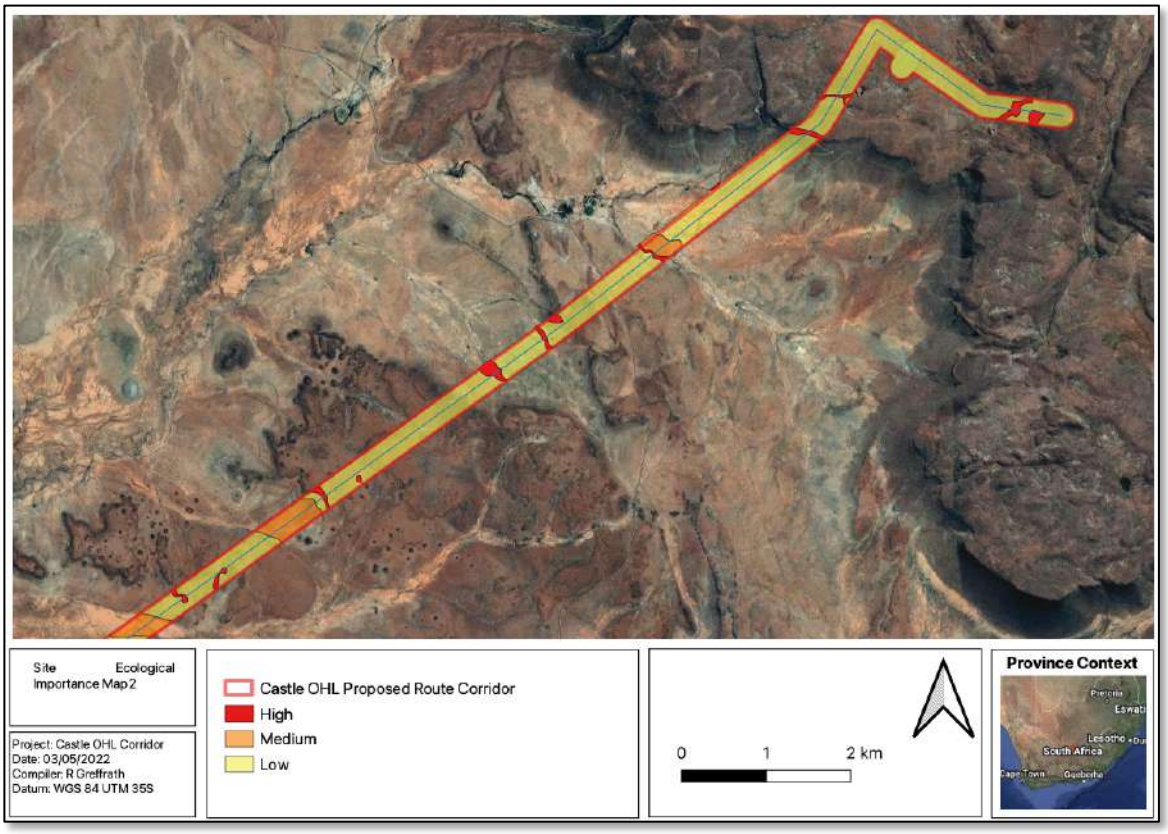


Figure 6-29: Project Area SEI (Part 2).

6.5.3 Impact assessment

6.5.3.1 Construction Phase

The following potential main impacts on the biodiversity (based on the framework above) were considered for the construction phase of the proposed development. This phase refers to the period during construction when the proposed features are constructed; and is considered to have the largest direct impact on biodiversity. The following potential impacts to terrestrial biodiversity were considered:

- Destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community (Table 6-9);
- Introduction of alien species, especially plants (Table 6-10);
- Destruction of protected plant species (Table 6-11); and
- Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching) (Table 6-12).

Table 6-9: Impacts to biodiversity associated with the proposed construction phase: Destruction, loss and fragmentation of the of habitats, ecosystems and vegetation community.

No.	1			
Project phase	**Construction**			
Impact title	Habitat and Vegetation destruction			
Impact description	Destruction, loss and fragmentation of the of habitats, ecosystems and vegetation community			
Impact Assessment	**Impact not mitigated**		**Impact mitigated**	
Nature	**Negative**		**Negative**	
Extent	**Local**	Extending across the site and to nearby settlements.	**Limited**	Limited to the site and its immediate surroundings.
Duration	**Long term**	Impact will last between 6 and 25 years.	**Short term**	Impact will last less than 1 year.
Intensity	**High**	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	**Low**	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	**High - negative**		**Low - negative**	
Probability	**Very likely (>90%)**	There are sound reasons that the impact will occur.	**Unlikely (>33%)**	The impacts occurrence is rare but has happened before.
Significance	**Major - negative**		**Minimal - negative**	
Importance	**Moderate**	Moderate	**Moderate**	Moderate
Consequence	**Moderately-detrimental**		**Very slightly-detrimental**	
Confidence	**Well established**		**Established, but incomplete**	
Reversibility	**Medium**	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	**High**	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 Biodiversity Management Plan (BMP) of specialist report also included in EMPr.			
Comment on ratings				

Table 6-10: Impacts to biodiversity associated with the proposed construction phase: AIP Introduction.

No.	2			
Project phase	Construction			
Impact title	AIP Introduction			
Impact description	Introduction of alien species, especially plants			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
Duration	Permanent	Impact may be permanent, or in excess of 25 years.	Temporary	Impact will last less than 1 month.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Very low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are not affected.
Magnitude	High - negative		Very low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Major - negative		Minimal - negative	
Importance	High	High	High	High
Consequence	Highly-detrimental		Very slightly-detrimental	
Confidence	Well established		Inconclusive	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.			
Comment on ratings				

Table 6-11: Impacts to biodiversity associated with the proposed construction phase: SCC destruction.

No.	3			
Project phase	Construction			
Impact title	SCC destruction			
Impact description	Destruction of protected plant species			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
Duration	Long term	Impact will last between 6 and 25 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	High - negative		Low - negative	

Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.
Significance	Major - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Highly-detrimental		Very slightly-detrimental	
Confidence	Well established		Deficient	
Reversibility	Low	The affected environment may not be able to recover from the impact - permanently modified.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.			
Comment on ratings				

Table 6-12: Impacts to biodiversity associated with the proposed construction phase: **Fauna species.**

No.	4			
Project phase	Construction			
Impact title	Fauna species			
Impact description	Displacement of faunal community due to habitat loss, direct mortalities and disturbance (road collisions, noise, dust, vibration and poaching			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
Duration	Long term	Impact will last between 6 and 25 years.	Temporary	Impact will last less than 1 month.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	High - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.
Significance	Moderate - negative		Minimal - negative	
Importance	Moderate	Moderate	Low	Low
Consequence	Slightly-detrimental		Very slightly-detrimental	
Confidence	Well established		Inconclusive	
Reversibility	Low	The affected environment may not be able to recover from the impact - permanently modified.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.			
Comment on ratings				

6.5.3.2 Operational Phase

The operational phase of the impact of daily activities is anticipated to further spread the IAP, as well as the deterioration of the habitats due to the increase of dust and edge effect impacts. Dust reduces the ability of plants to photosynthesize and thus leads to degradation/retrogression of the veld. Moving vehicles do not only cause sensory disturbances to fauna, affecting their life cycles and movement, but will lead to direct mortalities due to collisions. The following potential impacts were considered:

- Continued fragmentation and degradation of habitats and ecosystems (Table 6-13);
- Spread of alien and/or invasive species (Table 6-14);
- Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration) (Table 6-15); and
- Avifaunal SCC mortality.

Table 6-13: Impacts to biodiversity associated with the proposed operational phase: Habitat and Vegetation destruction.

No.	5			
Project phase	**Operation**			
Impact title	Habitat and Vegetation destruction			
Impact description	Continued fragmentation and degradation of habitats and ecosystems			
Impact Assessment	**Impact not mitigated**		**Impact mitigated**	
Nature	**Negative**		**Negative**	
Extent	**Regional**	Impacts manifest at a regional / municipal level.	**Limited**	Limited to the site and its immediate surroundings.
Duration	**Permanent**	Impact may be permanent, or in excess of 25 years.	**Short term**	Impact will last less than 1 year.
Intensity	**High**	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	**Low**	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	**High - negative**		**Low - negative**	
Probability	**Very likely (>90%)**	There are sound reasons that the impact will occur.	**Unlikely (>33%)**	The impacts occurrence is rare but has happened before.
Significance	**Major - negative**		**Minimal - negative**	
Importance	**Moderate**	Moderate	**Moderate**	Moderate
Consequence	**Moderately-detrimental**		**Very slightly-detrimental**	
Confidence	**Well established**		**Established, but incomplete**	
Reversibility	**Medium**	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	**High**	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.			
Comment on ratings				

Table 6-14: Impacts to biodiversity associated with the proposed operational phase: **AIP infestation.**

No.	6			
Project phase	Operation			
Impact title	AIP infestation			
Impact description	Spread of alien and/or invasive species			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
Duration	Permanent	Impact may be permanent, or in excess of 25 years.	Temporary	Impact will last less than 1 month.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Very low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are not affected.
Magnitude	High - negative		Very low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Major - negative		Minimal - negative	
Importance	High	High	High	High
Consequence	Highly-detrimental		Very slightly-detrimental	
Confidence	Well established		Inconclusive	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.			
Comment on ratings				

Table 6-15: Impacts to biodiversity associated with the proposed operational phase: **Fauna Communities.**

No.	7			
Project phase	Operation			
Impact title	Fauna Communities			
Impact description	Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Limited	Limited to the site and its immediate surroundings.
Duration	Long term	Impact will last between 6 and 25 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.

Magnitude	High - negative		Low - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.
Significance	Major - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Highly-detrimental		Very slightly-detrimental	
Confidence	Well established		Deficient	
Reversibility	Low	The affected environment may not be able to recover from the impact - permanently modified.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.			
Comment on ratings				

Table 6-16: Impacts to biodiversity associated with the proposed operational phase: **Avifaunal SCC.**

No.	8			
Project phase	Operation			
Impact title	Avifaunal SCC			
Impact description	Avifaunal SCC Mortality			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	National	Impacts manifest at a national level / provincial.	National	Impacts manifest at a national level / provincial.
Duration	Permanent	Impact may be permanent, or in excess of 25 years.	Permanent	Impact may be permanent, or in excess of 25 years.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.
Magnitude	Very high - negative		Very high - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Very likely (>90%)	There are sound reasons that the impact will occur.
Significance	Severe - negative		Severe - negative	
Importance	High	High	High	High
Consequence	Highly-detrimental		Highly-detrimental	
Confidence	Virtually certain		Virtually certain	
Reversibility	Low	The affected environment may not be able to recover from the impact - permanently modified.		
Mitigatability	Low	Mitigation does not exist; or mitigation may only slightly reduce the significance of impacts.		
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.			
Comment on ratings	Avifaunal SCC impacts cannot be mitigated and mortalities will occur			

6.5.3.3 Cumulative impacts Phase

Cumulative impacts are assessed in context of the extent of the proposed project area; other developments in the area; and general habitat loss and transformation resulting from other activities in the area.

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 like 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 fauna and flora.

Localised cumulative impacts include the cumulative effects from operations that are close enough to potentially cause additive effects on the environment or sensitive receivers (such as nearby wind farm with associated roads within the area). These include dust deposition, noise and vibration, disruption of corridors or habitat, groundwater drawdown, groundwater and surface water quality, and transport.

Long-term cumulative impacts due to extensive powerline corridors already established as well as the OHL corridor footprint and associated roads can lead to the loss of endemic species and threatened species, loss of habitat and vegetation types and even degradation of sensitive areas.

Table 6-17: Cumulative Impacts to biodiversity associated with the proposed project.

No.	10			
Project phase	**Construction & Decommissioning**			
Impact title	Cumulative Impacts			
Impact description	Cumulative impacts on Biodiversity			
Impact Assessment	**Impact not mitigated**		**Impact mitigated**	
Nature	**Negative**		**Negative**	
Extent	**Regional**	Impacts manifest at a regional / municipal level.	**Local**	Extending across the site and to nearby settlements.
Duration	**Long term**	Impact will last between 6 and 25 years.	**Long term**	Impact will last between 6 and 25 years.
Intensity	**High**	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	**High**	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.
Magnitude	**High - negative**		**High - negative**	
Probability	**Likely (>66%)**	The impact may occur, but not necessarily proof that it will.	**Likely (>66%)**	The impact may occur, but not necessarily proof that it will.
Significance	**Moderate - negative**		**Moderate - negative**	
Importance	**High**	High	**High**	High
Consequence	**Moderately-detrimental**		**Moderately-detrimental**	
Confidence	**Virtually certain**		**Virtually certain**	

Reversibility	**Medium**	The affected environment may only recover from the impact with significant intervention or over long time period.
Mitigatability	**Medium**	Mitigation exists and may notably reduce significance of impacts.
Potential mitigation	See Section 7.1.7 BMP of specialist report also included in EMPr.	
Comment on ratings	None.	

6.5.4 Conclusion and Recommendations

The completion of a comprehensive desktop study, in conjunction with the results from the field survey, suggest there is a good confidence in the information provided. The survey ensured that there was a suitable groundtruth coverage of the assessment area and most habitats and ecosystems were assessed to obtain a general species (fauna and flora) overview and the major current impacts were observed. The conservation status is classified as Least Concern albeit the protection level is regarded as 'Not Protected' Ecosystem. Moreover, the proposed activity overlaps with an CBA 1, CBA2, IBA and an ecological support area.

The current layout overlaps within sensitive habitats and other areas of high biodiversity potential. Portions of the current expected corridor of the development would be considered to have a significant and high negative impact as it would directly affect the habitat of threatened/protected plant species and expected listed faunal species that use these ecosystems;

- The assessment area possesses a high diversity and density of protected flora species. Moreover, protected fauna are ubiquitous within the assessment area and surrounding landscape.

The developer is urged to alter the layout or design which represents a compromise between the needs of the development and the environmental concerns at the site, especially in regard to the high sensitivity areas.

Historically, overgrazing from livestock (Sheep and cattle) and mismanagement has led to the deterioration these habits. However, the 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 the landscape.

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 the local landscape, not to mention the sensitivity according to various ecological datasets.

Development within confirmed CBA areas is not considered favourably by the regulating authorities, and implementation of the mitigation hierarchy must be demonstrated. This must include concerted efforts to avoid these high sensitive areas. Development of the corridor is not considered a destructive development and may be permitted within High sensitivity area, if pylons are placed with care. Development in High sensitivity areas must demonstrate avoidance mitigation, and offset mitigation may be further required. Development of the corridor and associated infrastructure must avoid the High sensitivity area, and disturbances to the medium sensitivity area must be kept to a minimum. The high sensitivity terrestrial areas still:

- Serve as and represent CBA1 and CBA2 as per the Conservation Plan;
- Supports and protects fauna and flora (including protected and threatened species); 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. Any development on the High sensitivity areas will lead the direct destruction and loss of portions of functional CBA1 and CBA2, and 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.

It's the specialist opinion that existing corridors should be used instead of establishing new ones. This will not only result in a less significant environmental and cumulative impact but will most likely save money due to already existing roads.

The following recommendations should be considered for the authorisation:

- The High sensitivity area should be avoided as much is feasible, but the OHL can span these systems.

6.6 Aquatic Ecology

Ecologist, Dr Brian Colloty, completed an Aquatic Impact Assessment for the proposed Castle to Hydra OHL. Key findings concluded that the proposed alignment seems to have limited impact on the aquatic environment as for the most part the final placement of the towers could avoid the delineated wetlands and potentially span watercourses. It has however been assumed that due to the width of some of the broader alluvial systems, towers will need to be placed within these systems, but this would have little impact on these systems, especially if no new permanent access tracks are created within these areas.

A summary of the of the findings on aquatic ecology are provided below. The Aquatic Impact Assessment Report is attached as Annexure D3.

6.6.1 Baseline Description

The proposed connection corridor only occurs within the D62D quaternary catchment of the Brak River, in the Nama Karoo Ecoregion (Figure 6-30). Thus, permanent rivers and wetlands are limited mostly to mainstem rivers such as those observed within the study area, typically only flow during extended periods of rainfall.

The study region is further characterised by Northern Upper Karoo (Nku3) vegetation and to a limited degree Besemkaree Koppies Shrubland (Gh4). This is due to the limited annual rainfall (ca. 190 – 400 mm/a), while the regional geomorphology is dominated by flat pediplain areas and hills with rocky outcrops.

The geology is mostly Dwyka / Ecca shales overlaid with shallow sandy soils that drain well. This typically allows for the development of broad alluvial floodplains, interspersed by the rocky inselbergs and small mountain ranges observed. These features thus concentrate flows into the lower portions of the catchment, and have allowed for the development of *Juncus rigidus* dominated wetlands in some areas. Both channelled and unchanneled valley bottom wetland types were observed within the region, but only one such area is located within 500m of the proposed alignment.

The National Wetland Inventory v5.2 spatial data (NWI), also indicated a Pan / depression, located more than 2km from the edge of the study area. However, the large-scale riverine floodplain was confirmed to be alluvial systems, and not wetlands as indicated in the NWI, (Figure 6-31).

Overall, these catchment and subsequent rivers / watercourses and wetlands are largely in a natural state. Current impacts occur in localised areas and include the following:

- Erosion due small road crossings and tracks;
- Grazing; and
- Farm dams.

In terms of the National Freshwater Ecosystems Priority Areas (NFEPA) assessment (Figure 6-32), all the watercourses within the site have been assigned a condition score of B (Nel et al. 2011), indicating that they are largely intact and of biological significance.

The National Freshwater Ecosystems Priority Areas (NFEPA) (Nel et al., 2011), also earmarked sub-quaternaries, based either on the presence of important biota (e.g. rare or endemic fish species) or conversely the degree of riverine degradation, i.e. the greater the catchment degradation the lower

the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas (FEPAs). The survey area falls within an Upstream FEPA, associated with the Brak River, although no permanent fish habitat occurs within the proposed site, this catchment is important for the provision and maintenance of flows within the lower catchments, that do contain important, fish, amphibian and invertebrate habitats with permanent water (Figure 6-32).

This report also indicates the significant watercourses and wetlands delineated within the study area (Figure 6-33) inclusive of the calculated 48m buffers. Any activities within these areas and or the 500m regulated zone will require a Water Use license (possible General Authorisation) under Section 21 c & i of the National Water Act (Act 36 of 1998). The respective Water Use Licenses must be finalised once the preferred alignment has been determined and the final tower / pylon positions are known and especially if any access tracks will need to cross these areas, but it is advised that the watercourse and wetlands areas are avoided.

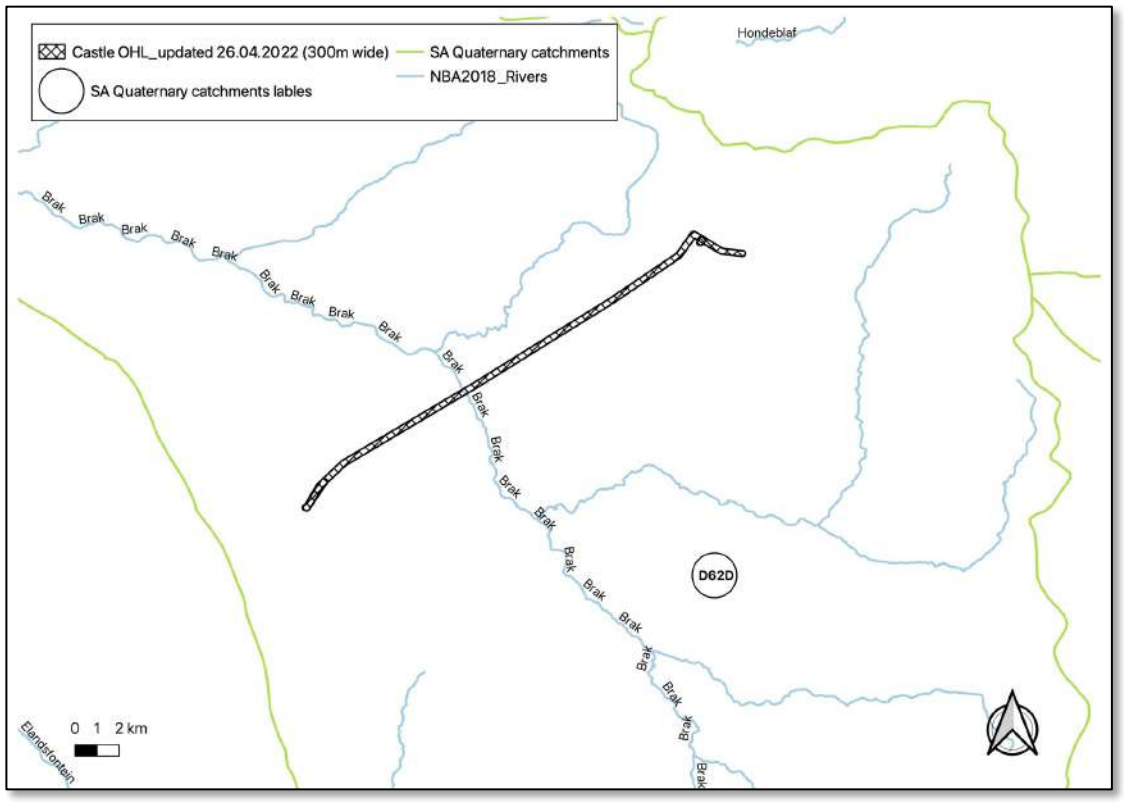


Figure 6-30: Project locality map indicating the various quaternary catchment boundaries (green line) in relation to the study area (Source DHSWS and NGI).

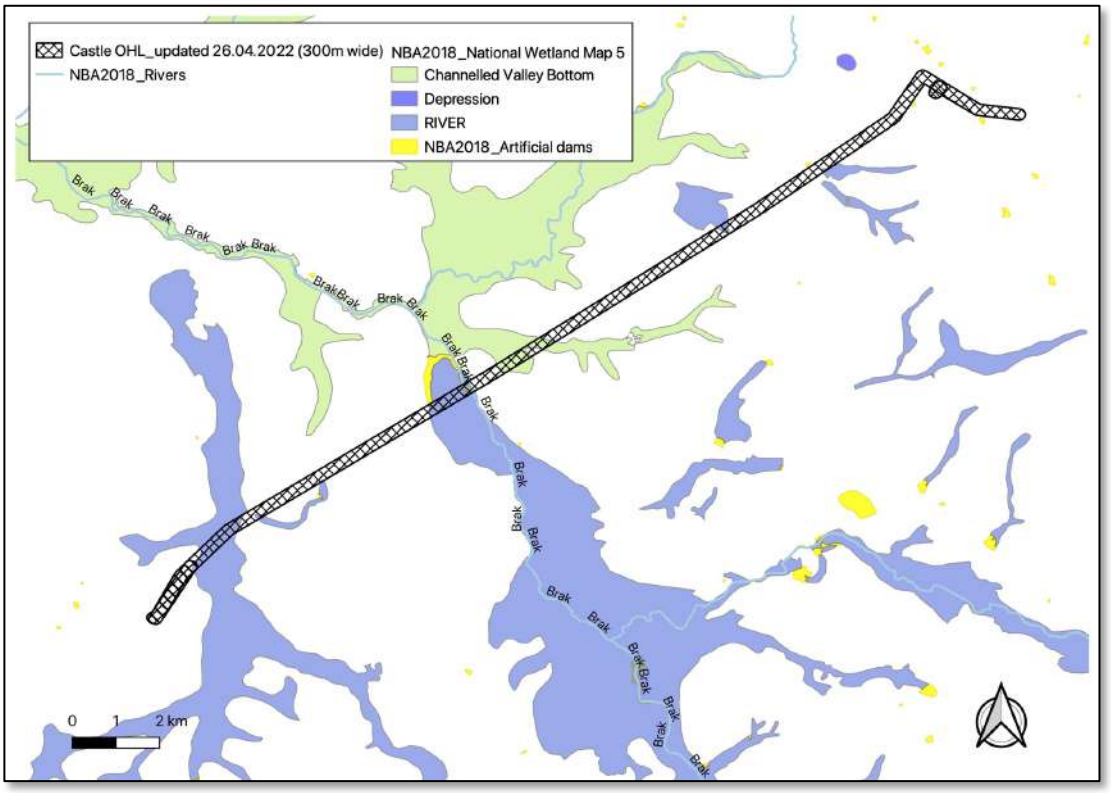


Figure 6-31: Various waterbodies identified in the National Wetland Inventory V5.2 (2020) based on 2007 land cover data.

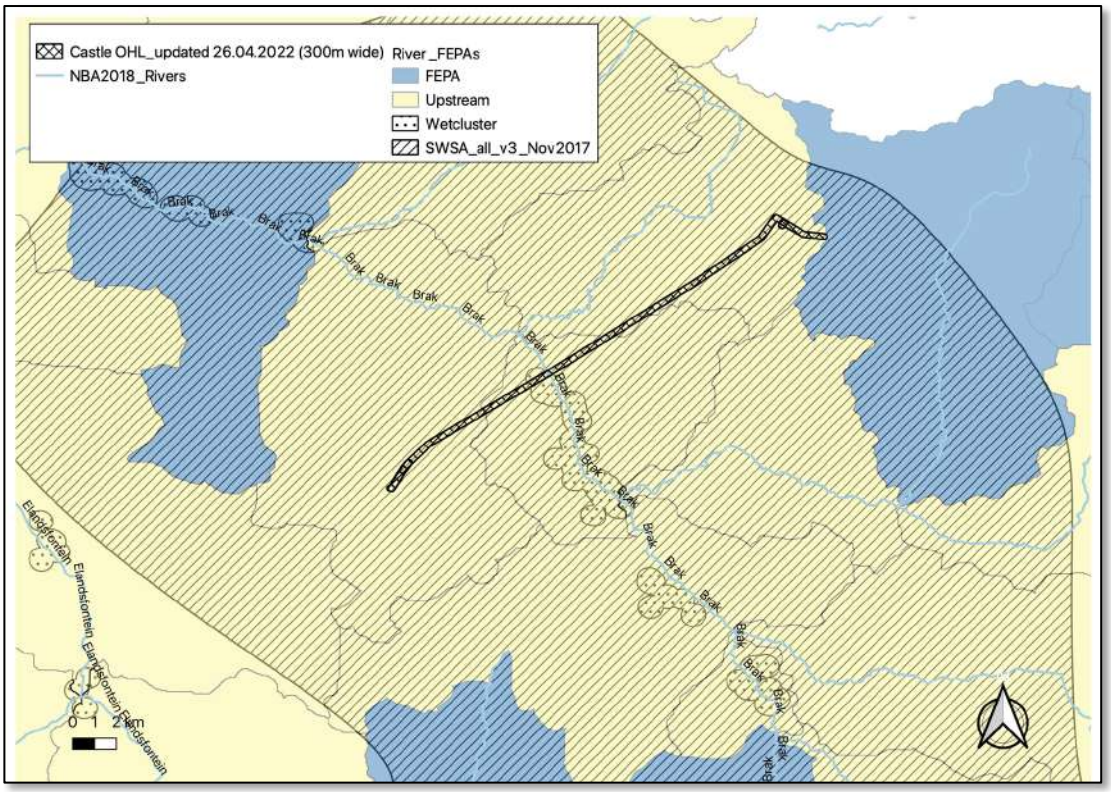


Figure 6-32: The respective Subquaternary catchments rated in terms of Freshwater Ecosystem Priority Areas (FEPAs) in relation to the study area.

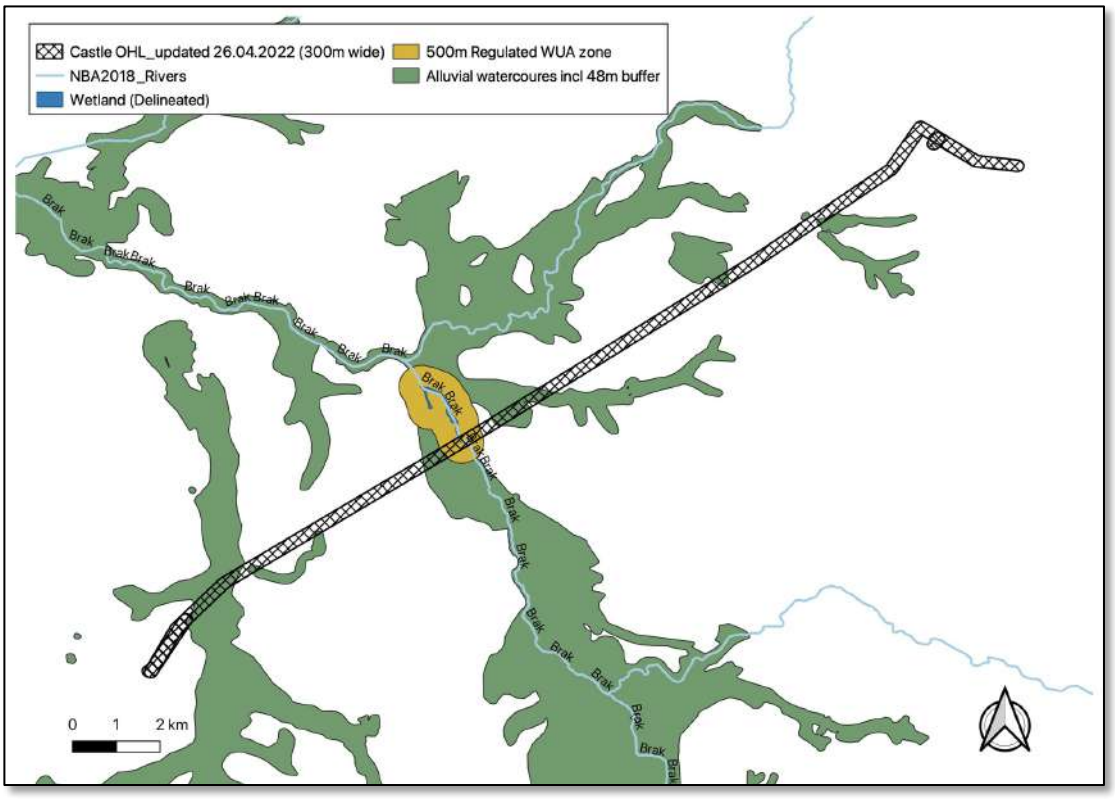


Figure 6-33: The confirmed watercourses and wetlands within the study area, inclusive of the respective buffers and the 500m Section 21c&i regulated water use zone.

6.6.2 Site Sensitivity

Government Notice No. 645, dated 10 May 2019, includes the requirement that an Initial Site Sensitivity Verification Report must be produced for a development footprint. As per Part 1, Section 2.3, the outcome of the Initial Site Verification must be recorded in the form of a report that-

a. Confirms or disputes the current use of the land and environmental sensitivity as identified by the national web based environmental screening tool;

b. Contains a motivation and evidence of either the verified or different use of the land and environmental sensitivity; and

c. Is submitted together with the relevant reports prepared in accordance with the requirements of the Environmental Impact Assessment Regulations.

This report has been produced specifically to consider the aquatic ecology theme and addresses the content requirements of (a) and (b) above. The report will be appended to the respective specialist study included in the Basic Assessment Report produced for the project.

Site sensitivity based on the aquatic biodiversity theme included in the Screening Tool and specialist assessment

Based on the DFFE Screening Tool, the Grid Connection falls within an area of very high sensitivity (Figure 6-34).

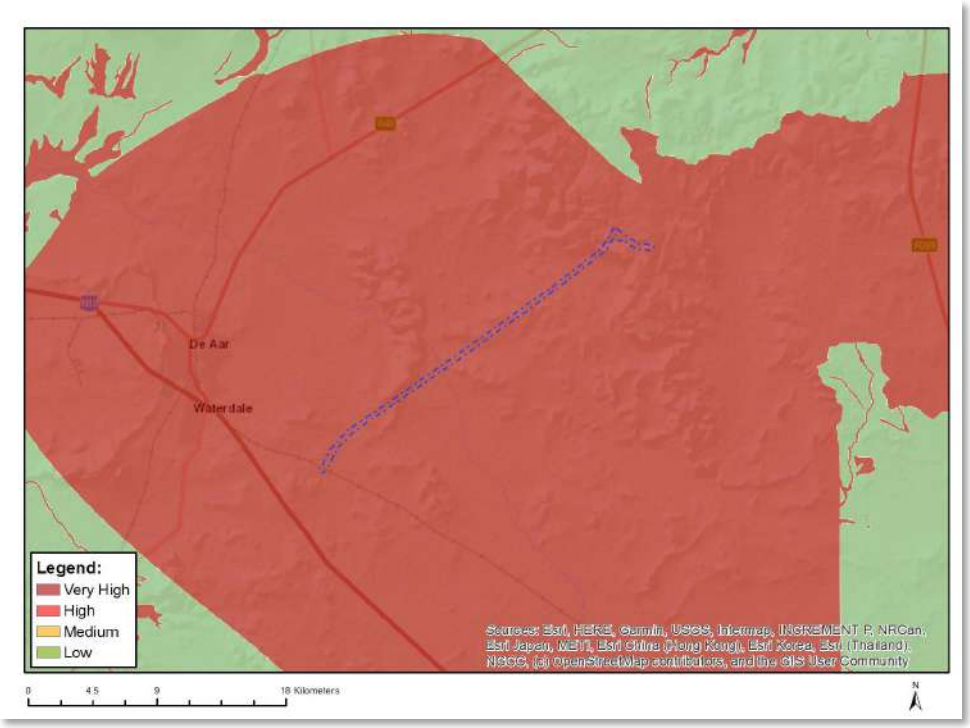


Figure 6-34: DFFE Screening Tool outcome for the aquatic biodiversity theme for the Grid Connection.

Based on the above outcomes, the specialist agrees the environmental sensitivities identified on site. However, disputes the exact extent of the systems, as the Screening Tool shows a catchment wide representation of the aquatic waterbodies that were rated as sensitive.

The specialist findings were informed by site visits undertaken by Dr Brian Colloty over the course of several years. The photos below show the various aquatic features present on site. This information was then compared to current wetland inventories, 1: 50 000 topocadastral surveys mapping and the site. A baseline map was then developed which was refined, noting that due to the complex of the topography and geology, some of the river lines were digitised at a scale of 1:2000.

Figure 6-35: A view of a typical riverine floodplain, dominated by *Vachellia karroo.*

Figure 6-36: A view of channelled valley bottom wetland colonised by Juncus rigidus more than 1 km from any of the proposed corridors.

Figure 6-37: Unchanneled valley bottom wetland, dominated by Juncus rigidus sedge within 500m of the transmission line corridor.

Figure 6-38: Several man-made dams are located within the study area and are not considered wetland areas.

Figure 6-33 below shows the sensitivity map produced following the desktop assessment as well as a groundtruthing exercises. The PES of a river, watercourse or wetland represents the extent to which it has changed from the reference or near pristine condition (Category A) towards a highly

impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E).

The Present Ecological State scores (PES) for the main watercourses in the study area were rated as follows (DHSWS, 2014 – where B = Largely Natural and C = Moderately Modified):

Subquaternary Catchment Number	Present Ecological State	Ecological Importance	Ecological Sensitivity
5332	B	Low	Low
5391	C	Moderate	Low

These scores were substantiated by observations made in the field within the study area, and due to the overall lack of impacts or disturbance these scores for each of the watercourses within the site should be upheld. This was further substantiated by the inclusion of study area catchments into Critical Biodiversity Areas (Type 1 and 2), i.e. the wetland areas near the alignment crossing the Brak River in particular and Ecological Support Area as shown in the Northern Cape CBA MAP spatial data and Wetland Clusters (Figure 6-39).

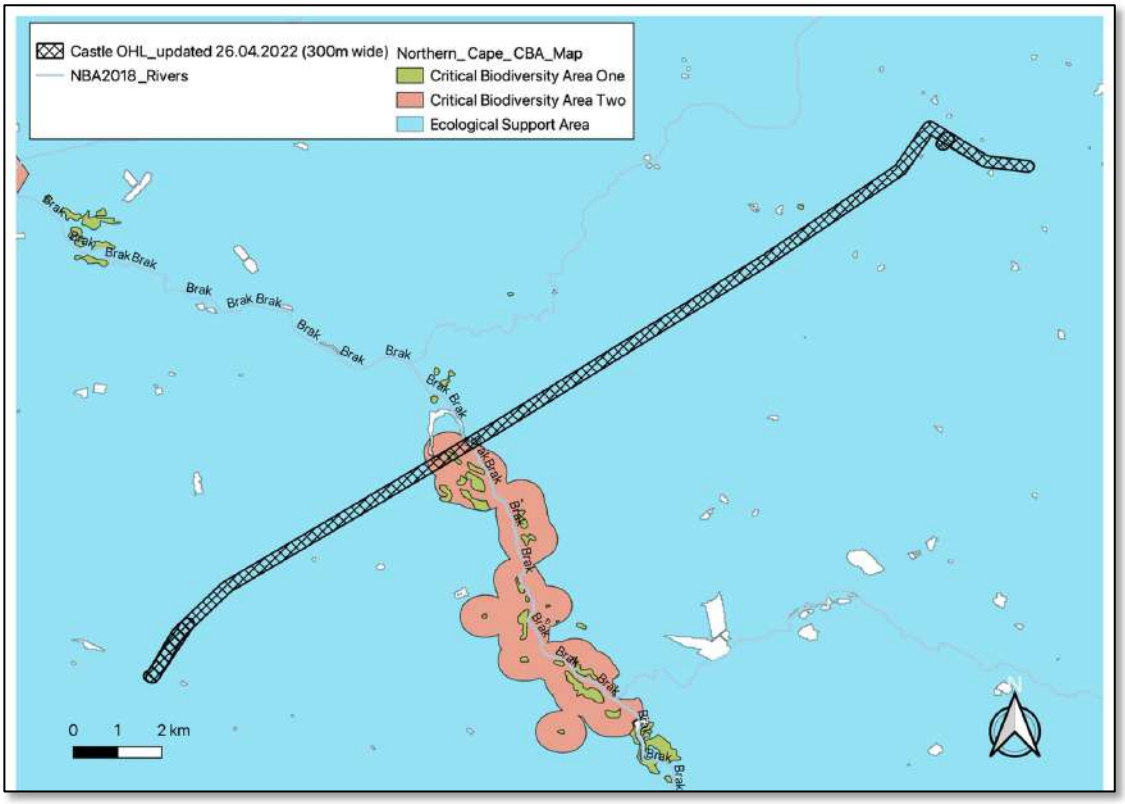


Figure 6-39: Critical Biodiversity Areas as per the Northern Cape Critical Biodiversity Map.

In conclusion, the DFFE Screening Tool identified one sensitivity rating within the development footprint, namely, very high. Although there is some overlap with the findings on site and the Screening Tool's outcome, the development footprint contains various sensitivities (very high and low) that were identified following the undertaking of several site visits and spatial input considerations.

The environmental sensitivity input received from the aquatic ecology specialist has been taken forward and considered within the formal EA process and the impact to these areas assessed. Appropriate layout and development restrictions will be implemented within the development footprint to ensure that the impact to aquatic ecology is deemed acceptable by the aquatic ecologist.

6.6.3 Impact assessment

During the impact assessment several potential key issues / impacts were identified and these were assessed based on the methodology supplied by Arcus.

The following impacts were not assessed as these were found not applicable:

- Loss of species of special concern – no listed or protected aquatic species were found during the assessment
- Loss of any wetlands – the only natural wetland observed could be avoided by the strategic placement of towers and no new road crossing must be allowed inclusive of the buffer – access can be gained from access roads to the upstream dam.

The following direct impacts were assessed with regard:

- Impact 1: Loss of riparian systems and the disturbance of the alluvial watercourses in the construction and decommissioning phases
- Impact 2: Impact on aquatic systems through the possible increase in surface water runoff on riparian/wetland form and function during the operational phase
- Impact 3: Increase in sedimentation and erosion in the construction, operational and decommissioning phases
- Impact 4: Potential impact on localised surface water quality during the construction and decommissioning phases
- Impact 5: The No-go Alternative
- Impact 6: Cumulative impacts for the overall project due to the high number of projects surrounding this application

Table 6-18: Loss of riparian system and disturbance of the alluvial watercourses in the construction, operational and decommissioning phases.

No.	1	Alternative 1
Project phase	Construction, Operation & Decommissioning	
Impact title	Loss of riparian system and disturbance of the alluvial watercourses in the construction, operational and decommissioning phases	
Impact description	Should any of the proposed structures associated with the transmission line be placed within the delineated watercourse, a physical loss of associated vegetation as well damage to the bed and banks of the observed systems could occur. Although true aquatic obligate vegetation was seldom seen, any disturbance of these areas could result in disturbance of the systems resulting in erosion / sedimentation, loss of habitat and corridor (Ecological Support Area) fragmentation. These disturbances will be the greatest during the construction and again in the decommissioning phases as the related disturbances could result in loss and/or damaged vegetation, while to a lesser degree in the operation phase (i.e. as and when maintenance occurs).	
Impact Assessment	Impact not mitigated	Impact mitigated
Nature	Negative	Negative

Extent	Local	Extending across the site and to nearby settlements.	Limited	Limited to the site and its immediate surroundings.
Duration	Medium term	Impact will last between 1 and 5 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.
Magnitude	Moderate - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Moderate - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	*Mitigation measures to reduce residual risk or enhance opportunities:* *- A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final tower layout as required.* *- The layout planning has taken cognisance of the sensitivity layer as shown in Figure 7, to avoid these areas (towers) or where access is required, cross such areas using existing tracks / roads or where the impacts would be low or can easily be mitigated.* *- Due to the broad nature of the alluvial systems, towers would need to the placed in some of these areas, but it is recommended that no new permanent tracks to access these areas are created.* *- Vegetation clearing where required should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.* *- It is also advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas within aquatic environment, using selected species detailed in this report.* *- All alien plant re-growth, which is currently low within the greater region must be monitored and should it occur, these plants must be eradicated within the project footprints and especially in areas near the proposed crossings. Prosopis (alien invasive riparian tree) is prevalent in areas to the north of the site, thus care in transporting any material, while ensuring that such materials is free of alien seed, coupled with pre and post alien clearing must be stipulated in the EMPr.*			
Comment on ratings	The ratings assume that the ECO/specialist that during the micro sitting process, that with the contractor the allowable work areas are pegged out, with the remaining areas be considered No-go. The contractor must provide a method statement to the ECO for each specific watercourse crossing once the allowable working areas are pegged. This method statement, coupled to a detailed pre-works photo record will form part of the ECO annexures and be audited.			

Table 6-19: Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns.

No.	2	Alternative 1		
Project phase	Construction, Operation & Decommissioning			
Impact title	Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns			
Impact description	*This could occur within the operational and decommissioning phases. When any of the hard or compacted surfaces (roads or substation areas) increase the volume and velocity of the surface runoff increases. This could impact the hydrological regime through the increase in flows that are concentrated in area, and as most plants are drought tolerant an increase in water will allow for other species to develop and outcompete typical plant species found within the region. This then affects the structure (i.e. larger taller grasses / shrubs / trees) and function (greater attenuation of flows, restricting any runoff from reaching downstream areas). The opposite can also happen. If flows are too concentrated with high velocities, scour and erosion results, with a complete reduction or disturbance of riparian habitat.*			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Limited	Limited to the site and its immediate surroundings.
Duration	Medium term	Impact will last between 1 and 5 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Moderate - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	Mitigation measures to reduce residual risk or enhance opportunities: - Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. - Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments, and reduce flow velocities - No stormwater runoff must be allowed to discharge directly into any water course along roads, and flows should thus be allowed to dissipate over a broad area covered by natural vegetation. - Stormwater in the switching substation (not part of this application) must be managed using appropriate channels and swales when located within steep areas or have steep embankments			
Comment on ratings	The ratings assume that the ECO/specialist that during the micro sitting process, that with the contractor the allowable work areas are pegged out, with the remaining areas be considered No-go.			

	The contractor must provide a method statement to the ECO for each specific watercourse crossing once the allowable working areas are pegged. This method statement, coupled to a detailed pre-works photo record will form part of the ECO annexures and be audited.

Table 6-20: Impacts include changes to the hydrological regime such as alteration of surface run-off patterns, runoff velocities and or volumes which could occur during the construction, operational and decommissioning phases.

No.	3	Alternative		
Project phase	Construction, Operation & Decommissioning			
Impact title	Increase in sedimentation and erosion within the development footprint			
Impact description	Impacts include changes to the hydrological regime such as alteration of surface run-off patterns, runoff velocities and or volumes which could occur during the construction, operational and decommissioning phases			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Limited	Limited to the site and its immediate surroundings.
Duration	Medium term	Impact will last between 1 and 5 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Moderate - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	Mitigation measures to reduce residual risk or enhance opportunities: - Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities. Any management actions must be dealt with in the Stormwater Management Plan (SWMP), forming part of any WULA.			
Comment on ratings	The ratings assume that the ECO/specialist that during the micro sitting process, that with the contractor the allowable work areas are pegged out, with the remaining areas be considered No-go. The contractor must provide a method statement to the ECO for each specific watercourse crossing once the allowable working areas are pegged. This method statement, coupled to a detailed pre-works photo record will form part of the ECO annexures and be audited.			

Table 6-21: Impact on localized surface water quality

No.	4	Alternative		
Project phase	Construction, Operation & Decommissioning			
Impact title	Impact on localized surface water quality			
Impact description	During construction / decommissioning and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Limited	Limited to the site and its immediate surroundings.
Duration	Medium term	Impact will last between 1 and 5 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Moderate - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	Mitigation measures to reduce residual risk or enhance opportunities: - Strict use and management of all hazardous materials used on site in line with the specific material safety data sheets, e.g. fuels must be stored within a contained / bunded site with the necessary and spill kits available. - Strict management of potential sources of pollution (e.g. litter, hydrocarbons from vehicles & machinery, cement during construction, etc.). - Containment of all contaminated water by means of careful run-off management on the development site. - Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. - Strict control over the behaviour of construction workers, with regard littering, use and storage of chemicals. - Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Environmental Management Programme (EMPr) for the project and strictly enforced.			
Comment on ratings	The ratings assume that the ECO/specialist that during the micro sitting process, that with the contractor the allowable work areas are pegged out, with the remaining areas be considered No-go. The contractor must provide a method statement to the ECO for each specific watercourse crossing once the allowable working areas are pegged. This method statement, coupled to a detailed pre-works photo record will form part of the ECO annexures and be audited.			

Table 6-22: No-go alternative (aquatic).

No.	5 Alternative			
Project phase	Construction, Operation & Decommissioning			
Impact title	No-go alternative			
Impact description	The no-go alternative assumes that no change in land use or additional activities will occur and that the status quo will persist. This includes agricultural activities along with the impact of existing roads and or existing renewable facilities on the project boundary			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.		
Duration	Medium term	Impact will last between 1 and 5 years.		
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.		
Magnitude	Moderate - negative			
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.		
Significance	Moderate - negative			
Importance	High	High		
Consequence	Moderately-detrimental			
Confidence	Well established			
Reversibility				
Mitigatability				
Potential mitigation	No mitigation measures will be implemented with the no-go alternative			
Comment on ratings	The ratings assume that the ECO/specialist that during the micro sitting process, that with the contractor the allowable work areas are pegged out, with the remaining areas be considered No-go. The contractor must provide a method statement to the ECO for each specific watercourse crossing once the allowable working areas are pegged. This method statement, coupled to a detailed pre-works photo record will form part of the ECO annexures and be audited.			

Table 6-23: Overall cumulative impact (aquatic).

No.	6 Alternative			
Project phase	Construction, Operation & Decommissioning			
Impact title	Overall cumulative impact			
Impact description	In the assessment of this project, several projects have been assessed by the report author within a 35km radius have been reviewed and or sites accessed during the course of travelling between the various projects of these potential projects, this report author has been involved in the initial EIA aquatic assessments or has managed / assisted with the WUL process for several of the projects. All of the projects have indicated that this is also their intention with regard mitigation, i.e. selecting the best possible routes to minimise the local and regional impacts and improving the drainage or hydrological conditions with these rivers the cumulative impact could be seen as a net benefit. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation be implemented by the other projects, and that flows within these systems are sporadic. This is also coupled to fact the several existing transmission lines already occur within the region			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Limited	Limited to the site and its immediate surroundings.
Duration	Medium term	Impact will last between 1 and 5 years.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Moderate - negative		Minimal - negative	
Importance	High	High	Low	Low
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	Mitigation measures to reduce residual risk or enhance opportunities by local land owners and or Provincial / District Roads organizations within the study area: - Improve the current stormwater and energy dissipation features not currently found along the tracks and roads within the region - Install properly sized culverts with erosion protection measures at the present road / track crossings			
Comment on ratings	The ratings assume that the ECO/specialist that during the micro sitting process, that with the contractor the allowable work areas are pegged out, with the remaining areas be considered No-go. The contractor must provide a method statement to the ECO for each specific watercourse crossing once the allowable working areas are pegged. This method statement, coupled to a detailed pre-works photo record will form part of the ECO annexures and be audited.			

6.6.4 Conclusion and Recommendations

The proposed alignment has limited impact on the aquatic environment as for the most part the final placement of the towers could avoid the delineated wetlands and potentially span watercourses. It has however been assumed that due to the width of some of the broader alluvial systems, towers will need to be placed within these systems, but this would have little impact on these systems, especially if no new permanent access tracks are created within these areas.Thus, based on the findings of this study there is no objection to the authorisation of any of the proposed activities. Therefore, based on the site visit the significance of the impacts assessed for the aquatic systems after mitigation would be LOW.

Note the final number of actual water course crossings (i.e. towers within the alluvial water course and or within 500m of the wetland) can be determined when micro-siting occurs, as these would trigger the need for a Water Use License application (WULA). A potential General Application [GA] in terms of Section 21 (c) and (i) of the National Water Act (Act 36 of 1998) (NWA), should any construction take place within these areas will be required. Should any of the present road crossings need to be upgraded then the opportunity exists to improve the current state (lack of habitat continuity) for example by replacing pipe culverts with box culverts. This opportunity to improve the hydrological conditions is a net benefit and has been assessed as part of the cumulative impact statement.

As the proposed activities have the potential to create erosion the following recommendations are reiterated:

- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment, and suitable dust and erosion control mitigation measures should be included in the EMP to mitigate.
- All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination / leaks. Washing and cleaning of equipment should also be done in berms or bunds, to trap any cement / hazardous substances and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be located more than 50 m from any demarcated watercourses.
- It is also advised that an Environmental Control Officer (ECO), with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas along aquatic features, using selected species detailed in this report.
- All alien plant re-growth must be monitored and should these alien plants reoccur these plants should be re-eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.
- It is further recommended from the project onset that all watercourse areas (inclusive of buffers) are included into any existing EMPr as reference, this to ensure a net benefit to the aquatic environment. This should from part of the suggested walk down as part of the final EMP preparation.

6.7 Avifauna

Avifaunal specialists, Chris Rooyen in association with Albert Froneman, have completed an Avifauna Impact Assessment for the proposed Castle to Hydra OHL. Key findings concluded that at a site-specific level, environmentally most sensitive features present within the proposed Project Area of Impact (PAOI) are priority species nest locations and the permanent and ephemeral waterbodies. These areas are deemed to be areas of high sensitivity. The construction of the proposed powerline across or within proximity to the waterbodies and nests will necessitate the marking of the powerline with bird flight diverters to mitigate the collision impact. Site specific recommendations for the management of the disturbance and collision impacts associated with these high sensitivity areas will be provided following the pre-construction avifaunal walk-through (inspection). The remainder of the PAOI is of medium to high sensitivity, given its propensity to regularly support Ludwig's Bustard, Secretarybird and Blue Crane. It will therefore also require marking of the powerline with bird flight diverters to mitigate the collision impact, which in effect comes down to marking the entire powerline. The expected impacts of the proposed Castle to Hydra MTS grid connection range from minor to major significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to moderate and minor negative. No fatal flaws were discovered during the investigation. It is therefore recommended that the activity is authorised, on condition that the proposed mitigation measures are strictly implemented.

A summary of the of the findings on avifauna are provided below. The Avifauna Impact Assessment Report is attached as Annexure D4.

6.7.1 Baseline Description

6.7.1.1 Important Bird Areas

The PAOI falls within the Platberg-Karoo Conservancy IBA SA037 (Figure 5). The landscape consists of extensive flat to gently undulating plains that are broken by dolerite hills and flat-topped inselbergs. The ephemeral Brak River flows in an arc from south-east to north-west, eventually feeding into the Orange River basin. Other ephemeral rivers include the Hondeblaf, Seekoei, Elandsfontein and Ongers rivers with a network of tributaries. This IBA contributes significantly to the conservation of large terrestrial birds and raptors. These include Blue Crane *Anthropoides paradiseus*, Ludwig's Bustard *N. ludwigii*, Kori Bustard *Ardeotis kori,* Blue *Korhaan Eupodotis caerulescens*, Black Stork *Ciconia nigra*, Secretarybird *Sagittarius serpentarius*, Martial Eagle *P. bellicosus*, Verreauxs' Eagle *A. verreauxii* and Tawny Eagle *A. rapax* (Marnewick *et al*. 2015).

A total of 289 bird species are known to occur here. In summer, close to 10% of the global population of Lesser Kestrel *Falco naumanni* congregate and roost in this IBA. Amur Falcons *Falco amurensis* are also abundant and forage and roost with Lesser Kestrels *F. naumanni* . This IBA is seasonally important for White Stork *Ciconia ciconia*, and Coordinated Avifaunal Roadcounts indicate high numbers of this species during outbreaks of brown locusts *Locustana pardalina* and armoured ground crickets *Acanthoplus discoidalis*. The IBA also supports the following biome-restricted species: Karoo Lark *Calendulauda albescens*, Karoo Long-billed Lark *Certhilauda subcoronata,* Karoo Chat *Cercomela schlegelii*, Tractrac Chat *Cercomela tractrac*, Sickle-winged

Chat *Cercomela sinuata,* Namaqua Warbler *Phragmacia substriata*, Layard's Tit-Babbler *Sylvia layardi*, Pale-winged Starling *Onychognathus nabouroup* and Black-headed Canary *Serinus alario* (Marnewick *et al*. 2015).

All of the aforementioned species have been recorded by SABAP2 in the PAOI. It is therefore likely that the impacts, associated with the construction and operation of the proposed Castle to Hydra MTS OHL grid connection, could negatively affect these species if the necessary avoidance and mitigation measures are not implemented.

6.7.1.2 Biomes and Vegetation Types

Temperatures at De Aar range between a mean daily maximum of 31˚C in January (summer) and 15.1˚C in July (winter), and rainfall happens mostly between October and April and averages about 211mm per year, which makes for a fairly arid climate (meteoblue.com). Winters are very dry. The land is used for sheep and game farming.

The proposed Castle to Hydra MTS OHL grid connection is located within the Nama Karoo and Grassland biomes (Mucina & Rutherford 2006), comprised of two vegetation units i.e. Northern Upper Karoo, dominating the plains and the Besemkaree Koppies Shrubland (Figure 6) occurring on the slopes of the ridges and mountains respectively (Mucina & Rutherford 2006). The Northern Upper Karoo unit is found on floristic and ecological gradients between the Nama Karoo, arid Kalahari savanna and highveld grassland. This vegetation unit is comprised of dwarf mycrophyllus shrubs, with white grasses of the genera Aristida and Eragrostis. The Besemkaree Koppies Shrubland occurs on the slopes of koppies, butts and tafelbergs and consists of a two-layered karroid shrubland. The lower layer of the vegetation is dominated by dwarf small-leaved shrubs and the upper layer is dominated by tall shrubs (Mucina & Rutherford 2006). The main relevance of this classification to avifauna is that the site is composed of short Karoo type veld, with grassy components. This affects the species likely to occur on site with most of the SCC recorded in the PAOI favouring the short open vegetation types described above.

Whilst the distribution and abundance of the bird species in the development area are typical of the broad vegetation types, it is also necessary to examine bird habitats in more detail as it may influence the distribution and behaviour of priority species. These are discussed in more detail below.

6.7.1.3 Bird Habitats

6.7.1.3.1 Nama Karoo

The vegetation at the development area consists of Karoo shrub vegetation, punctuated by rugged relief. Although not remarkably rich in species or endemism, the flora and fauna of the region are remarkably adapted to the region's climatic extremes. The major threats to biodiversity are posed by pastoralism, exotic plants, mining and agriculture. Trees and taller woody shrubs are restricted mostly to watercourses and include *Acacia karroo, Diospyros lycioides, Grewia robusta, Rhus lancea,* and *Tamarix usneoides* (Palmer and Hoffman 1997). This habitat type will typically support Secretarybird *S. serpentarius*, Ludwig's Bustard *N. ludwigii*, Common Buzzard *Buteo buteo*, Jackal Buzzard *Buteo rufofuscus*, Blue Crane *A. paradiseus*, Booted Eagle *Hieraaetus pennatus*, Martial

Eagle *P. bellicosus*, Tawny Eagle *A. rapax*, Amur Falcon *F. amurensis*, Lanner Falcon *F. biarmicus*, Pale Chanting Goshawk *Melierax canorus*, African Harrier-Hawk *Polyboroides typus*, Greater Kestrel *F. rupicoloides*, Lesser Kestrel *F. naumanni*, Blue Korhaan *Eupodotis caerulescens*, Northern Black Korhaan *Afrotis afraoides*, White Stork *C.ciconia* and Cape Vulture *Gyps coprotheres.*

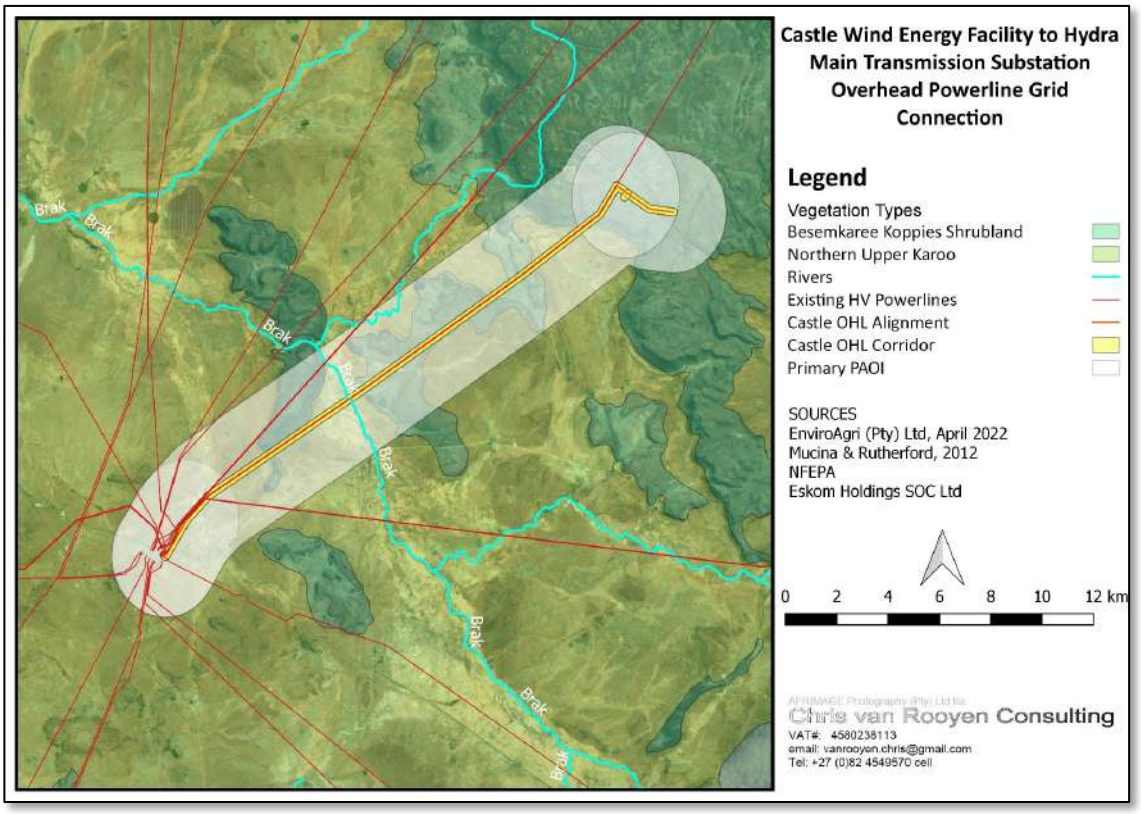


Table 6-24: Regional map delineating the vegetation units, river systems and existing high voltage powerlines within the proposed Castle to Hydra MTS grid connection project PAOI.

6.7.1.3.2 Rivers

The ephemeral Brak River bisects the PAOI (Figure 6-25) and together with its associated drainage lines, are of specific importance to a variety of priority species in this arid PAOI. Occasionally, after good rains when pools form in the channels, this habitat will become an attractive draw card for a diversity of waterbirds and raptors. During such times, small birds are attracted to the water, which in turn may attract Lanner Falcon *F. biarmicus* and other raptors.

6.7.1.3.3 Trees and Woody Shrubs

Several ephemeral drainage lines, associated with the Brak River, bisect the PAOI. These areas are typically covered with broken Karoo veld, typically more shrubby than grassy. Whilst these areas probably hold a relatively high species diversity, this is probably mostly comprised of small passerine species, which are generally considered to be at less risk of impact from the construction and operation of powerlines. However, the utilisation of these areas by large terrestrial species cannot be discounted particularly since it is in these areas where small trees and woody shrubs occur. In

an environment that is largely devoid of trees, these areas are attractive to tree nesters like Secretarybird *S. serpentarius*.

6.7.1.3.4 Surface water (excluding rivers)

The PAOI contains sources of both permanent (i.e. boreholes with water troughs) and ephemeral surface waterbodies (i.e. dams and pans). Pans are endorheic wetlands having closed drainage systems; water usually flows in from small catchments but with no outflow from the pan basins themselves. They are characteristic of poorly drained, relatively flat and dry regions. Water loss is mainly through evaporation, sometimes resulting in saline conditions, especially in the most arid regions. Water depth is shallow (<3m), and flooding characteristically ephemeral (Harrison et al. 1997). When filled with water, the waterbodies typically attract Blue Crane *A. paradiseus* and Greater Flamingo Phoenicopterus roseus, Secretarybird *S. serpentarius*, Booted Eagle *H. pennatus*, Martial Eagle *P. bellicosus*, Tawny Eagle *A. rapax*, Verreaux's Eagle *A. verreauxii* , Lanner Falcon *F. biarmicus*, Gabar Goshawk *Micronisus gabar*, Pale Chanting Goshawk *M. canorus*, Helmeted Guineafowl *Numida meleagris*, African Harrier-Hawk *P. typus*, Black Stork *Ciconia nigra*, White Stork *C.ciconia*, Cape Vulture *G. coprotheres*, various waterfowl, ibis, heron and goose species that utilise this habitat type in which to roost, forage, drink and bathe.

6.7.1.4 Wetlands

Wetlands are characterized by slow flowing seasonal water (or permanently wet) and tall emergent vegetation (rooted or floating) and provide habitat for many water birds. The conservation status of many of the bird species that are dependent on wetlands reflects the critical status of wetlands worldwide, with many having already been destroyed. The wetland areas contained within the PAOI are associated with the Brak River and are likely to attract Blue Crane *A. paradiseus*, Black Stork *C. nigra* and White Stork *C.ciconia* (Young 2003). Various common species i.e. ibis, herons, ducks and geese are also likely to utilise this wetland for their foraging needs.

6.7.1.5 Mountains, ridges and rocky outcrops

The PAOI contains exposed rocky ridges and a major escarpment in the northeast. Large ridges and cliff lines provide a suitable breeding substrate, prey base and present favourable air currents, which are typically utilised by raptors. In addition, these areas hold different vegetation (often more woody species) to the plains and as such attract a slightly different suite of bird species. Large eagles such as Verreaux's Eagle feature prominently in this habitat type. This premise was confirmed with the observation of two Verreaux's Eagle *A. verreauxii* nests in this habitat type. Black Stork *C. nigra* and Lanner Falcon *F. biarmicus* may also breed on these cliffs.

6.7.1.6 Agricultural lands

Relevant to this project, cultivation is limited to pockets of subsistence dryland agricultural lands, and a small irrigated field located in the north east reaches of the primary PAOI, surrounding the proposed grid connection alignment. Arable or cultivated land represents a significant feeding area for many bird species in any landscape, but perhaps more so in arid environments. The opening up of the soil surface, and 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. Ludwig's Bustard *N. ludwigii*, Common Buzzard *B. buteo*, Blue Crane *A. paradiseus*, Amur Falcon *F. amurensis*, Lanner Falcon *F. biarmicus*, Lesser Kestrel *F. naumanni*, Rock Kestrel *Falco rupicolus*, Egyptian Goose *Alopochen aegyptiaca*, Spur-winged Goose *Plectropterus gambensis*, Helmeted Guineafowl *N. meleagris* and Hadeda Ibis *Bostrychia hagedash* are likely to frequent this microhabitat. Although the cultivated lands are not located within the proposed powerline corridor, we must account for the potential movement birds across the powerline alignment, as and when food resources become available within the cultivated areas, thereby increasing the risk of collision with the overhead powerline conductors and/or earthwires.

6.7.1.7 Alien trees

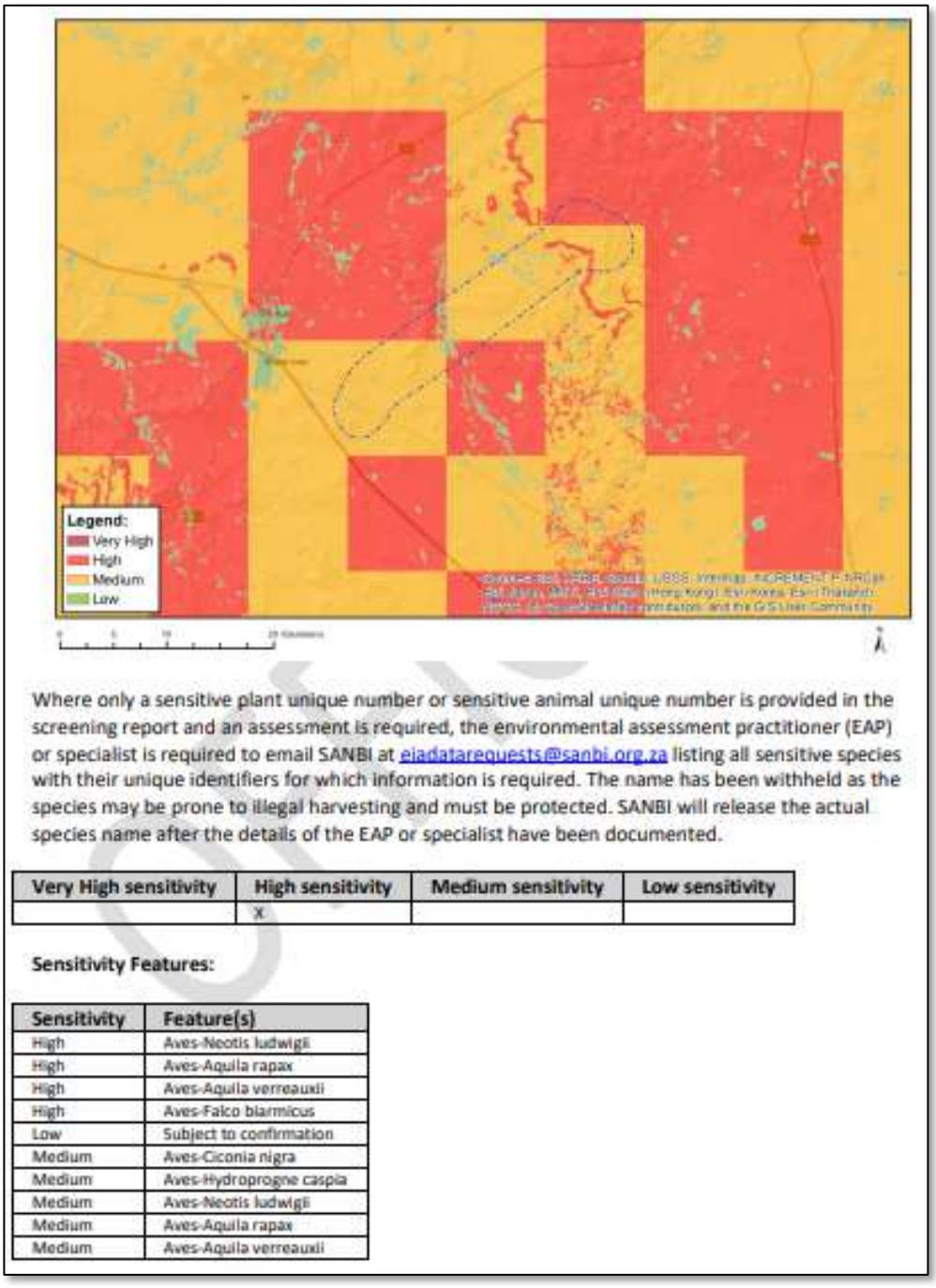
The development area is largely devoid of trees, except for alien trees which have been planted in homestead areas. Although stands of *Eucalyptus* are strictly speaking invader species, they have become important refuges for certain species of raptors, particularly Amur Falcon, a Palearctic migrant, which will commonly roost in small stands of *Eucalyptus* in suburbs of small towns. Relevant to this project Amur Falcon *F. amurensis*, Lanner Falcon *F. biarmicus*, Lesser Kestrel *F. naumanni*, Greater Kestrel *F. rupicoloides*, Tawny Eagle *A. rapax* and Martial Eagle *P. bellicosus* may utilise this habitat type occasionally.

6.7.1.8 High voltage lines

Twelve existing high voltage transmission powerlines are operational within primary PAOI, one of which runs parallel to the proposed Castle to Hydra MTS OHL grid connection alignment, within the 300m Castle WEF to Hydra MTS OHL grid connection corridor (Figure 6). Transmission lines are an important breeding substrate for raptors in the Karoo, due to the lack of large trees – see 7.1 for a list of nests recorded on the existing HV lines (Jenkins *et al.* 2013).

6.7.2 Site Sensitivity

The primary and secondary PAOI is classified as MEDIUM to HIGH sensitivity for terrestrial animals according to the Terrestrial Animal Species Theme. These classifications are linked to the potential occurrence of Ludwig's Bustard *Neotis ludwigii* (Globally and Regionally Endangered), Tawny Eagle Aquila rapax (Globally Vulnerable and Regionally Endangered), Verreaux's Eagle *Aquila verreauxii* (Regionally Vulnerable), Lanner Falcon *Falco biarmicus* (Regionally Vulnerable), Black Stork Ciconia nigra (Regionally Vulnerable) and Caspian Tern *Hydroprogne caspia* (Regionally Vulnerable). In addition, the PAOI contains confirmed habitat for SCC as defined in the Protocol for the specialist assessment and minimum report content requirements for environmental impacts on terrestrial animal species (Government Gazette No 43855, 30 October 2020). Although Verreaux's Eagle *A. verreauxii* was the only SCC observed during the site visit, the authors have conducted several assessments and research projects in the secondary PAOI and immediate environment and have previously observed Ludwig's Bustard *N. ludwigii*, Martial Eagle *Polemaetus bellicosus*, Tawny Eagle *A. rapax*, Lanner Falcon *F. biarmicus* and Black Stork *C. nigra* in identical habitats. Based on these observations, the classification of MEDIUM to HIGH sensitivity for avifauna in the screening tool is therefore confirmed (Figure 4).



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-Neotis ludwigii
High	Aves-Aquila rapax
High	Aves-Aquila verreauxii
High	Aves-Falco biarmicus
Low	Subject to confirmation
Medium	Aves-Ciconia nigra
Medium	Aves-Hydroprogne caspia
Medium	Aves-Neotis ludwigii
Medium	Aves-Aquila rapax
Medium	Aves-Aquila verreauxii

Figure 4: The National Web-Based Environmental Screening Tool map of the three PV project sites, indicating sensitivities for the Terrestrial Animal Species theme. The High and Medium sensitivity classifications are linked to Ludwig's Bustard *Neotis ludwigii*, Verreaux's Eagle *Aquila verreauxii*, Lanner Falcon *Falco biarmicus*, Black Stork *Ciconia nigra* and Caspian Tern *Hydroprogne caspia*.

6.7.2.1 On-site surveys (verification)

A single autumn survey was conducted on 19 and 20 April 2022 within the PAOI. To describe the avifaunal community present, a concerted effort was made to observe the various species in all the primary habitats that were available within the proposed Castle to Hydra MTS OHL grid connection PAOI.

The site visit produced a combined list of 31 species (Appendix 4 - highlighted in grey), covering both the primary PAOI and to a limited extent, the secondary PAOI. Eight priority species were observed along the proposed powerline alignment, with Verreaux's Eagle *A. verreauxii* being the only SCC observed. All other observations were of small passerine and game bird species that are common to this area. Each of the species has the potential to be displaced by the proposed Castle to Hydra MTS OHL grid connection because of habitat transformation and disturbance. Of particular importance are the six raptor nests that were observed, three of which are on the existing transmission structures within the proposed OHL corridor belonging to Verreaux's Eagle *A. verreauxii*, Martial Eagle *P. bellicosus* and Jackal Buzzard *B. rufofuscus* respectively. The other three nests occur with the primary POIA - two Verreaux's Eagle nests on the cliffs in the northeastern reaches of the PAOI and a Jackal Buzzard *B. rufofuscus* nest on an existing transmission structure. These birds will be especially vulnerable to the disturbance impact, particularly during construction of the OHL grid connection.

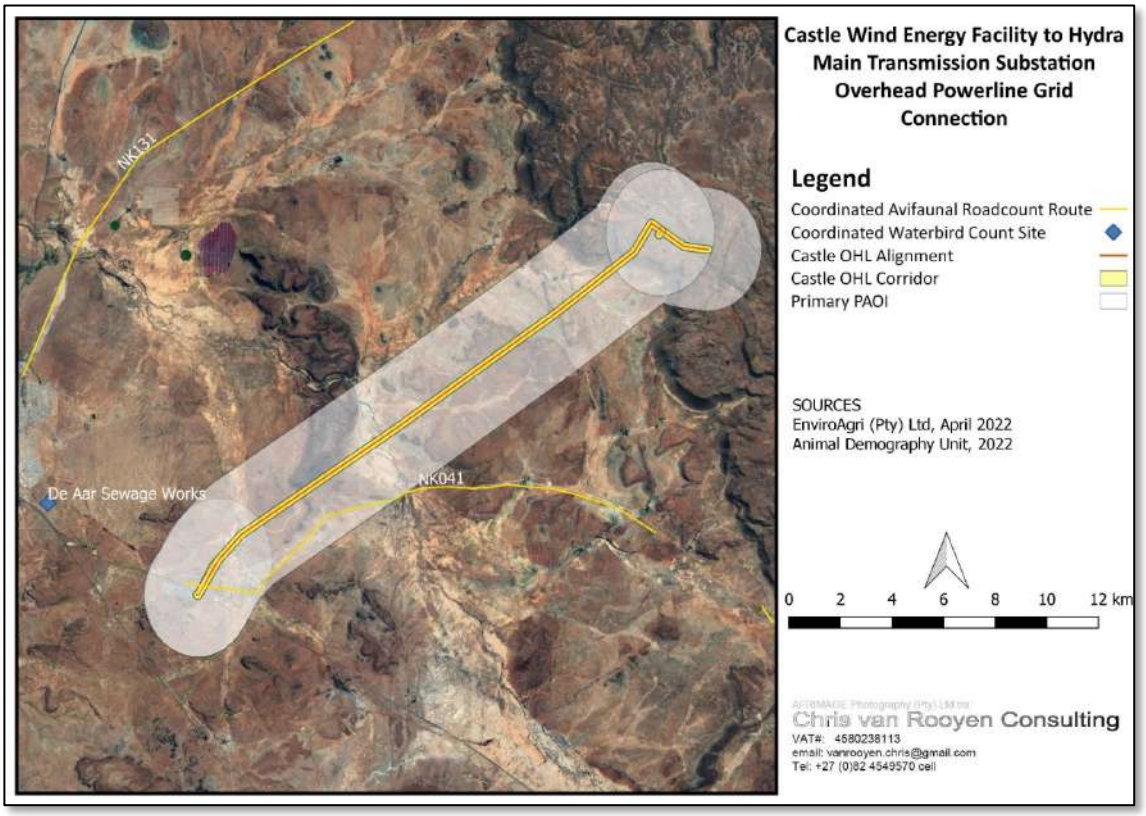


Figure 7: Regional map detailing the location of the proposed Castle to Hydra MTS grid connection project in relation to Coordinated Avifaunal Roadcount (CAR) routes and Coordinated Waterbird Count (CWAC) sites.

6.7.2.2 High Sensitivity

At a site-specific level, environmentally most sensitive features present within the proposed PAOI are priority species nest locations and the permanent and ephemeral waterbodies. These areas are deemed to be areas of high sensitivity. The construction of the proposed powerline across or within close proximity to the waterbodies and nests will necessitate the marking of the powerline with bird flight diverters to mitigate the collision impact. Site specific recommendations for the management of the disturbance and collision impacts associated with these high sensitivity areas will be provided following the pre-construction avifaunal walk-through (inspection).

6.7.2.3 Medium to High Sensitivity

The remainder of the PAOI is medium to high sensitivity, given its propensity to regularly support Ludwig's Bustard, Secretarybird and Blue Crane. It will therefore also require marking of the powerline with bird flight diverters to mitigate the collision impact, which in effect comes down to marking the entire powerline.

6.7.3 Impact assessment

Negative impacts on avifauna by electricity infrastructure generally take two (2) 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 and other associated infrastructure is another impact that could potentially impact on avifauna.

The following potential impacts have been identified:

- Construction Phase
  - Displacement due to disturbance associated with the construction of the proposed Castle to Hydra MTS OHL grid connection; and
  - Displacement due to habitat transformation associated with the construction of the proposed Castle to Hydra MTS OHL grid connection;
- Operational Phase
  - Collisions with the proposed Castle to Hydra MTS OHL grid connection; and
  - Electrocution of vultures on the proposed infrastructure, in the event that the OHL is constructed at a voltage of 132kV using either a single or double circuit steel monopole structure.
- Decommissioning Phase
  - Displacement due to disturbance associated with the decommissioning of the Castle WEF to Hydra MTS OHL grid connection.
- Cumulative Impacts
  - Displacement due to disturbance associated with the construction and decommissioning of the proposed Castle to Hydra MTS OHL grid connection;
  - Displacement due to habitat transformation associated with the Castle to Hydra MTS OHL grid connection;
  - Collisions with the proposed Castle to Hydra MTS OHL grid connection;
  - Electrocution of vultures on the proposed infrastructure, in the event that the OHL is constructed at a voltage of 132kV using either a single or double circuit steel monopole structure

6.7.3.1 Construction Phase

Table 6-25: Displacement due to disturbance impact assessment.

No.	1	Alternative		
Project phase	Construction			
Impact title	Displacement: Disturbance			
Impact description	Displacement of priority species due to disturbance associated with construction of the OHL			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Local	Extending across the site and to nearby settlements.
Duration	Medium term	Impact will last between 1 and 5 years.	Medium term	Impact will last between 1 and 5 years.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.
Magnitude	High - negative		Moderate - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Likely (>66%)	The impact may occur, but not necessarily proof that it will.
Significance	Major - negative		Moderate - negative	
Importance	High	High	Moderate	Moderate
Consequence	Highly-detrimental		Slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	Medium	Mitigation exists and may notably reduce significance of impacts.		
Potential mitigation	Conduct a pre-construction inspection (avifaunal walk-through) of the final powerline alignment to identify priority species that may be breeding within the final footprint. If a SSC nest is occupied, the avifaunal specialist must consult with the contractor to find ways of minimising the potential disturbance to the breeding pair of eagles/birds during the construction period. This could include measures such as delaying some of the activities until after the breeding season.			
Comment on ratings	The rating of Major Negative significance prior to mitigation is agreed with. Six priority nests have been identified in the primary POAI. Construction activities in close proximity to breeding locations will be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. The timeous identification of nests and the timing of the construction activities to avoid disturbance during a critical phase of the breeding cycle will reduce the significance of this impact to moderate levels.			

Table 6-26: Displacement due to habitat transformation impact assessment.

No.	2	Alternative		
Project phase	Construction			
Impact title	Displacement: Habitat Loss or Transformation			
Impact description	Displacement of priority species due to habitat loss or transformation associated with construction of the OHL			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Limited	Limited to the site and its immediate surroundings.	Limited	Limited to the site and its immediate surroundings.
Duration	Medium term	Impact will last between 1 and 5 years.	Medium term	Impact will last between 1 and 5 years.
Intensity	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Low - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	About as likely as not (33-66%)	The impact has occurred before and could occur in the lifetime of the project.
Significance	Minor - negative		Minor - negative	
Importance	Low	Low	Very low	Very low
Consequence	Very slightly-detrimental		Very slightly-detrimental	
Confidence	Established, but incomplete		Established, but incomplete	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	Medium	Mitigation exists and may notably reduce significance of impacts.		
Potential mitigation	Prevent unnecessary displacement of avifauna by ensuring that the rehabilitation of transformed areas is implemented where possible by an appropriately qualified rehabilitation specialist, according to the recommendations of the biodiversity specialist study.			
Comment on ratings	The rating of Minor Negative significance prior to mitigation is agreed with. The direct habitat transformation is limited to the pole/tower footprints and the narrow access road/track under the powerline. The habitat in the PAOI is relatively uniform from a bird impact perspective. The loss of habitat will be a relatively small percentage of the habitat that regularly supports priority species and the resultant impact is likely to be fairly minimal.			

6.7.3.2 Operational Phase

Table 6-27: Mortality due to collision impact assessment.

No.	3 Alternative			
Project phase	Operation			
Impact title	Collision			
Impact description	Mortality of priority species due to collisions with the OHL (regardless of voltage size and technology alternatives)			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Regional	Impacts manifest at a regional / municipal level.
Duration	Long term	Impact will last between 6 and 25 years.	Medium term	Impact will last between 1 and 5 years.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.
Magnitude	High - negative		Moderate - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Likely (>66%)	The impact may occur, but not necessarily proof that it will.
Significance	Major - negative		Moderate - negative	
Importance	Very high	Very high	High	High
Consequence	Highly-detrimental		Moderately-detrimental	
Confidence	Virtually certain		Well established	
Reversibility	Medium	The affected environment may only recover from the impact with significant intervention or over long time period.		
Mitigatability	Medium	Mitigation exists and may notably reduce significance of impacts.		
Potential mitigation	The entire length of powerline must be marked with Eskom approved bird flight diverters (BFDs). The bird flight diverters should be installed on 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 and earthwires are strung.			
Comment on ratings	The rating of Major Negative significance prior to mitigation is agreed with. Collisions are the biggest threat posed by high voltage powerlines to birds in southern Africa. Most heavily impacted upon are bustards, storks, cranes and various species of waterbirds, and to a lesser extent, vultures. Several large terrestrial birds occur within the primary POAI. The installation of Bird Flight Diverters on the earthwires that traverse key habitats will reduce the significance of this impact to moderate levels.			

Table 6-28: Mortality due to electrocution impact assessment (132kV powerline only).

No.	4	Alternative		
Project phase	Operation			
Impact title	Electrocution			
Impact description	Mortality of priority species due to electrocution on **132kV powerline infrastructure** using the single circuit, double circuit, steel lattice or standard steel monopole tower structures alternatives			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Regional	Impacts manifest at a regional / municipal level.	Regional	Impacts manifest at a regional / municipal level.
Duration	Long term	Impact will last between 6 and 25 years.	Long term	Impact will last between 6 and 25 years.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.
Magnitude	High - negative		High - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Moderate - negative		Minor - negative	
Importance	High	High	Low	Low
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	If the grid connection is constructed using a single circuit configuration, the only mitigation option is the construction of the powerline using the approved vulture friendly pole/tower design D-DT-7649 (Appendix 7) in accordance with the Distribution Technical Bulletin Reference Number 240-170000467. If the grid connection is constructed using a double circuit configuration, it is imperative that there is a minimum clearance of 1.8m between the jumpers and/or insulators and the horizontal earthed component on the lattice structure. Additional mitigation in the form of insulating sleeves on jumpers present on strain poles and terminal poles is also required (if possible), alternatively all jumpers must be suspended below the crossarms.			
Comment on ratings	The rating of Moderate Negative significance prior to mitigation is agreed with. The only priority species capable of bridging the clearance distances of 132kV OHL infrastructure is the Cape Vulture, due to their size and gregarious nature. The low reporting rate for the species in the SABAP data suggests that the species is unlikely to occur regularly in the PAOI. However, pastoral activities feature prominently, so their sporadic occurrence cannot be ruled out. The construction of the powerline at a voltage >132kV or using the appropriate vulture friendly structure will reduce the significance of this impact.			

6.7.3.3 Decommissioning Phase

Table 6-29: Displacement due to disturbance impact assessment.

No.	5	Alternative		
Project phase	Decommissioning			
Impact title	Displacement: Disturbance			
Impact description	Displacement of priority species due to disturbance associated with decommissioning of the OHL			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Local	Extending across the site and to nearby settlements.
Duration	Short term	Impact will last less than 1 year.	Short term	Impact will last less than 1 year.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	About as likely as not (33-66%)	The impact has occurred before and could occur in the lifetime of the project.
Significance	Minor - negative		Minor - negative	
Importance	High	High	Moderate	Moderate
Consequence	Slightly-detrimental		Slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	Conduct a an avifaunal inspection of the OHL prior to its decommissioning to identify nests on the poles/towers. A site-specific Decommissioning EMPr (DEMPr) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted.			
Comment on ratings	The rating of Moderate Negative significance prior to mitigation is agreed with. Decommissioning activities in close proximity to breeding locations will be a source of disturbance and could lead to temporary breeding failure or even permanent abandonment of nests. The timeous identification of nests and the timing of the decommissioning activities to avoid disturbance during a critical phase of the breeding cycle will reduce the significance of this impact to moderate levels.			

6.7.4 Cumulative impacts

"Cumulative Impact", in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that may not be significant, but may become significant when added to existing and reasonably foreseeable impacts eventuating from similar or diverse activities.

The role of the cumulative assessment is to test if such impacts are relevant to the proposed project in the proposed location (i.e. whether the addition of the proposed project in the area will increase the impact). This section addresses whether the construction of the proposed development will result in:

- Unacceptable risk
- Unacceptable loss
- Complete or whole-scale changes to the environment
- Unacceptable increase in impact

According to the official database of DFFE, there are at least 103 renewable energy projects (or amendments thereof), approximately 1368km^2 in area, within a 30km radius around the proposed development as at the fourth quarter (Q4) of 2021 (Figure 6-40).

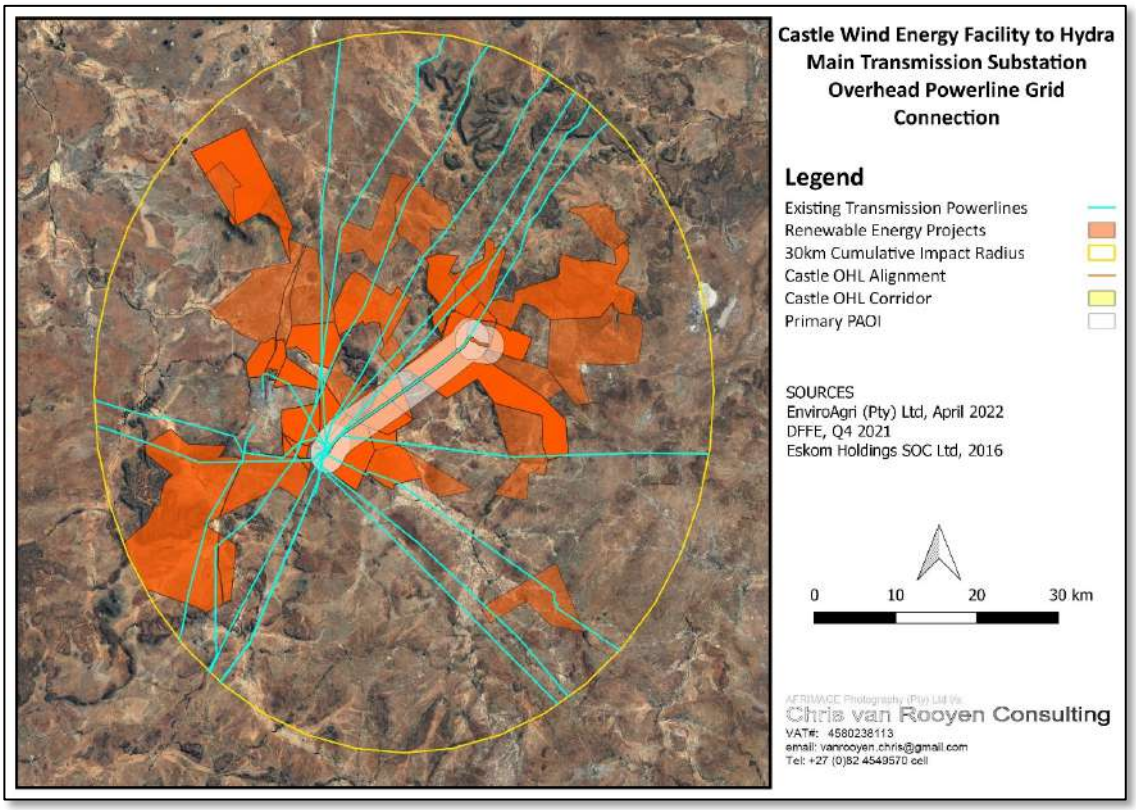


Figure 6-40: Renewable energy applications and existing high voltage powerlines within 30km of the proposed Castle to Hydra MTS grid connection project.

The proposed Castle to Hydra MTS grid connection project equates to a maximum of 25km. There are approximately 24 high voltage powerlines totalling hundreds of kilometres of existing powerlines within the 30km radius around the Castle to Hydra MTS grid connection project area. An intensive internet search was conducted to source information on the grid connections of the abovementioned projects available within the public domain, but in some instances no information could be obtained. The Castle to Hydra MTS grid connection project will thus increase the total number of existing high voltage lines by a very small percentage. The contribution of the proposed Castle to Hydra MTS 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 powerlines on avifauna within a 30km radius is MODERATE to HIGH.

6.7.5 Conclusion and Recommendations

The expected impacts of the proposed Castle to Hydra MTS grid connection range from MINOR to MAJOR significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to MODERATE and MINOR negative. 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 as detailed are strictly implemented. The proposed mitigation measures are detailed in the EMPr (Attached to specialist report as Appendix 6 and included into the main BAR EMPr Annexure G).

6.8 Heritage, including Archaeology and Palaeontology

Heritage specialist, Jenna Levin, completed a Heritage (including archaeology and palaeontology) Screening Assessment for the proposed Castle to Hydra OHL. Key findings of the heritage screener concluded that significant archaeological, palaeontological and cultural landscape heritage resources are located within the grid corridor based on thorough previous assessments. No impact to these significant resources should take place as long as the recommendations included in Gribble and Euston Browne (2021) are implemented. As the area has been thoroughly surveyed, it is recommended that no further heritage assessments are required in terms of section 38(3) of the NHRA.

A summary of the of the findings on Heritage (including archaeology and palaeontology) are provided below. The Heritage (including archaeology and palaeontology) Screening Report is attached as Annexure D5.

6.8.1 Baseline Description

The development application under consideration in this report is an amended grid connection alignment associated with the approved Castle WEF. The area proposed for the Castle WEF was previously assessed by Van der Walt (2014) as part of the original authorisation process and has been recently surveyed again in 2021 by Gribble and Euston-Browne. The Castle WEF is also located in close proximity to an approved PV Facility, Vetlaagte PV, and a proposed PV Facility (Wag n Bietjie PV Facility), all located in close proximity to the town of De Aar. In 2021, a heritage impact assessment was completed of the proposed grid connection routes and switching station for the De Aar 2 South wind energy facility, east of De Aar by ACO Associates (Gribble and Euston-Browne, SAHRIS ID 570440). The alignment assessed in the report by Gribble and Euston-Browne (2021) aligns with the proposed alignment assessed in this report. Furthermore, there is an existing powerline located within the grid alignment assessed.

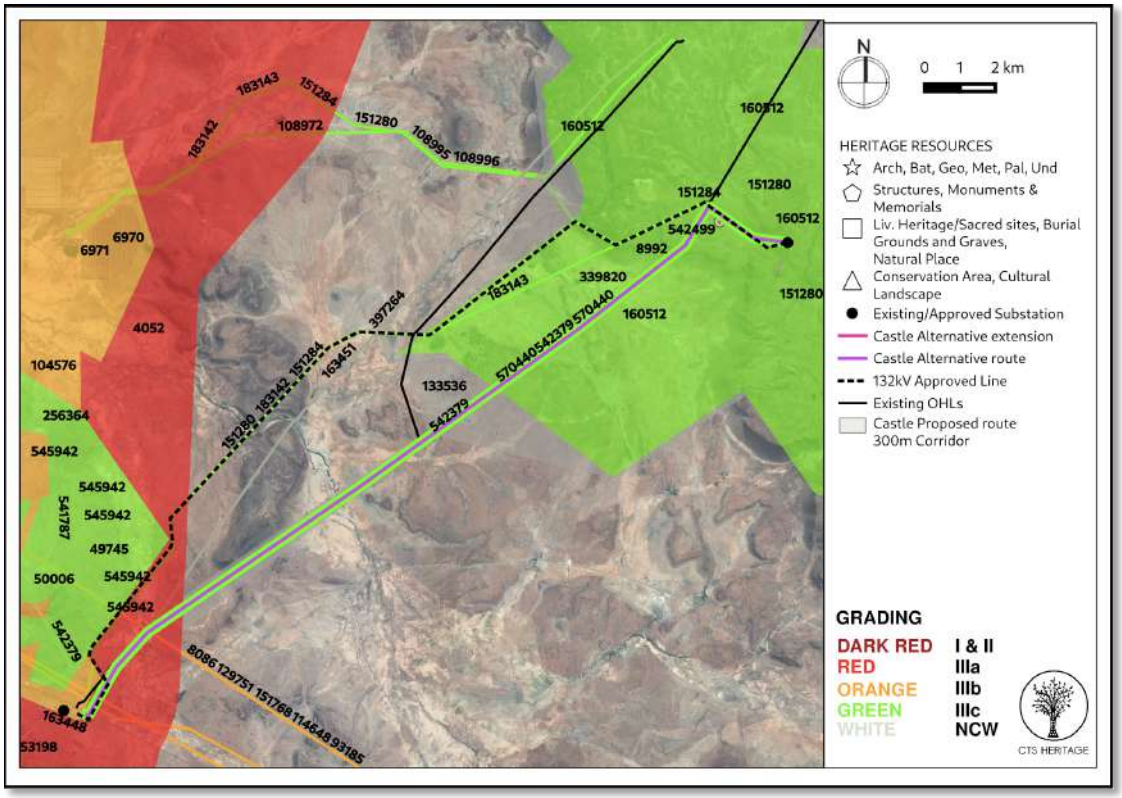


Figure 6-41: Previous HIAs Map. Previous Heritage Impact Assessments surrounding the proposed development area within 10km, with SAHRIS NIDS indicated.

De Aar was originally established on the Farm "De Aar." The name means "the artery," a reference to its underground water supply. The Cape Government Railways were founded in 1872, and the route that the government chose for the line to connect the Kimberley diamond fields to Cape Town on the coast, ran directly through De Aar. Because of its central location, the government also selected the location for a junction between this first railway line, and the other Cape railway networks further east, in 1881.

In 1899 two brothers who ran a trading store and hotel at the junction, Isaac and Wulf Friedlander, purchased the farm of De Aar. Following the Anglo Boer War, the Friedlander brothers surveyed the land for the establishment of a town. The municipality was created a year later in 1900. Kruger (2012) describes the development area as “characterised by flat undulating Karoo vegetation comprised out of relatively sparse scrub and grasses, with dolerite hills in the surrounding landscape. Large portions of the land is currently devoted to livestock farming but a number of solar energy facilities are to be constructed on farms around De Aar. Shallow soils covers a combination of calcrete, shale and dolerite substrates, and large sections in the landscape are exposed to sheet erosion, specifically along low lying areas and drainage lines. Dolerite and sandstone is present, while exotic rocks occur in the gravel of the Orange River bed and terraces. These provided suitable material for stone tool production during the Earlier, Middle and Later Stone Ages. “

6.8.1.1 Archaeology

As part of the 2012 process for approval of the nearby Vetlaagte Solar Energy Facility, Kruger conducted a detailed Heritage Impact Assessment of the area proposed for development. According to Kruger (2012), "During the survey, widespread Middle Stone Age (MSA) material, including characteristic formal MSA stone tools such as points, blades and scrapers were documented in the survey area along a north-south oriented drainage on the eastern periphery of the property. The lithic remains occur in three large scatters and, almost without exception, in low lying areas along non-perennial drainage lines and wetland areas where precipitation and groundwater have exposed the stone tools, originally deposited on a decomposed calcrete rock layer approximately 30cm sub surface. Preliminary examinations of some of the lithics indicated that a number of flakes displayed facetted platforms, characteristic of the MSA." Kruger (2012) also documented historical period remains, "specifically the old Vetlaagte homestead with restored farmhouse, outbuildings, midden and labourers quarters, as well as a dilapidated dam wall constructed in the drainage line east of the farmstead are present on the property. The date of construction of the farm house is denoted by a year count ("1930") on the front gable of the structure. The entire farmstead is situated in an area excluded from the solar farm development. A small family graveyard, associated with the farmstead at Vetlaagte, also occurs in the exclusion zone about 100m north of the farm house." Van der Walt (SAHRIS NID 183142) conducted a field assessment of the broader area proposed for development in 2014 as part of the original authorisation process for the Castle WEF. Van der Walt (2014) found that: "At the start of the survey Stone Age material was immediately noticed scattered in varying densities throughout the study area… Artefacts were observed in low densities over much of the study area where hornfel is almost exclusively used as raw material. Morris (2011) notes in most cases at documented sites in the area, the predominant component appears to be Pleistocene and early Holocene in age (the greater number of artefacts are highly patinated – a weathering/oxidation process resulting from long exposure of knapped surfaces), but there are also places with a much younger component of tools, late Holocene Later Stone Age, that are still relatively fresh-looking (little or no apparent patination – the artefacts are nearly black or grey as opposed to the more heavily patinated orange-brown of older stone tools). Some of the patinated artefacts show a high degree of weathering probably being washed in from their original context and are therefore of lower archaeological value…" Van der Walt (2014) went on to note that "MSA and LSA artefacts are mixed at some locations and indicate that downward deflation had occurred in the study area. Nine sites were recorded consisting of six Stone Age sites (Site 1, 3, 4, 6, 7, 9) of which site 6 is an engraving site, a historical stone kraal (Site 8) and 2 historical farmstead complexes (Site 2 and 5). A further total of 3 find spots were mapped, recorded and digitally photographed." Van der walt (2014) concludes his report by noting that: "The abundance of locally available raw material in the form of hornfels or indurated shale resulted in the use of the landscape over millennia by Stone Age people. Stone Age remains are mostly represented by thinly spread MSA scatters but more substantial quarries/workshops that are found scattered over the study and to a lesser extent also by LSA quarries/workshops on higher lying areas or hills. Erosion of the hills results in the gravitating of raw material and artefacts towards gently dipping plains between the dolerite hills and outcrops. Some of these deposits might be covered by the clay and sandy soils in the valleys or plains…" Some remnants of the farms history is represented in the form of two dilapidated farm complexes.

In the assessments completed by CTS Heritage (2021) for the Castle WEF Walkdown, it was found that "The overall archaeological sensitivity of the development area with regard to the preservation

of Early, Middle and Later Stone Age archaeology as well as Khoe and San heritage, early colonial settlement is regarded as very high. Despite this, the field assessment conducted for this project has demonstrated that the specific area proposed for development has low sensitivity for impacts to significant archaeological heritage. As indicated above, the results of this assessment align with the findings of other specialists such as Morris (2011) who notes that ephemeral MSA and LSA scatters are the dominant archaeological signature of the area and are therefore not archaeologically significant."

In 2021, ACO Associates (Gribble and Euston-Browne, SAHRIS ID 570440) completed an archaeological walkdown of this exact grid alignment. This assessment "identified a large number of archaeological occurrences which include Middle and Late Stone Age archaeological material, possible historic period stone structures, Khoikhoi stone kraal complexes, some rock engravings and scattered occurrences of historical period archaeological material. The volume of and apparently ubiquitous nature of the Middle Stone Age artefacts scattered across the landscape, and the fact that much of this material was found to be in secondary, or disturbed context, means that the combined overall impact of activities associated with this project on Middle Stone Age material will be relatively low. By contrast, the context of much of the Late Stone Age artefacts noted during the survey appears to be better preserved than the Middle Stone Age material, and is thus of greater archaeological significance… The possible Khoi kraals and other stone structures noted during the survey represent a little known aspect of the history and archaeology of this area and their damage or destruction would result in a loss of heritage." The report recommends that "the archaeologist must review the positions of the individual pylons once these have been determined, to ensure that they will not impact on any recorded heritage resources. The micro-siting of pylon positions may be required, which should also be done in consultation with the archaeologist."

All of the heritage resources identified by Gribble and Euston-Browne (2021), Kruger (2012), Van der Walt (2014) and other past heritage specialist assessments completed in the vicinity of the proposed development have been mapped relative to the proposed development in Figure 6-41. A number of graded archaeological sites are known to be located within the assessed 300m grid corridor. Impacts to these sites can be avoided through careful micro-siting of pylon footings and the implementation of the recommendations included in Gribble and Euston-Browne (2021)(Figure 6-42).

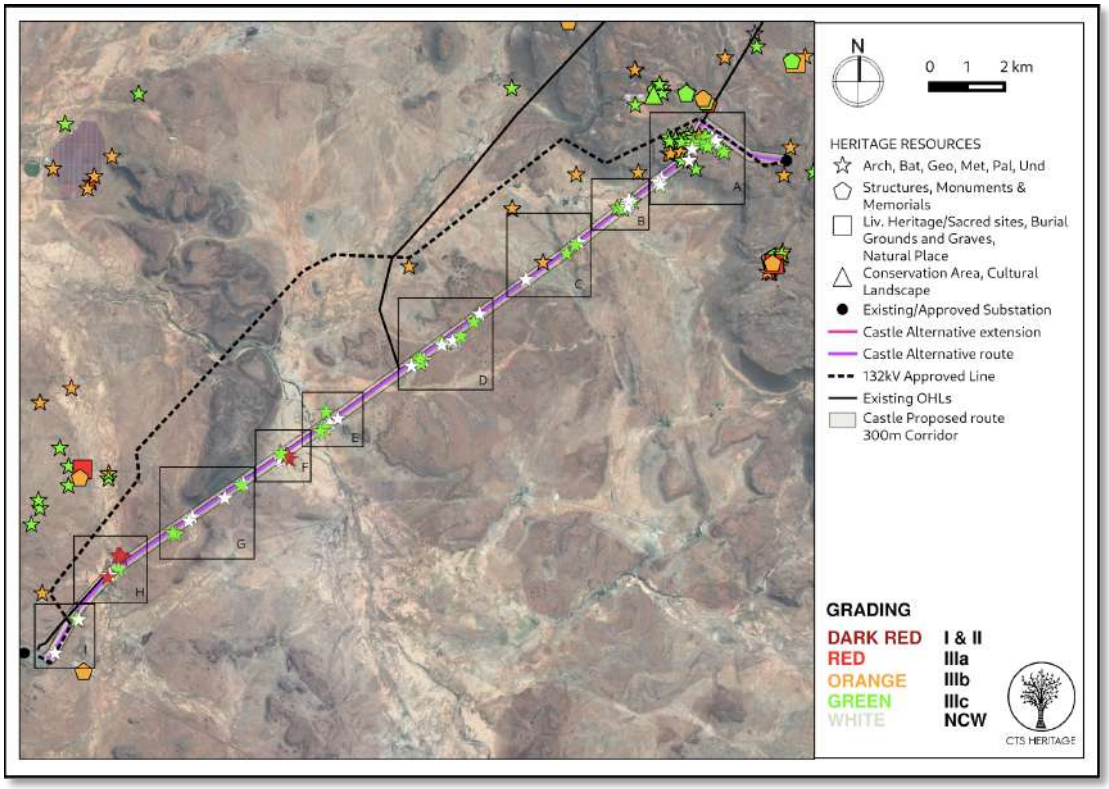


Figure 6-42: Heritage Resources Map. Heritage Resources previously identified in and near the study area, with SAHRIS Site IDs indicated.

6.8.1.2 Palaeontology

According to the SAHRIS Palaeosensitivity Map (Figure 6-45), the area proposed for development is underlain by sediments of moderate and very high paleontological sensitivity. According to the extract from the Council for GeoSciences Map 3024 for Colesburg, the development area is underlain by Jurassic Dolerite, the Tierberg Formation of the Ecca Group and the Adelaide Subgroup of the Beaufort Group.

As part of a process undertaken for the nearby Vetlaagte PV Facility, Almond completed a field-based palaeontological assessment of the area proposed for development in this application. Almond (2012) found that "The potentially fossiliferous sediments of the Late Palaeozoic Karoo Supergroup (Ecca and Lower Beaufort Groups) that underlie the study area are almost entirely mantled in a thick layer of superficial deposits of probable Pleistocene to Recent age. These include various soils, gravels and – at least in some areas - a well-developed calcrete hardpan. The upper Ecca Group bedrocks in the northern portion of the study area contain locally abundant fossil wood (of palaeontological interest for dating and paleoenvironmental studies), as well as low diversity non-marine trace fossil assemblages typical of the Waterford Formation, rather than the Tierberg Formation as mapped. No vertebrate fossils and only scattered woody plant impressions of the Permian Glossopteris Flora were observed within the Lower Beaufort Group rocks that are very poorly exposed in the southern portion of the Vetlaagte study area. Trace fossils, silicified wood and rare vertebrate remains (therapsids, parareptiles) of the Middle Permian Pristerognathus Assemblage Zone have recently been recorded from this succession in the De Aar region (Almond 2010b). Extensive dolerite sills and dykes of the Early Jurassic Karoo Dolerite Suite intruding the

Karoo Supergroup sediments are entirely unfossiliferous, as are rare intrusive kimberlite pipe rocks of Cretaceous age. The diverse superficial deposits within the three study areas (e.g. soils, gravels, alluvium, calcrete hardpans) are of low palaeontological sensitivity as a whole . Abundant fragments of reworked fossil wood material of Ecca provenance occur widely within subsurface and surface gravels overlying the Ecca Group outcrop area."

The observations made by Almond (2012) are mapped relative to the proposed development in Figure 6-45. One palaeontological site may be impacted by the proposed laydown areas - SAHRIS Site 34607. This site is described by Almond (2012) as "Thin tempestite sandstones of Waterford Formation with moderately diverse trace fossil assemblages" and he indicates that no mitigation of this site is required. Millsteed (2014, SAHRIS ID 183143) completed his palaeontology assessment for the original environmental authorisation for the Castle WEF. Millsteed (2014) found that: "The reporting area is underlain by Late Permian sedimentary rocks of the Adelaide Subgroup, Jurassic dolerites of the Karoo Dolerite Suite and unconsolidated sands constituting a Cenozoic-age regolith. The rocks of the Adelaide Subgroup are known to be fossiliferous elsewhere in the Karoo Basin and contain famous and scientifically significant vertebrate faunas and plant macrofossil floras. Several fragmentary fossils were located within this unit during the site investigation and the density of their occurrence suggests that numerous other fossils may be present within the unit elsewhere in the reporting area. No fossils were located within the Cenozoic regolith, but similar deposits are known to be fossiliferous elsewhere in the Karoo and fossil materials may well be present within subsurface portions of the stratigraphic unit. The dolerites formed via intrusion of magma that crystallised deep in the earth's crust, and accordingly, are unfossiliferous.

The potential for a negative impact on the fossil heritage of the area can be quantified in the following manner. It is probable that there will be a negative impact on the palaeontological heritage of the Adelaide Subgroup. As the Adelaide Subgroup underlies the majority of the reporting area and is likely to be affected by the construction of the project's infrastructure, the overall probability of a negative impact is assessed as being probable. Should any undiscovered fossil materials be impacted upon, they may well be of high scientific and cultural significance." Millsteed (2014) recommended that a Chance Fossil Finds Protocol be implemented for the duration of construction activities.

In Bamford's desktop assessment for this area in 2021, she notes that "Based on experience, other reports and the lack of any significant previously recorded fossils from the area, it is unlikely that any fossils would be preserved in the Tierberg Formation or Adelaide Subgroup. Nonetheless, a Fossil Chance Find Protocol should be added to the EMPr." This recommendation is also applicable to the proposed grid alignment.

6.8.2 Site Sensitivity

The area proposed for the grid connection alignment has been extensively surveyed for impacts to heritage resources (Figure 6-42). We know enough about the overall heritage sensitivity of the area to be able to determine the heritage sensitivity of the area, especially due to the recent heritage impact assessment completed by ACO Associates in 2021 for the same grid alignment. A number of graded archaeological sites are known to be located within the assessed 300m grid corridor. Impacts to these sites can be avoided through the implementation of the no-go buffers and other mitigation measures recommended in Gribble and Euston-Browne (2021) (see appendix 1.2), as well as the implementation of the attached chance fossil finds procedure.

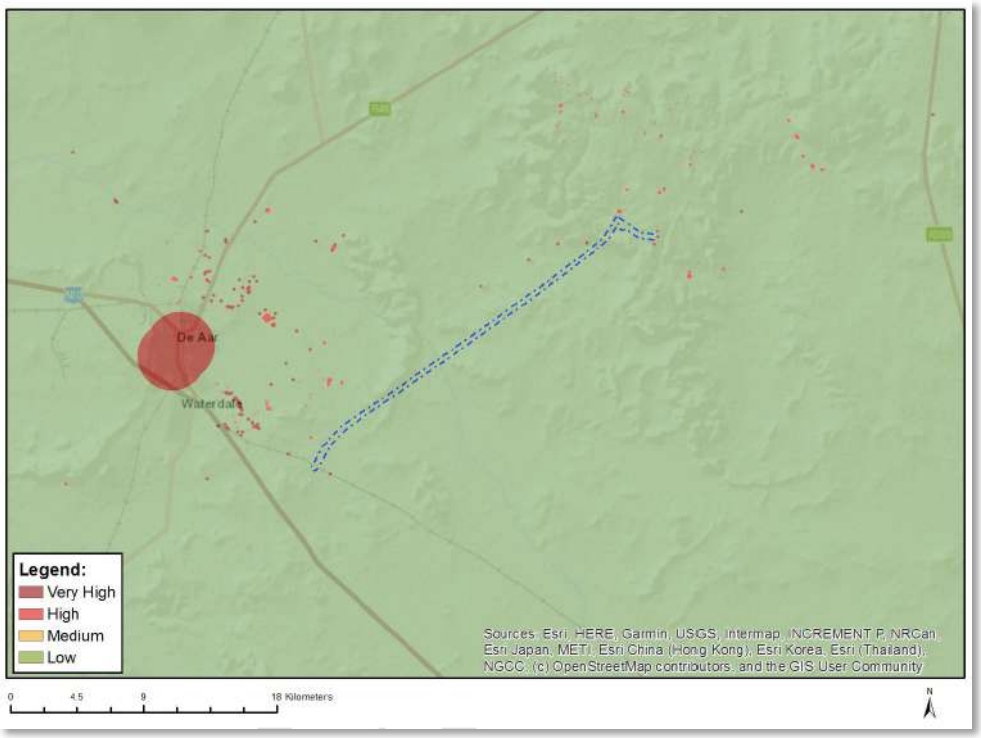


Figure 6-43: Map of relative archaeological and cultural heritage theme sensitivity as per DFFE screening tool (2022/04/28).

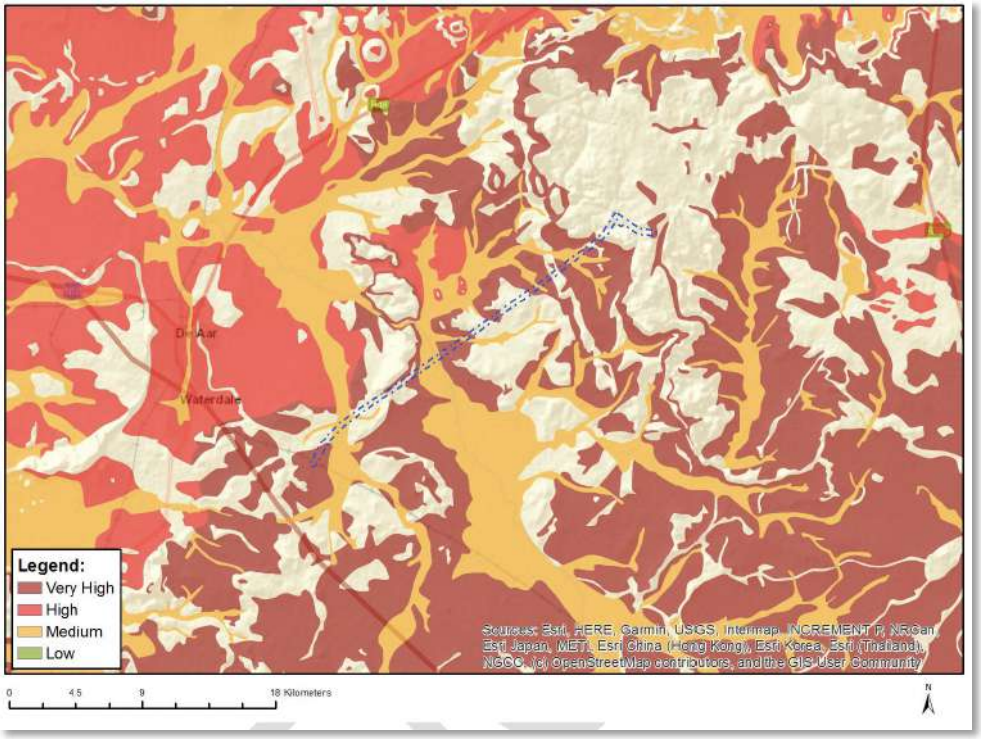
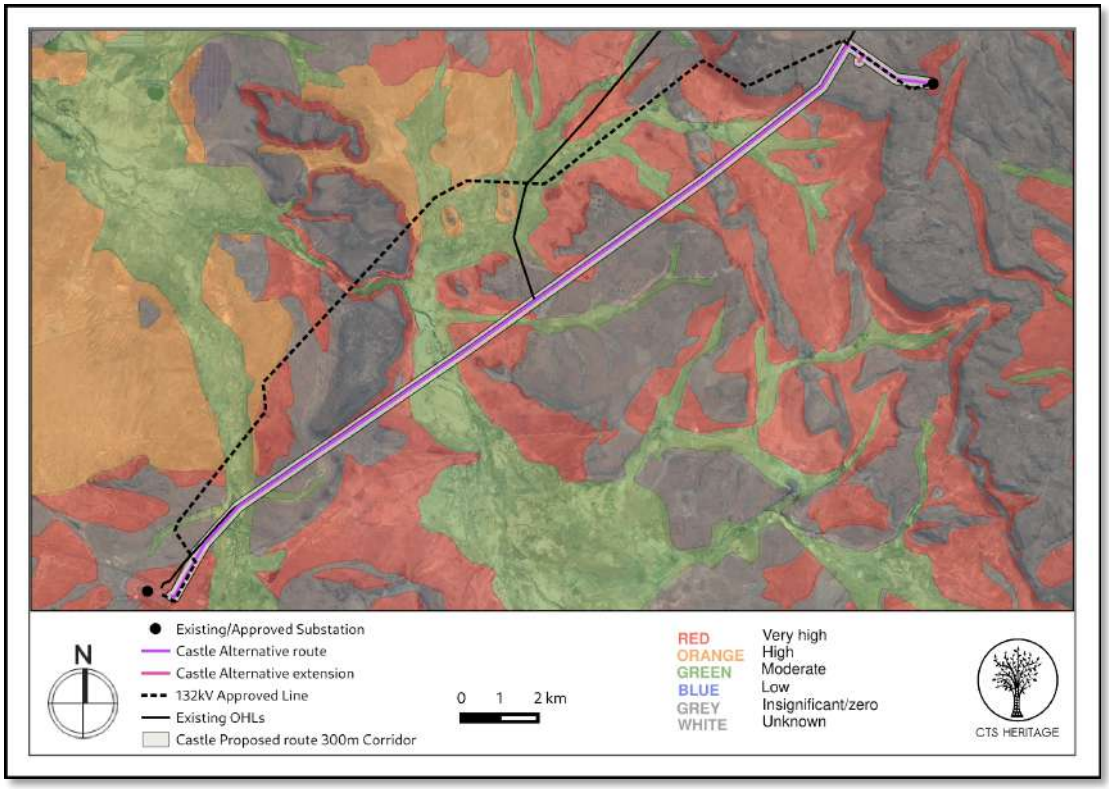


Figure 6-44: Map of relative palaeontology theme sensitivity as per DFFE screening tool (2022/04/28).



	RED:	VERY HIGH - field assessment and protocol for finds is required
	ORANGE/YELLOW:	HIGH - desktop study is required and based on the outcome of the desktop study, a field assessment is likely
	GREEN:	MODERATE - desktop study is required
	BLUE/PURPLE:	LOW - no palaeontological studies are required however a protocol for chance finds is required
	GREY:	INSIGNIFICANT/ZERO - no palaeontological studies are required
	WHITE/CLEAR:	UNKNOWN - these areas will require a minimum of a desktop study.

Figure 6-45: Palaeo-sensitivity Map indicating very high fossil sensitivity underlying the study area.

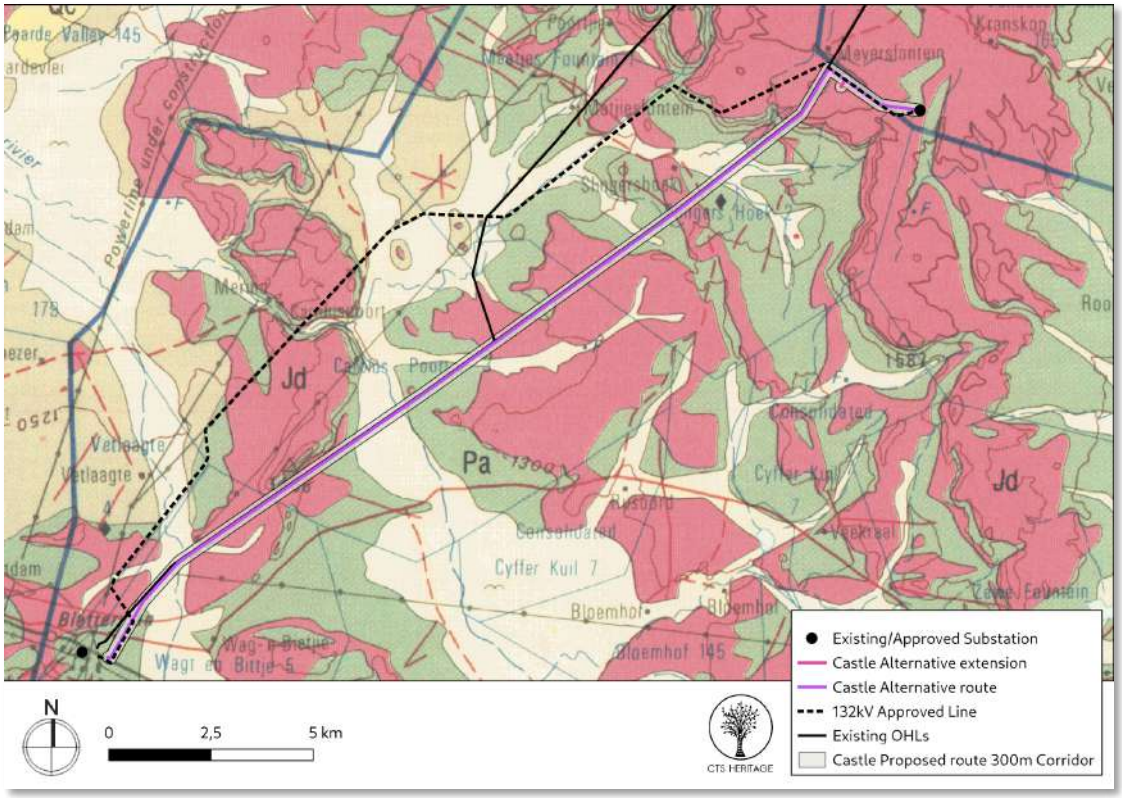


Figure 6-46: Geology Map. Extracted from the Council for GeoSciences Map 3024 for Colesburg indicating that the development area is underlain by Jd: Jurassic Dolerite, Pt (lighter green): Tierberg Formation of the Ecca Group and Pa (darker green): Adelaide Subgroup of the Beaufort Group.

6.8.3 Impact assessment

Table 6-30: Pre-colonial and Colonial Archaeological Impact Assessment.

No.	1 Alternative 1			
Project phase	Construction			
Impact title	Pre-colonial and Colonial Archaeological Impact Assessment			
Impact description	Possible impacts to archaeological sites and materials			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Local	Extending across the site and to nearby settlements.
Duration	Permanent	Impact may be permanent, or in excess of 25 years.	Permanent	Impact may be permanent, or in excess of 25 years.
Intensity	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Moderate - negative	
Probability	Very likely (>90%)	There are sound reasons that the impact will occur.	Very unlikely (>10%)	There are reasons that make the impact conceivable, yet improbable.
Significance	Moderate - negative		Minimal - negative	

Importance	High	High	High	High
Consequence	Moderately-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	Low	The affected environment may not be able to recover from the impact - permanently modified.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	General: • Do not disturb any old stone kraals or ruins and do not remove stone from walls, or artefacts from the earth. • Report any chance discoveries of human remains to an archaeologist or a heritage authority. Specific: • Three archaeological sites require mitigation, in the form of artefact mapping, recording and collection by the archaeologist prior to the commencement of construction of the grid connections. These are: • JG050-JG052 / GEB013-GEB014; • JG067–JG072 / GEB025; and • JG077. • The following sites, each with the buffer described below, must be considered no-go areas during construction activities and those nearest the route alignments must be clearly marked as out of bounds: • The possible Khoi kraals and shepherds' huts (JG040; JG064; JG066; JG081-JG090) – 40 m buffer centered on JG088; • The possible "wolwehok" (JG036) – 20 m buffer; and • The rock engraving (JG044) - 20 m buffer.			
Comment on ratings	Ratings obtained from ACO Associates (Gribble and Euston-Browne, 2021, SAHRIS ID 570440).			

Table 6-31: Palaeontological Impact Assessment.

No.	2 Alternative			
Project phase	Construction			
Impact title	Palaeontological Impact Assessment			
Impact description	Possibility of encountering fossils during groundworks			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Limited	Limited to the site and its immediate surroundings.	Limited	Limited to the site and its immediate surroundings.
Duration	Permanent	Impact may be permanent, or in excess of 25 years.	Permanent	Impact may be permanent, or in excess of 25 years.
Intensity	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Moderate - negative	
Probability	Unlikely (>33%)	The impacts occurrence is rare but has happened before.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Minor - negative		Minor - negative	
Importance	Low	Low	Low	Low
Consequence	Very slightly-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	

Reversibility	**Low**	The affected environment may not be able to recover from the impact - permanently modified.
Mitigatability	**High**	Mitigation exists and will considerably reduce the significance of impacts.
Potential mitigation	Implementation of a Chance Fossil Find Protocol (see Appendix C) • Reporting by the ECO of any chance fossil finds to SAHRA and their conservation (preferably in situ). • Recording and judicious sampling of significant chance fossil finds by a qualified palaeontologist, together with pertinent contextual data (stratigraphy, sedimentology, taphonomy) within the final footprint; and • Curation of any recovered fossil material within an approved repository (museum / university fossil collection) by a qualified palaeontologist.	
Comment on ratings	Ratings obtained from ACO Associates (Gribble and Euston-Browne, 2021, SAHRIS ID 570440).	

6.8.4 Conclusion and Recommendations

The area proposed for the grid connection alignment has been extensively surveyed for impacts to heritage resources. We know enough about the overall heritage sensitivity of the area to be able to determine the heritage sensitivity of the area, especially due to the recent heritage impact assessment completed by ACO Associates in 2021 for the same grid alignment. Several graded archaeological sites are known to be located within the assessed 300m grid corridor. Impacts to these sites can be avoided through the implementation of the no-go buffers and other mitigation measures recommended in Gribble and Euston-Browne (2021), as well as the implementation of the attached chance fossil finds procedure

Based on the information available, the area proposed for development has been thoroughly assessed and we therefore know that significant archaeological, palaeontological and cultural landscape heritage resources are located within the grid corridor. No impact to these significant resources should take place as long as the recommendations included in Gribble and Euston Browne (2021) are implemented. As the area has been thoroughly surveyed, it is recommended that no further heritage assessments are required in terms of section 38(3) of the NHRA. The attached Fossil Chance Find Protocol must be implemented for the duration of construction activities and the recommendations included in Gribble and Euston-Browne (2021) must be implemented.

6.9 Visual Landscape

Visual specialist, Lourens du Plessis, completed a Visual Impact Assessment for the proposed Castle to Hydra OHL. Key findings concluded that construction and operation of the proposed grid connection infrastructure may have a visual impact on the study area, especially within a 0.5km radius (and potentially up to a radius of 1.5km) of the power line structures. The visual impact will differ amongst places, depending on the distance from the infrastructure.

The proposed power line infrastructure is located adjacent to numerous existing power line infrastructure for most of its alignment. The visual amenity along this infrastructure corridor has already been compromised to a large degree. Admittedly, the frequency of visual exposure to power lines is expected to increase, but it is still preferable to consolidate the linear infrastructure as much as possible. To this end, the cumulative visual impact associated with the proposed grid connection infrastructure is within acceptable limits. Overall, the significance of the visual impacts is expected to range from moderate to low because of the generally undeveloped character of the landscape. No visual impacts of a high significance are expected to occur.

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 is acceptable from a visual impact perspective.

A summary of the of the findings on visual landscape are provided below. The Visual Impact Assessment Report is attached as Annexure D6.

6.9.1 Baseline Description

The study area occurs on land that ranges in elevation from approximately 1600m above sea level along the escarpment at the Castle WEF Substation in the north east, to 1300m where the proposed OHL connects to the Hydra MTS in the south west. The terrain along the proposed alignment (except for the escarpment) is predominantly flat with no major topographical features. The topography or terrain morphology of the region is broadly described as Lowlands with Hills of the Interior Plain. Refer to Map 1 for a shaded relief map of the study area.

Land cover in the region and along the alignment consists predominately of low shrubland, bare rock and soil with areas of erosion. The natural vegetation types of the study area are very homogenous and are indicated as Northern Upper Karoo, in the lower lying areas, and Besemkaree Koppies Shrubland on the elevated areas, hills and low mountains. Refer to Figure 6-51 for the land cover map of the study area.

The region receives an average of less than 300mm rainfall per annum and is representative of the dry semi-desert climate associated with the Great Karoo. The non-perennial Brak River is the only major hydrological feature, traversing the study area from the south-east to the west. Other non-perennial rivers or streams are located throughout the region. A number of farm dams are found throughout the study area and there is a high occurrence of non-perennial pans to the east.

The most prominent land use activity within the study area is described as sheep farming. There are no major tourist attractions within the study area and the region, generally referred as the Karoo, is not considered to be a final tourist destination. It is however quite popular as a stopover for visitors travelling between Gauteng and Cape Town.

The greater landscape of the study area is characterised by wide-open spaces and otherwise very limited development. It should however be noted that there are a number of authorised (and current) renewable energy applications within the study area and the greater region, that may change the landscape to some degree in the future. There are no formally protected or conservation areas within the study area.

Additional industrial style infrastructure within the study area, include a railway line in the south and a number of power lines traversing from the south-west to the north-east all congregating at the Hydra substation. These existing lines include the Hydra to Roodekuil 2 220kV power line, Hydra to Roodekuil 1 220kV, Beta to Hydra 1 & 2 400kV, Perseus to Hydra 2 & 3 400kV and Hydra to Ruigtevallei 1 & 2 22kV.

The rural part of the study area is sparsely populated with most of the population residing at homesteads or farm dwellings. Some of the homesteads in closer proximity to the proposed power line include:

- Meyersfontein
- Slingershoek
- Wag-'n-Bietjie
- Poortjie
- Vetlaagte

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 photographs below aid in describing the general environment within the study area and surrounding the proposed project infrastructure.

Figure 6-47: Powerline infrastructure within the region (note the shrubland vegetation).

Figure 6-48: Hydra substation.

Figure 6-49: Topography and vegetation of the region.

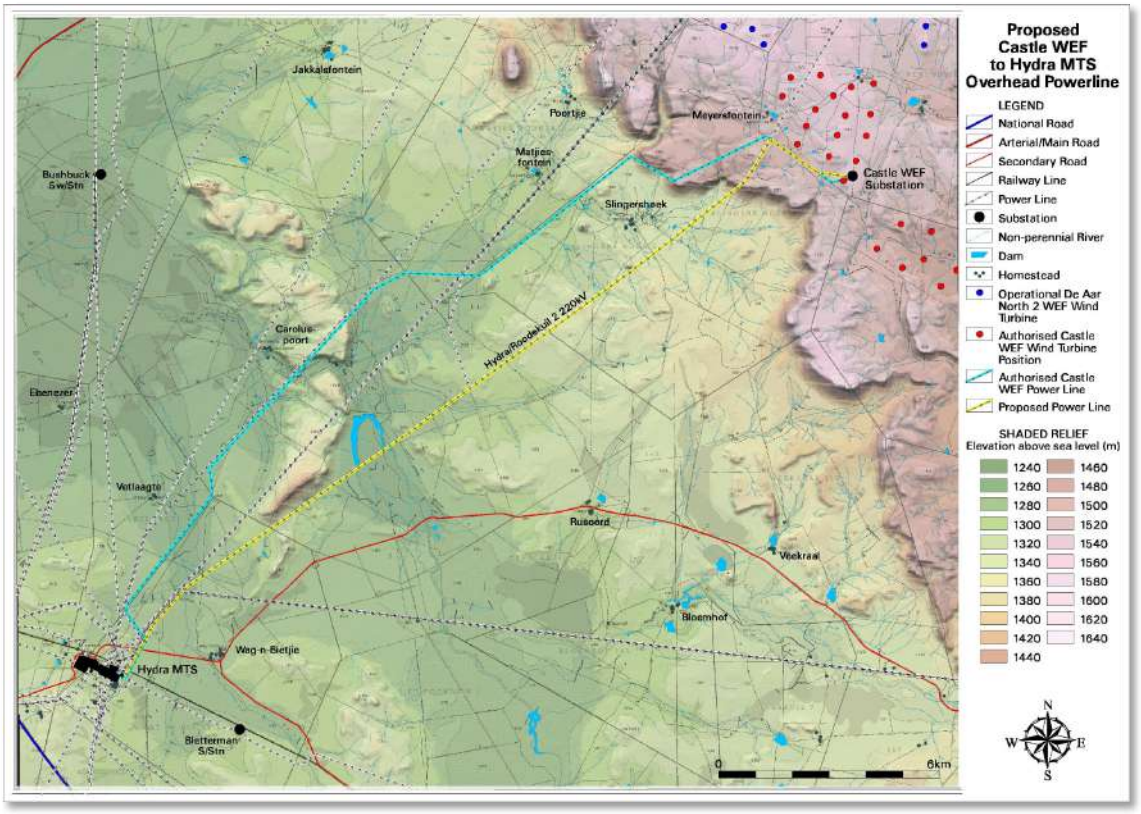


Figure 6-50: Shaded relief map of the study area.

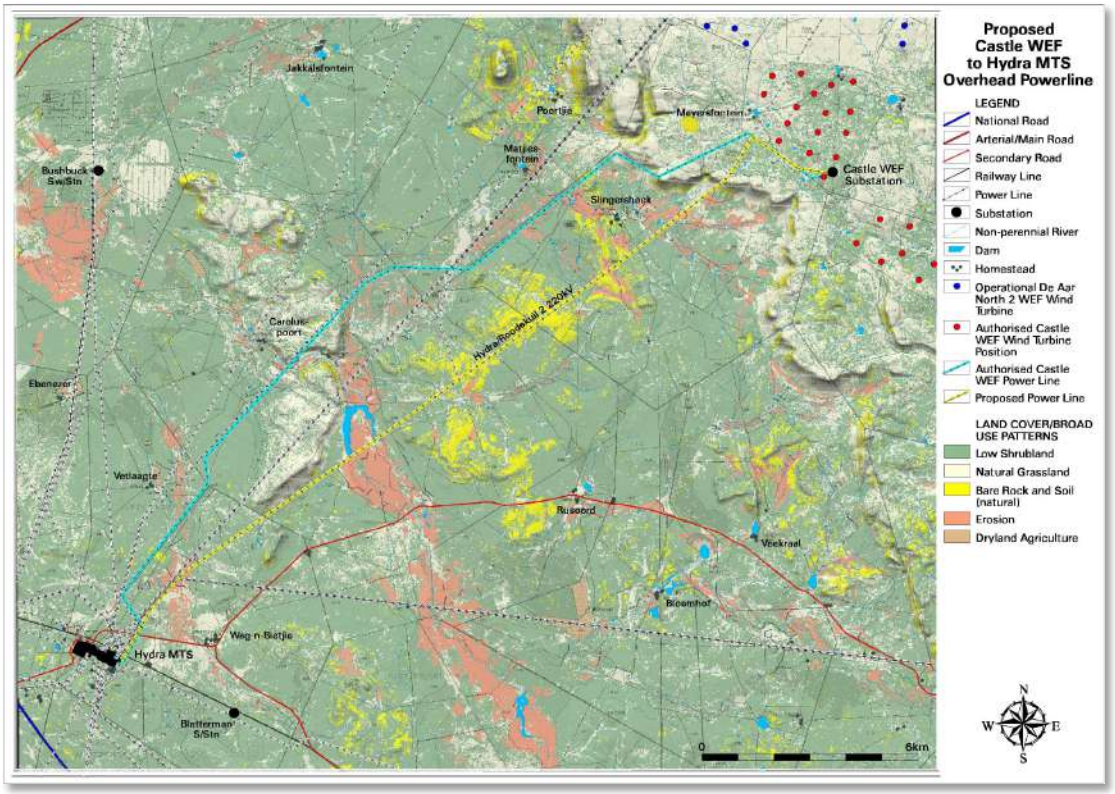


Figure 6-51: Land cover and broad land use patterns.

6.9.2 Site Sensitivity

6.9.2.1 Potential visual exposure

The potential visual exposure (visibility) of the grid connection infrastructure is shown on Figure 6-53. The visibility analyses were undertaken from the proposed power line alignment at 32m above ground level (i.e. the approximate maximum height of the power line towers). 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 infrastructure (i.e. a 132kV-400kV power line).

Figure 6-53 also indicates proximity radii from the proposed grid connection infrastructure to show the viewing distance (scale of observation) of the structures in relation to their surrounds.

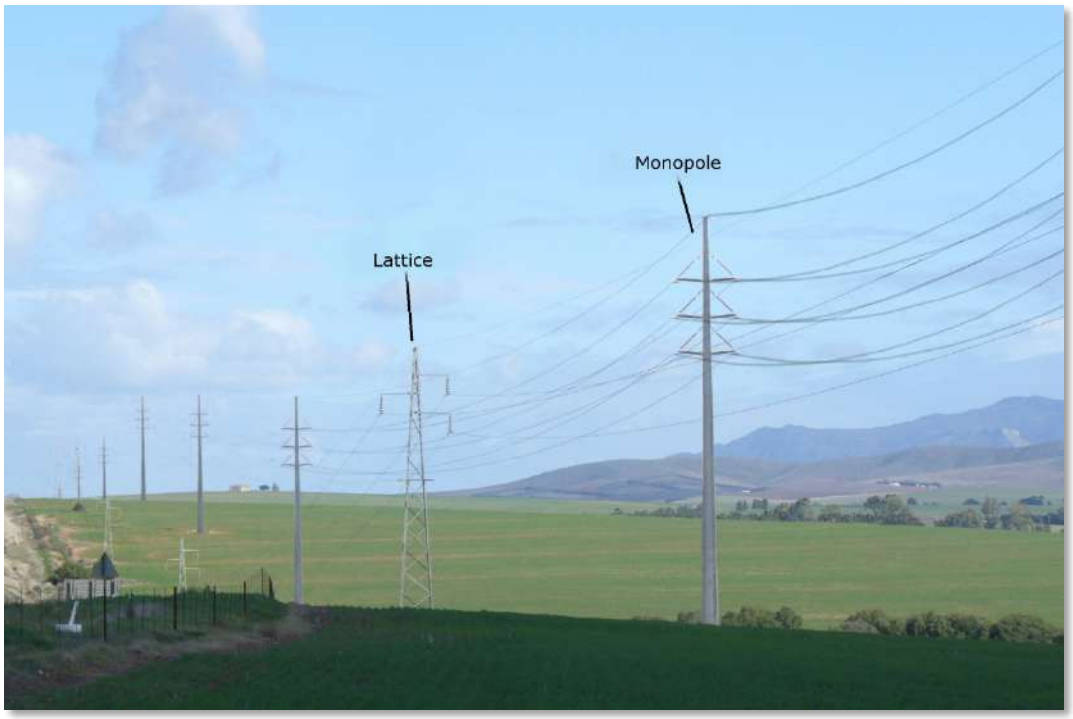


Figure 6-52: Examples of 132 kV overhead power lines.

It is expected that the grid connection infrastructure may theoretically be visible within the 3km visual corridor and potentially highly visible within a 0.5km radius of the structures due to the generally flat terrain it traverses. Beyond 1,5km the visibility becomes more scattered due to the undulating nature of the topography. The grid connection structures are unlikely to be visible beyond a 3km radius of the structures.

It should also be noted that the potential visual exposure will not occur in isolation, but rather in conjunction with the existing power lines and railway line within the study area.

- 0 – 0.5km (short distance)
  - It is expected that the power line structures would be highly visible from the secondary road near Hydra substation as well as a small number of unknown homesteads.
- 0.5 – 1.5km (short to medium distance)

  - The potential sensitive visual receptors within this zone include residents of Meyersfontein, Slingershoek and a few unknown homesteads. Users of the secondary road may also be impacted upon.
  - The rest of the visually exposed areas fall within vacant farmland and open space generally devoid of potential sensitive visual receptors.
- 1.5 – 3km (medium to long distance)
  - The potential sensitive visual receptors within this zone include residents of Wag-n-Bietjie, Vetlaagte and a number of unknown homesteads. Users of the secondary road may also be impacted upon.
  - Scattered visually screened areas can be found to the east and north of the Castle WEF Substation, as well as, south of the Hydra MTS.
- > 3km
  - At distances exceeding 3km the intensity of visual exposure is expected to be very low and highly unlikely due to the distance between the object (grid connection infrastructure) and the observer.

In general terms it is envisaged that the grid connection infrastructure, where visible from shorter distances (e.g. less than 0.5km and potentially up to 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 low, due to the generally remote location of the proposed infrastructure and the low number of potential observers. It should once again be noted that the potential visual exposure will not occur in isolation, but rather in conjunction with the existing power lines and railway line electrical infrastructure in the study area.

6.9.2.2 Potential cumulative visual exposure

Cumulative visual impacts can be defined as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments. In this case the 'development' would be a new 132kV power line as seen in conjunction with the existing (or proposed/authorised) grid connection infrastructure in proximity. Refer to Map 4.

Cumulative visual impacts may be:

- Combined, where several power lines are within the observer's arc of vision at the same time;
- Successive, where the observer has to turn his or her head to see the various structures of a power line; and
- Sequential, when the observer has to move to another viewpoint to see different power line structures, or different views of the same power line (such as when travelling along a route).

The visual impact assessor is required (by the competent authority) to identify and quantify the cumulative visual impacts and to propose potential mitigating measures. This is often problematic as most regulatory bodies do not have specific rules, regulations or standards for completing a cumulative visual assessment, nor do they offer meaningful guidance regarding appropriate assessment methods. There are also not any authoritative thresholds or restrictions related to the

capacity of certain landscapes to absorb the cumulative visual impacts of the power line infrastructure.

To complicate matters even further, cumulative visual impact is not just the sum of the impacts of two developments. The combined effect of both may be much greater than the sum of the two individual effects, or even less.

The cumulative impact of the proposed grid connection infrastructure on the landscape and visual amenity is a product of:

- The distance between the power lines;
- The distance over which the structures are visible;
- The overall character of the landscape and its sensitivity to the structures;
- The siting and design of the power line; and
- The way in which the landscape is experienced.

The specialist is required to conclude if the proposed 'development' will result in any unacceptable loss of visual resource considering the industrial infrastructure proposed in the area.

The proposed power line infrastructure is located adjacent to an existing power line and the authorized Castle WEF powerline. There are also five (5) existing power lines that lie just west of the proposed OHL, three (3) existing powerlines and a railway line lie to the south of the proposed alignment. The visual amenity along this power line corridor has already been compromised to a large degree. Admittedly, the frequency of visual exposure to power line infrastructure is expected to increase, but it is still preferable to consolidate the linear infrastructure as much as possible. To this end, the cumulative visual impact associated with the proposed power line is within acceptable limits.

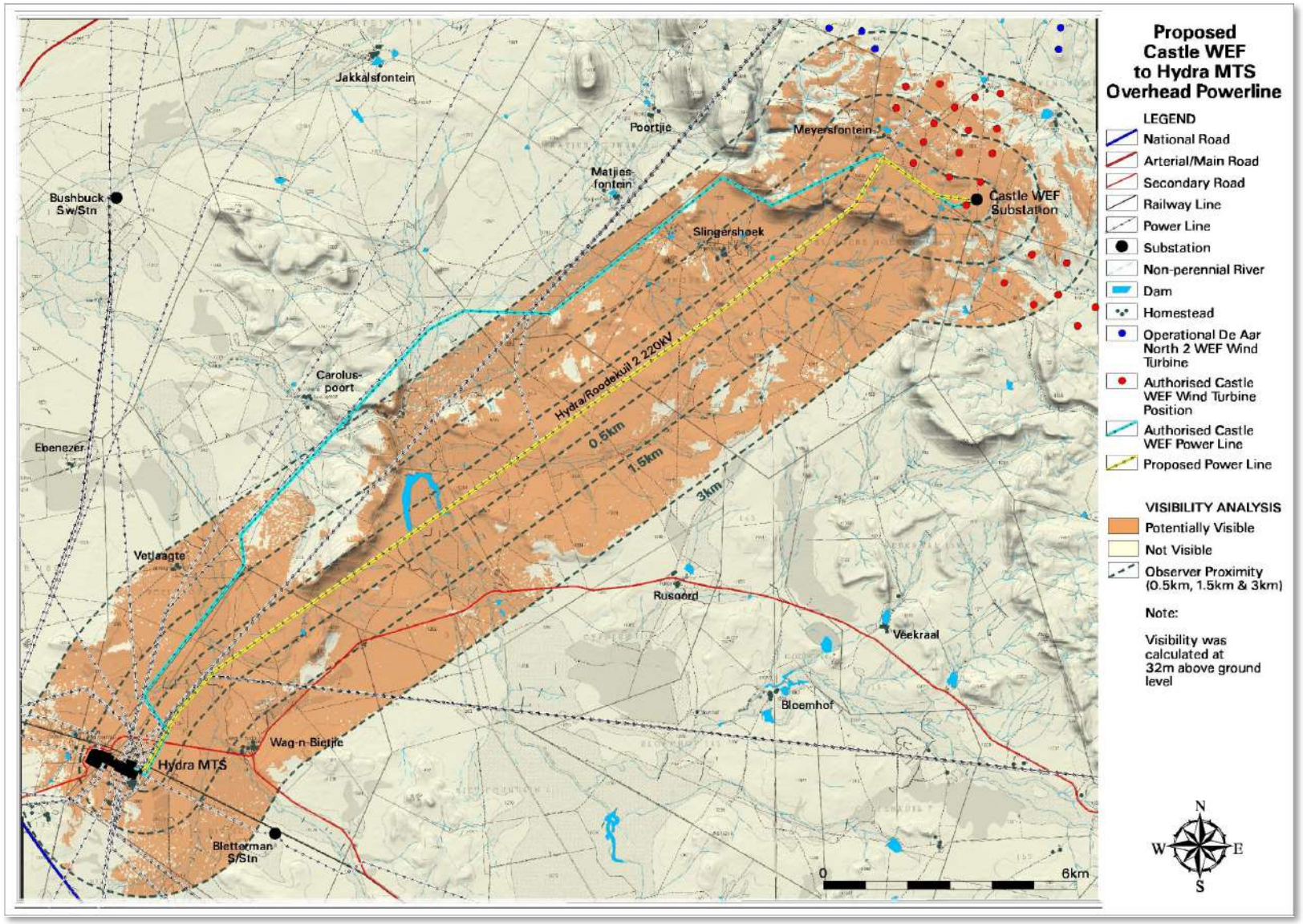


Figure 6-53: Viewshed analysis of the proposed grid connection infrastructure.

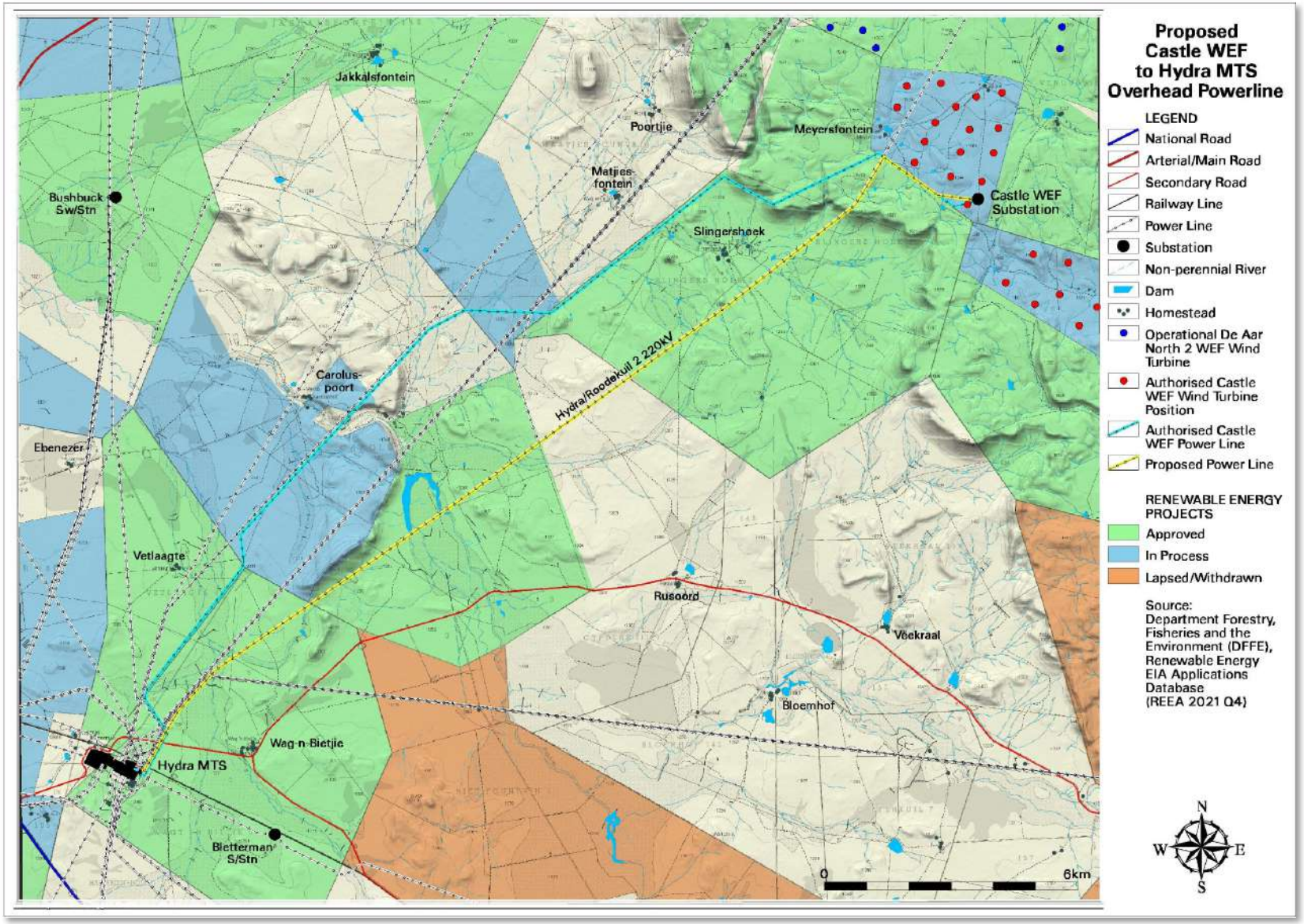


Figure 6-54: Renewable energy projects within the region contributing to cumulative visual exposure.

6.9.2.3 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 power lines) and downwards for smaller structures (e.g. 132kV power line) 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 6-55, 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 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.

6.9.2.4 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.

Viewer incidence within the study area is anticipated to be the highest along the secondary road adjacent to or underneath the proposed project infrastructure. 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 generally remote location of the proposed power line, and the sparsely populated nature of the receiving environment, there are only a limited number of potential sensitive visual receptors in closer proximity to the proposed infrastructure. These receptor sites are indicated on Figure 6-55.

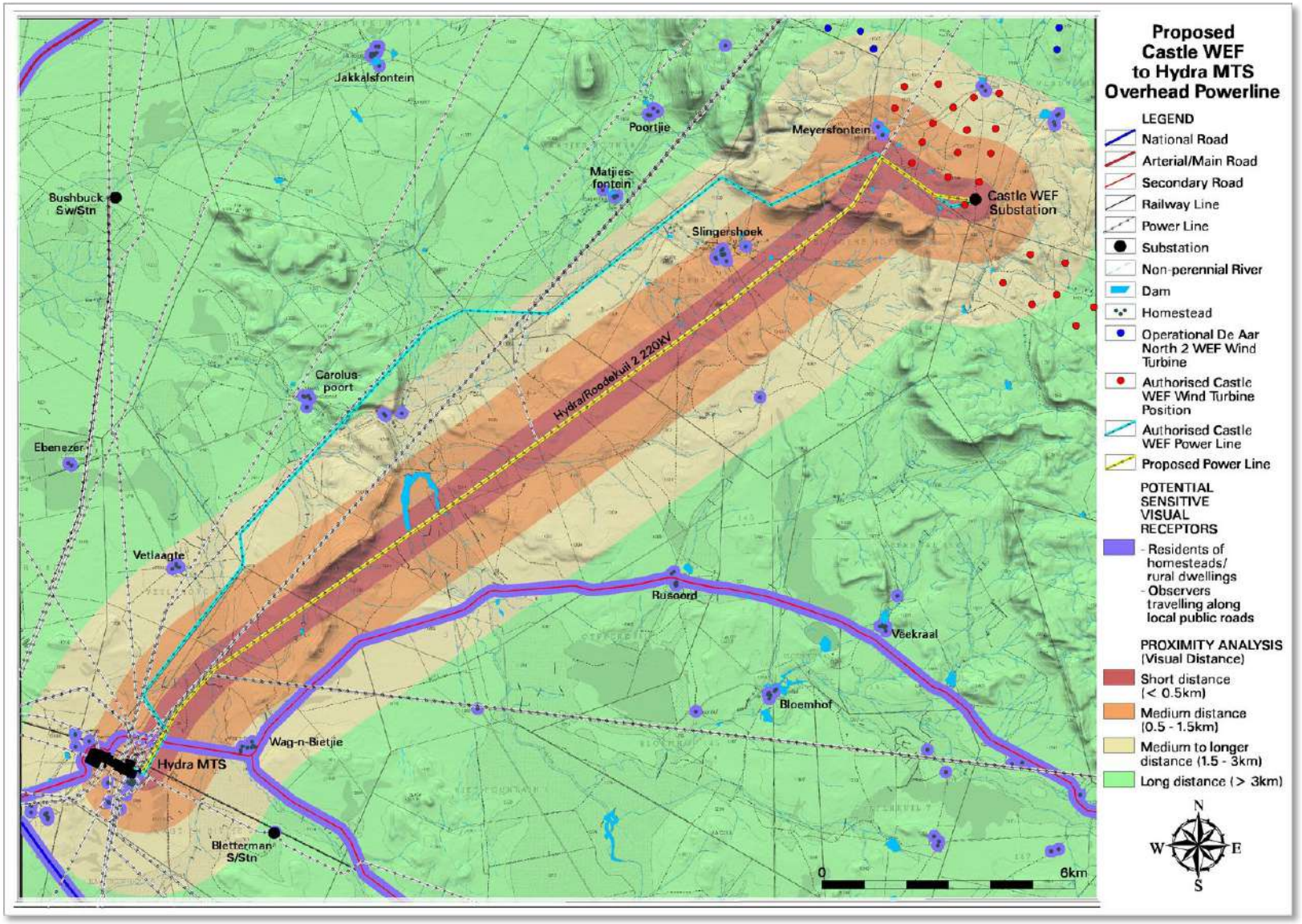


Figure 6-55: Proximity analysis and potential sensitive visual receptors.

6.9.2.5 Visual absorption capacity

The region receives an average of less than 300mm rainfall per annum and is representative of the dry semi-desert climate associated with the Great Karoo. The dominant land cover type is shrubland, which is described as plants with a low growth form or restricted height.

Overall, the Visual Absorption Capacity (VAC) of the receiving environment is low by virtue of the limited height (or absence) of the vegetation and the overall low occurrence of buildings and structures. 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 considered, 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 considered for any of the homesteads or settlements, thus assuming a worst-case scenario in the impact assessment.

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

The visual impact index and potentially affected sensitive visual receptors are indicated on Figure 6-56. In general, there are only a limited number of receptor sites within closer proximity (3km) to

the proposed project infrastructure. The magnitude of the potential visual impact on these receptor sites are discussed below.

Magnitude of the potential visual impact

- 0 – 0.5km
  - The grid connection infrastructure (power line) may have a visual impact of very high magnitude on the following observers:
  - Site 1: Observers travelling along the secondary road where it traverses adjacent or underneath the power line alignment
- 0.5 – 1.5km
  - The grid connection infrastructure (power line) may have a visual impact of high magnitude on the following observers:
  - Residents of/or visitors to:
    - Site 2: Slingershoek
    - Site 3: Meyersfontein
- 1.5 – 3km
  - The grid connection infrastructure (power line) may have a visual impact of moderate magnitude on the following observers:
  - Residents of/or visitors to:
    - Site 4: Vetlaagte
    - Site 5: Wag-n-Bietjie
  - Observers travelling along the secondary road where it traverses adjacent or underneath the power line alignment.

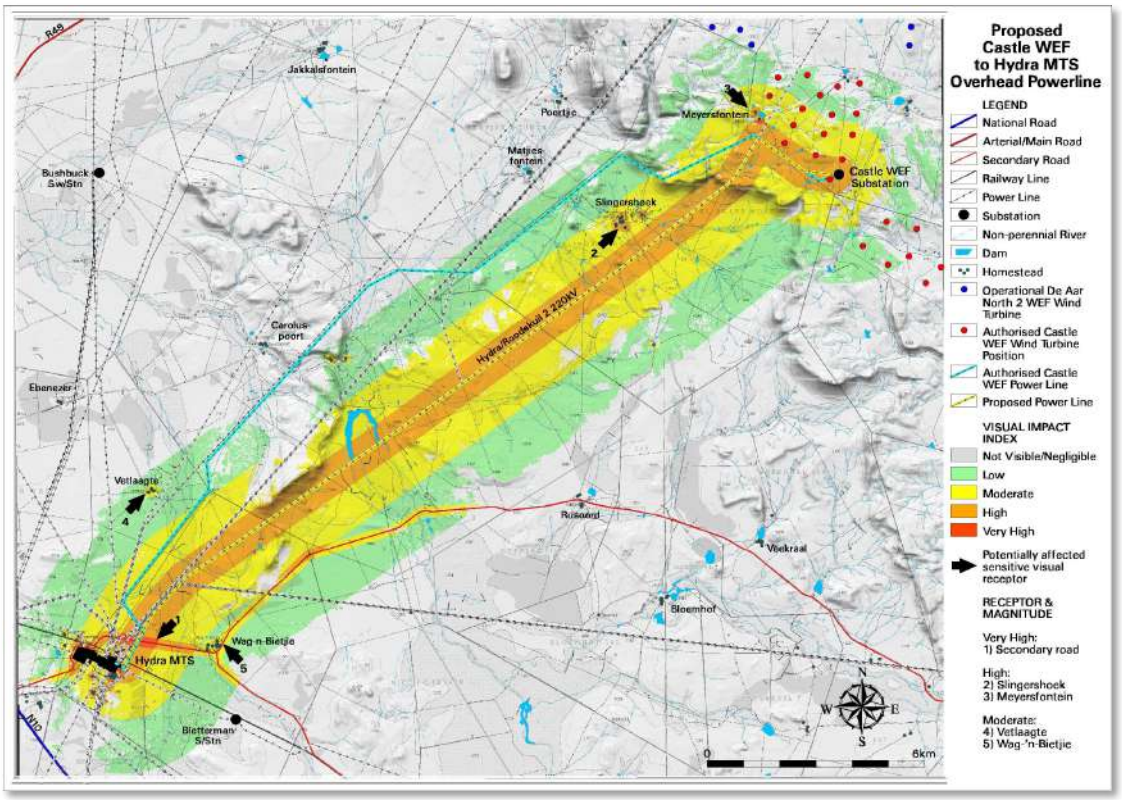


Figure 6-56: Visual impact index and potentially affected sensitive visual receptors.

6.9.3 Impact assessment

The primary visual impacts of the proposed grid connection infrastructure for the Castle Wind Energy facility are assessed below.

6.9.3.1 Construction impacts

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 servitude site that may cause, at the very least, a visual nuisance to other road users and landowners in the area.

Construction activities may potentially result in a moderate (significance rating = 48), temporary visual impact, that may be mitigated to low (significance rating = 20).

Table 6-32: Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.

No.	1	Alternative 1		
Project phase	Construction			
Impact title	Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.			
Impact description	Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Local	Extending across the site and to nearby settlements.
Duration	Short term	Impact will last less than 1 year.	Short term	Impact will last less than 1 year.
Intensity	Very high	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will permanently cease.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Low - negative	
Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Moderate - negative		Minimal - negative	
Importance	Low	Low	Low	Low
Consequence	Slightly-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		

Potential mitigation	• 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 (if required) 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 appropriate and effective 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.
Comment on ratings	A mitigating factor within this scenario is the very low occurrence of receptors within the receiving environment and within close proximity to the proposed infrastructure. Additionally, observers traveling along the secondary road will only be exposed to the visual intrusion for a short period of time. This reduces the probability of this impact occurring.

6.9.3.2 Operational impacts

Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase

The grid connection infrastructure is expected to have a moderate visual impact (significance rating = 36) on observers within a 0.5km radius (and potentially up to a 1.5km radius) of the grid connection infrastructure. The visual impact of the power line will largely be absorbed by the presence of the existing power line, railway line and mining 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.

Table 6-33: Visual impact on observers in close proximity to the proposed grid connection infrastructure.

No.	2 Alternative			
Project phase	Operation			
Impact title	Visual impact on observers in close proximity to the proposed grid connection infrastructure.			
Impact description	Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Local	Extending across the site and to nearby settlements.
Duration	Long term	Impact will last between 6 and 25 years.	Long term	Impact will last between 6 and 25 years.
Intensity	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.	High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.
Magnitude	High - negative		High - negative	

Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Likely (>66%)	The impact may occur, but not necessarily proof that it will.
Significance	Moderate - negative		Moderate - negative	
Importance	Moderate	Moderate	Moderate	Moderate
Consequence	Slightly-detrimental		Slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	• Planning: – Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. • Operations: – Maintain the general appearance of the infrastructure. • Decommissioning: – Remove infrastructure not required for the post-decommissioning use. Rehabilitate all affected areas. – Consult an ecologist regarding rehabilitation specifications.			
Comment on ratings	A mitigating factor within this scenario is the very low occurrence of receptors within the receiving environment. Observers traveling along the secondary road will only be exposed to the visual intrusion for a short period of time. Additionally, the proximity of existing powerlines and the Hydra Substation reduces the probability of this impact occurring as there is already an existing visual intrusion.			

Potential visual impact on sensitive visual receptors within the region (1.5 – 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.

Table 6-34: Visual impact of the proposed grid connection infrastructure within the region.

No.	3	Alternative		
Project phase	Operation			
Impact title	Visual impact on observers in close proximity to the proposed grid connection infrastructure.			
Impact description	Potential visual impact on sensitive visual receptors within the region (1.5 – 3km radius) during the operation of the grid connection infrastructure.			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent	Local	Extending across the site and to nearby settlements.	Local	Extending across the site and to nearby settlements.
Duration	Long term	Impact will last between 6 and 25 years.	Long term	Impact will last between 6 and 25 years.
Intensity	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.	Medium	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes are moderately altered.
Magnitude	Moderate - negative		Moderate - negative	

Probability	Likely (>66%)	The impact may occur, but not necessarily proof that it will.	Likely (>66%)	The impact may occur, but not necessarily proof that it will.
Significance	Moderate - negative		Moderate - negative	
Importance	Moderate	Moderate	Moderate	Moderate
Consequence	Slightly-detrimental		Slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	High	Mitigation exists and will considerably reduce the significance of impacts.		
Potential mitigation	• Planning: – Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. • Operations: – Maintain the general appearance of the infrastructure. • Decommissioning: – Remove infrastructure not required for the post-decommissioning use. Rehabilitate all affected areas. – Consult an ecologist regarding rehabilitation specifications.			
Comment on ratings	A mitigating factor within this scenario is the very low occurrence of receptors within the receiving environment. Observers traveling along the secondary road will only be exposed to the visual intrusion for a short period of time. Additionally, the proximity of existing powerlines and the Hydra Substation reduces the probability of this impact occurring as there is already an existing visual intrusion.			

6.9.3.3 Visual impact assessment: secondary impacts

The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.

Sense of place refers to a unique experience of an environment by a user, based on his or her cognitive experience of the place. Visual criteria, specifically the visual character of an area (informed by a combination of aspects such as topography, level of development, vegetation, noteworthy features, cultural / historical features, etc.), plays a significant role.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light.

The greater environment has a rural and undeveloped character. Settlements, where these occur, are limited in extent and domestic in scale. These vast, generally undeveloped landscapes are considered to have a high visual quality, except where structures (such as power lines and the Hydra substation) represent existing visual disturbances.

The anticipated visual impact of the proposed grid connection infrastructure on the regional visual quality (i.e. beyond 3km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of low significance.

Table 6-35: The potential impact on the sense of place of the region.

No.	4	Alternative
Project phase	Construction & Operation	
Impact title	The potential impact on the sense of place of the region.	
Impact description	The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.	
Impact Assessment	Impact not mitigated	Impact mitigated
Nature	Negative	Negative

Extent	Regional	Impacts manifest at a regional / municipal level.	Regional	Impacts manifest at a regional / municipal level.
Duration	Long term	Impact will last between 6 and 25 years.	Long term	Impact will last between 6 and 25 years.
Intensity	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.	Low	Impacts affect the environmental in such a way that natural, cultural and/or social functions and processes are slightly affected.
Magnitude	Moderate - negative		Moderate - negative	
Probability	Unlikely (>33%)	The impacts occurrence is rare but has happened before.	Unlikely (>33%)	The impacts occurrence is rare but has happened before.
Significance	Minor - negative		Minor - negative	
Importance	Low	Low	Low	Low
Consequence	Very slightly-detrimental		Very slightly-detrimental	
Confidence	Well established		Well established	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	Low	Mitigation does not exist; or mitigation may only slightly reduce the significance of impacts.		
Potential mitigation	• Planning: – Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. • Operations: – Maintain the general appearance of the infrastructure. • Decommissioning: – Remove infrastructure not required for the post-decommissioning use. Rehabilitate all affected areas. – Consult an ecologist regarding rehabilitation specifications.			
Comment on ratings	The low incidence of visual receptors within this environment, the relatively remote location of the proposed powerline and the occurrence of numerous existing powerlines within close proximity reduces the probability of this impact occurring. However, the potential future development of neighbouring renewable energy projects may drastically change the overall visual impact on the sense of place within the region.			

The potential cumulative visual impact of the proposed grid connection infrastructure on the visual quality of the landscape.

The construction of the grid connection infrastructure for the Castle Wind Energy facility 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 (significance rating = 42). This is acceptable from a visual impact perspective.

Table 6-36: The potential cumulative visual impact on the visual quality of the landscape (mitigated only).

No.	5	Alternative		
Project phase	Construction & Operation			
Impact title	Cumulative visual impact of the proposed grid connection infrastructure on the visual quality of the landscape.			
Impact description	The potential cumulative visual impact of the proposed grid connection infrastructure on the visual quality of the landscape.			
Impact Assessment	Impact not mitigated		Impact mitigated	
Nature	Negative		Negative	
Extent			Regional	Impacts manifest at a regional / municipal level.
Duration			Long term	Impact will last between 6 and 25 years.
Intensity			High	Impacts affect the environment in such a way that natural, cultural and/or social functions and processes will temporarily or permanently cease.
Magnitude			High - negative	
Probability			Likely (>66%)	The impact may occur, but not necessarily proof that it will.
Significance			Moderate - negative	
Importance			Low	Low
Consequence			Slightly-detrimental	
Confidence			Well established	
Reversibility	High	The affected environment may be able to recover from the impact.		
Mitigatability	Low	Mitigation does not exist; or mitigation may only slightly reduce the significance of impacts.		
Potential mitigation	• Planning: – Retain/re-establish and maintain natural vegetation immediately adjacent to the development footprint/servitude. • Operations: – Maintain the general appearance of the infrastructure. • Decommissioning: – Remove infrastructure not required for the post-decommissioning use. Rehabilitate all affected areas. – Consult an ecologist regarding rehabilitation specifications.			
Comment on ratings	Within the study area there are numerous existing power lines that all congregate at the Hydra Substation. The addition of the proposed powerline will contribute to the overall occurrence of industrial type infrastructure within the region. However, the low incidence of visual receptors within this environment and the relatively remote location of the proposed powerline reduces the probability of this impact occurring.			

6.9.4 Conclusion and Recommendations

The construction and operation of the proposed grid connection infrastructure for the Castle Wind energy facility may have a visual impact on the study area, especially within a 0.5km radius (and potentially up to a radius of 1.5km) of the power line structures. The visual impact will differ amongst places, depending on the distance from the infrastructure.

The proposed power line infrastructure is located adjacent to numerous existing power line infrastructure for most of its alignment. The visual amenity along this infrastructure corridor has already been compromised to a large degree. Admittedly, the frequency of visual exposure to power lines is expected to increase, but it is still preferable to consolidate the linear infrastructure as much as possible. To this end, the cumulative visual impact associated with the proposed grid connection infrastructure is within acceptable limits.

Overall, the significance of the visual impacts is expected to range from moderate to low because of the generally undeveloped character of the landscape. No visual impacts of a high significance are expected to occur.

Several mitigation measures have been proposed. Regardless of whether mitigation measures will reduce the significance of the anticipated visual impacts, they are 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 Castle Wind Energy facility is acceptable from a visual impact perspective.

7 ENVIRONMENTAL IMPACT STATEMENT

The potential impacts associated with the proposed OHL are summarised in Table 7-1. With mitigation measures in place as set out in chapter 6 and detailed in the generic EMPr (Annexure G), post mitigation impacts are anticipated to be minimal to severe negative significance. A cumulative impact map (Figure 7-1 to Figure 7-4) showing the main sensitivities associated with the proposed development site is provided at the end of this chapter.

Impact on agricultural production, potential, soils and the loss of future agricultural production potential resulting from the proposed development is totally insignificant in the context of the agricultural environment. This is because an insignificantly small amount of land will be excluded from agricultural production and that land has very limited production potential, anyway. Therefore, the impact on the agricultural production capability of the site is acceptable. The only potential source of impact is minimal disturbance to the land (erosion and topsoil loss) during construction (and decommissioning). Land disturbance can be completely and easily mitigated through generic mitigation measures. Overall impact ratings for impact on agriculture are of minimal-negative significance and only very slightly detrimental consequence, essentially making the potential impacts insignificant.

Anticipated impacts to terrestrial ecology include construction and decommission phase impacts such as destruction, further loss and fragmentation of the of habitats, ecosystems and vegetation community; introduction of alien species; destruction of protected plant species; and displacement of faunal community due to habitat loss, direct mortalities and disturbance. These impacts are all rated as moderate to high negative without mitigation, but all can be mitigated down to be of minimal negative significance. Operation phase impacts include continued fragmentation and degradation of habitats and ecosystems; spread of alien and/or invasive species; ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration); and Avifaunal SCC mortality. These impacts are mostly rated as moderate to high negative without mitigation, and most can be mitigated down to be of minimal negative significance. The exception is avifaunal mortality of SCC which has been rated as severe. To this extent an avifaunal impact assessment was undertaken (summary provided below) which found that impact may have an up to major negative significance impact, but with mitigation can be reduced to moderate negative significance. Cumulative impacts on terrestrial ecology are rated as being of moderate negative significance before and after mitigation. Although parts of the study area are of significance for biodiversity maintenance and ecological processes, specifically CBAs, development may proceed but with caution and only with the implementation of mitigation measures to reduce the significance of the risk. Development within the high sensitivity areas is not regarded as a fatal flaw for the project. However, these areas should not be considered for the pylon placements.

Anticipated impacts to aquatic ecology include loss of riparian systems and the disturbance of the alluvial watercourses in the construction and decommissioning phases. Impact on aquatic systems form and function through the possible increase in surface water runoff on riparian/wetland during the operational phase. Increase in sedimentation and erosion in the construction, operational and decommissioning phases. Potential impact on localised surface water quality during the construction and decommissioning phases and cumulative impacts of the overall project due to the high number of projects surrounding this application. These impacts are all rated to be of moderate negative significance before mitigation and minimal negative significance after mitigation. The proposed alignment has limited impact on the aquatic environment as for the most part the final placement of the towers could avoid the delineated wetlands and potentially span watercourses. Due to the width of some of the broader alluvial systems, towers will need to be placed within these systems, but this would have little impact on these systems, especially if no new permanent access tracks are created within these areas. If new permanent access tracks need to be created and placement of towers do not follow mitigation measure the impacts may will be moderately negative and moderately detrimental and as such must be avoided as far as possible.

In terms of impact on avifauna at a site-specific level, environmentally most sensitive features present within the proposed PAOI are priority species nest locations and the permanent and ephemeral waterbodies. These areas are deemed to be areas of high sensitivity. The construction of the proposed powerline across or within proximity to the waterbodies and nests will necessitate the marking of the powerline with bird flight diverters to mitigate the collision impact. Site specific recommendations for the management of the disturbance and collision impacts associated with these high sensitivity areas will be provided following the pre-construction avifaunal walk-through (inspection). The remainder of the PAOI is of medium to high sensitivity, given its propensity to regularly support Ludwig's Bustard, Secretarybird and Blue Crane. It will therefore also require marking of the powerline with bird flight diverters to mitigate the collision impact, which in effect comes down to marking the entire powerline. The expected impacts of the proposed Castle to Hydra MTS grid connection range from minor to major significance and negative status pre-mitigation. However, with appropriate mitigation, the post-mitigation significance of the identified impacts should be reduced to moderate and minor negative. No fatal flaws were discovered during the investigation.

Heritage resources include archaeological, paleontological and cultural heritage material. The heritage screener concluded that significant archaeological, palaeontological and cultural landscape heritage resources are located within the grid corridor based on thorough previous assessments. Impact on pre-colonial and colonial archaeological is rated be of moderate negative prior significance without mitigation and minimal negative significance post mitigation. Impacts on palaeontology (limited to construction phase) is rated to be of minor negative with or without mitigation with the requirement of a chance fossil find procedure to be set in place. No impact to these significant resources should take place as long as the recommendations included in Gribble and Euston Browne (2021) are implemented.

Visual impacts associated with the OHL may manifest during construction and operation within a 0.5km radius (and potentially up to a radius of 1.5km) of the power line structures. The visual impact will differ amongst places, depending on the distance from the infrastructure. The proposed power line infrastructure is located adjacent to numerous existing power line infrastructure for most of its alignment. The visual amenity along this infrastructure corridor has already been compromised to a large degree. Admittedly, the frequency of visual exposure to power lines is expected to increase, but it is still preferable to consolidate the linear infrastructure as much as possible. To this end, the cumulative visual impact associated with the proposed grid connection infrastructure is within acceptable limits. Overall, the significance of the visual impacts is expected to range from moderate to minimal because of the generally undeveloped character of the landscape. No visual impacts of a high significance are expected to occur. 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, i.e. minimal to moderate negative significance. As such, the grid connection infrastructure is acceptable from a visual impact perspective.

Several nuisance impacts will be created by the construction of the proposed grid connection infrastructure. These impacts include an increase in dust, noise and an increase in traffic. The receptors to these impacts may be anyone who enters the local area in the vicinity of the proposed development. These impacts where not assigned specific impact ratings but will be mitigated through mitigations measures as described in the EMPr.

Table 7-1: Summary of the potential impacts.

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
Agriculture	Impact on Agricultural Production, Potential and Soils	Minimal -	Minimal -	Minimal -	Minimal -	Minimal -	Minimal -
Agriculture	No-go	neutral	neutral	neutral	neutral	neutral	neutral
Agriculture	Cumulative	neutral	neutral	neutral	neutral	neutral	neutral
Terrestrial ecology	Destruction, loss and fragmentation of the of habitats, ecosystems and vegetation community	Major -	Minimal -				
Terrestrial ecology	Introduction of alien species, especially plants	Major -	Minimal -				
Terrestrial ecology	Destruction of protected plant species	Major -	Minimal -				
Terrestrial ecology	Displacement of faunal community due to habitat loss, direct mortalities and disturbance	Moderate -	Minimal -				
Terrestrial ecology	Continued fragmentation and degradation of habitats and ecosystems			Major -	Minimal -		
Terrestrial ecology	Spread of alien and/or invasive species			Moderate -	Minimal -		
Terrestrial ecology	Ongoing displacement and direct mortalities of faunal community (including SCC) due to disturbance (road collisions, collisions with substation, noise, light, dust, vibration			Major -	Minimal -		
Terrestrial ecology	Avifaunal SCC Mortality			Severe -	Severe -		
Terrestrial ecology	Cumulative	Moderate -	Moderate -			Moderate -	Moderate -
Terrestrial ecology	No-go	neutral	neutral	neutral	neutral	neutral	neutral
Aquatic ecology	Loss of riparian system and disturbance of the alluvial watercourses in the construction, operational and decommissioning phases	Moderate -	Minimal -	Moderate -	Minimal -	Moderate -	Minimal -
Aquatic ecology	Impact on riparian systems through the possible increase in surface water runoff on downstream riparian form and function, due to impacts to the hydrological regime such as alteration of surface run-off patterns	Moderate -	Minimal -	Moderate -	Minimal -	Moderate -	Minimal -
Aquatic ecology	Impacts include changes to the hydrological regime such as alteration of surface run-off patterns, runoff velocities and or volumes which could occur during the construction, operational and decommissioning phases	Moderate -	Minimal -	Moderate -	Minimal -	Moderate -	Minimal -
Aquatic ecology	During construction / decommissioning and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems	Moderate -	Minimal -	Moderate -	Minimal -	Moderate -	Minimal -
Aquatic ecology	Cumulative	Moderate -	Minimal -	Moderate -	Minimal -	Moderate -	Minimal -
Aquatic ecology	No-go	Moderate -	Moderate -	Moderate -	Moderate -	Moderate -	Moderate -
Avifauna	Displacement of priority species due to disturbance associated with construction of the OHL	Major -	Moderate -				
Avifauna	Displacement of priority species due to habitat loss or transformation	Minor -	Minor -				

Impact title	Impact description	Construction		Operation		Decommissioning	
		Significance pre- and post-mitigation					
		pre	post	pre	post	pre	post
	associated with construction of the OHL						
Avifauna	Mortality of priority species due to collisions with the OHL (regardless of voltage size and technology alternatives)			Major -	Moderate -		
Avifauna	Mortality of priority species due to electrocution on 132kV powerline infrastructure using the single circuit, double circuit, steel lattice or standard steel monopole tower structures alternatives			Moderate -	Minor -		
Avifauna	Displacement of priority species due to disturbance associated with decommissioning of the OHL					Minor -	Minor -
Avifauna	Cumulative	Major -	Moderate -	Major -	Moderate -	Major -	Moderate -
Avifauna	No go	Major -	Moderate -	Major -	Moderate -	Major -	Moderate -
Heritage, Archaeology	Possible impacts to archaeological sites and materials, pre-colonial and Colonial Archaeological Impact	Moderate -	Minimal -				
Palaeontology	Possibility of encountering fossils during groundworks	Minor -	Minor -				
Visual	Visual impact of construction activities on sensitive visual receptors in close proximity to the proposed grid connection infrastructure.	Moderate -	Minimal -				
Visual	Potential visual impact on sensitive visual receptors located within a 0.5km radius of the grid connection infrastructure during the operational phase			Moderate -	Moderate -		
Visual	Potential visual impact on sensitive visual receptors within the region (1.5 – 3km radius) during the operation of the grid connection infrastructure.			Moderate -	Moderate -		
Visual	The potential visual impact of the proposed grid connection infrastructure on the sense of place of the region.	Minor -	Minor -	Minor -	Minor -		
Visual	Cumulative	Moderate -	Moderate -	Moderate -	Moderate -		
Visual	No go	neutral	neutral	neutral	neutral	neutral	neutral

7.1.1 The OHL

The findings of this basic assessment process indicate that the proposed OHL will have a severe to minimal negative impact, with mitigation, on the receiving environment and are considered acceptable. The overall impact of the proposed OHL in context of the Castle WEF developments are seen as a significant potential positive which outweigh the potential negative impacts on the environment given the appropriate mitigation measures are followed and outcomes achieved. We must consider what is being a proposed, an OHL of which approximately half will be an upgrade of an existing OHL and the other half within and existing Eskom transmission servitude next to an existing OHL and only a short section of new OHL which will largely fall within the same alignment of a previously authorised OHL. During the basic assessment of the OHL, the environmental sensitivities were mapped by the EAP and specialists. Areas of sensitivity have therefore been avoided as far as possible. However, micro-siting of turbine footprints will have to take place to avoid watercourses and sensitive areas which the OHL will span.

7.1.2 No-go alternative

The no-go alternative implies that the *status quo* of the site would be maintained. This option would prevent the authorised Castle WEF from exporting their energy to the national grid, and as such the WEF would never be constructed. This would mean that the positive impacts associated with the development of the Castle WEFs (and OHL), such as job creation, foreign investment, local economic development, energy security and a decreasing reliance on fossil fuel industries would not be realised.

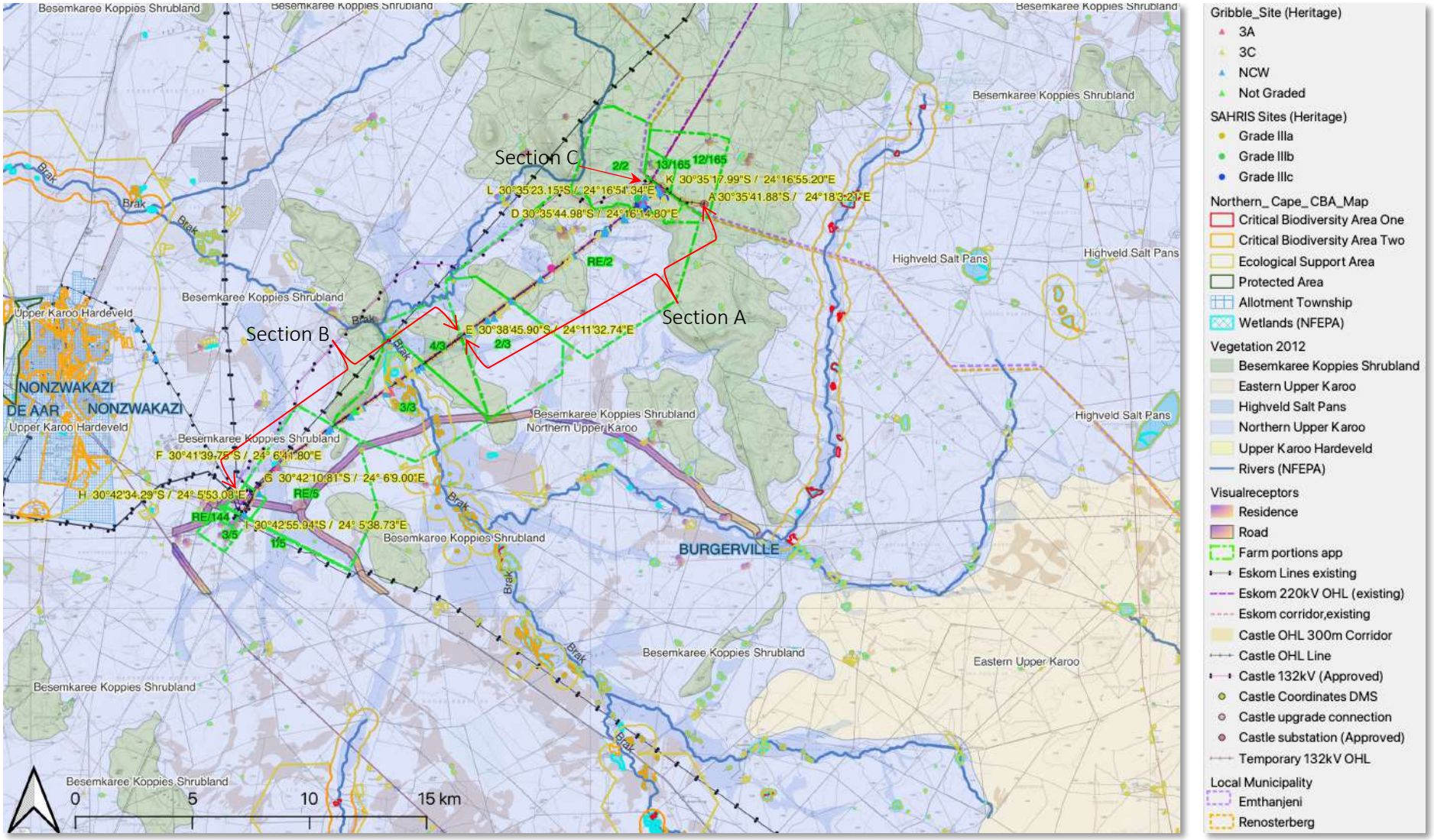


Figure 7-1: Combined sensitivity map showing the proposed OHL (Overview), legend on right.

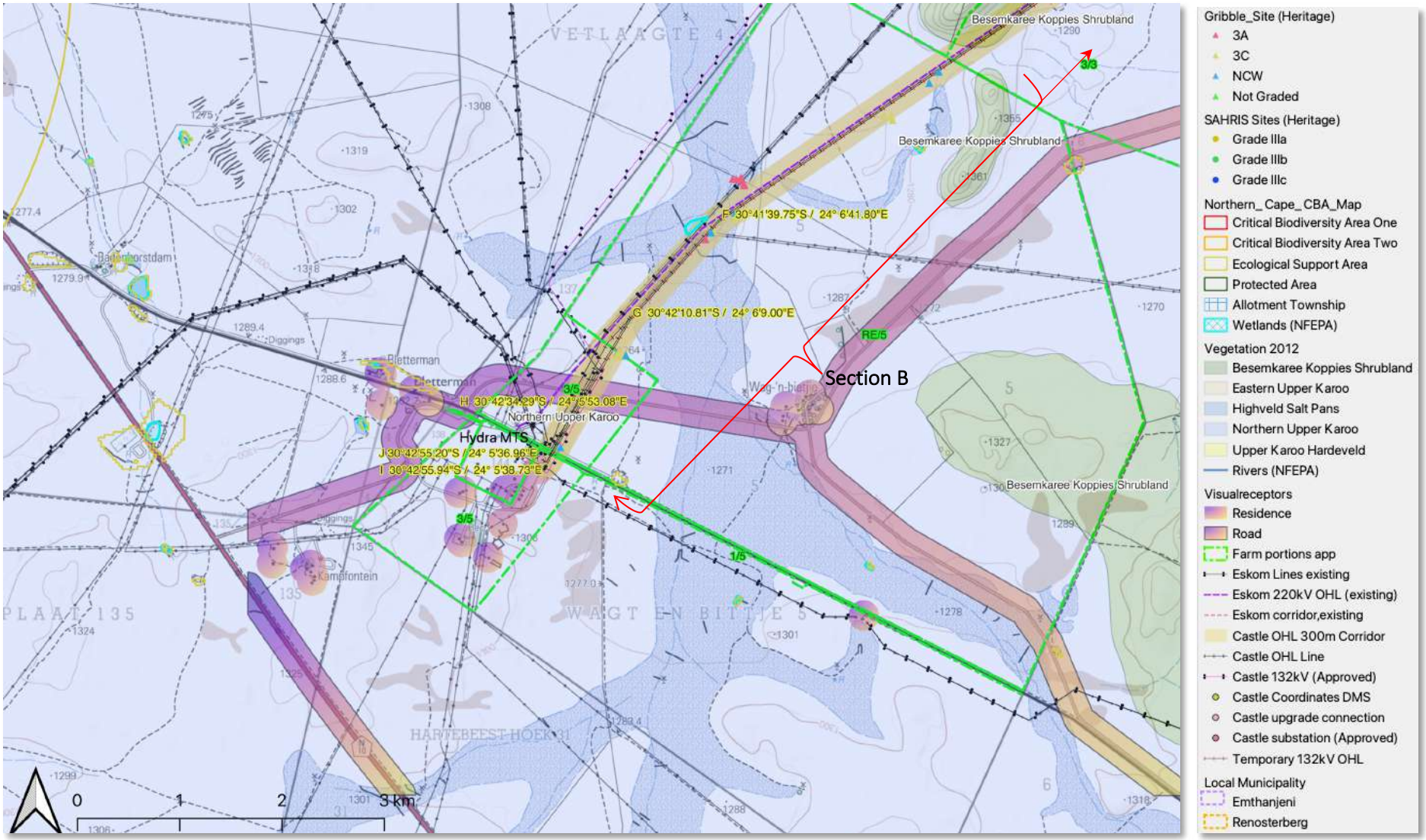


Figure 7-2: Combined sensitivity map showing the proposed OHL (1 of 3), legend on right.

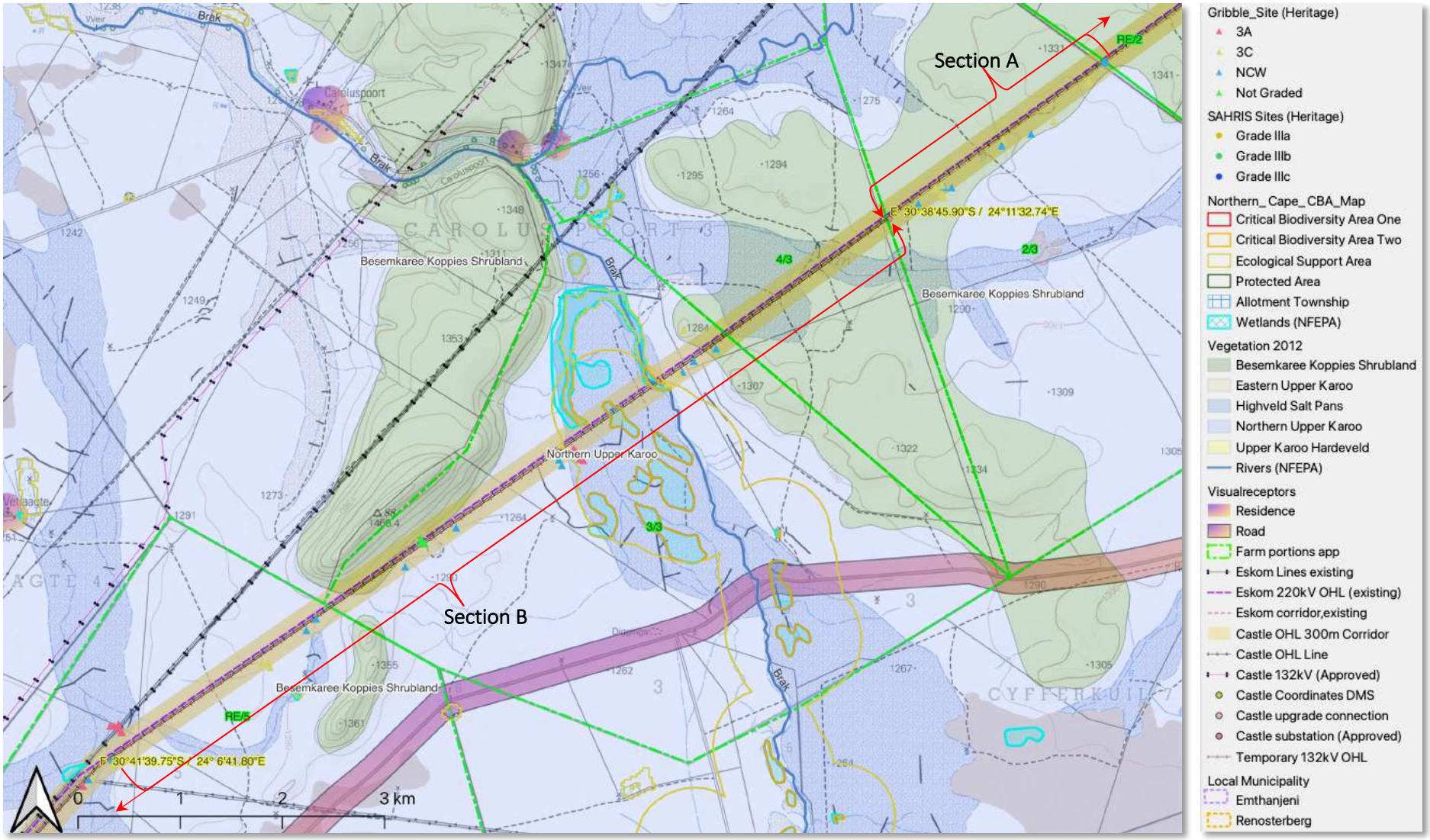


Figure 7-3: Combined sensitivity map showing the proposed OHL (2 of 3), legend on right.

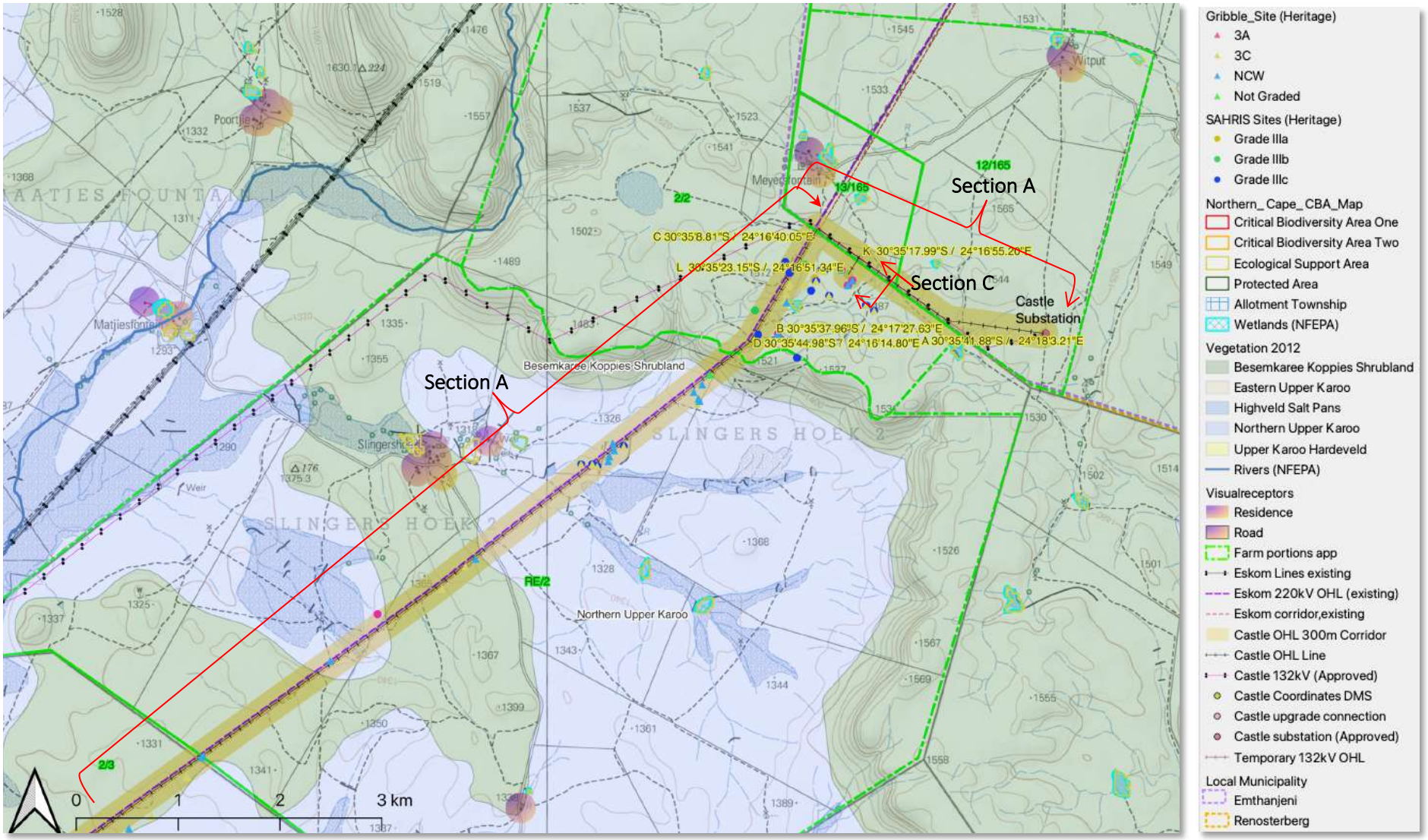


Figure 7-4: Combined sensitivity map showing the proposed OHL (3 of 3), legend on right.

8 CONCLUSIONS AND WAY FORWARD

Based on the information presented within this basic assessment report and associated annexures, it is recommended that the proposed OHL be granted a positive Environmental Authorisation.

This BAR will be updated where necessary following the 30-day public comment period. All comments received on the BAR will be collated, responded to, and included in the updated Public Participation Report (Annexure C). Where necessary, the BAR will be updated to address the received comments. The final BAR will be submitted to the DFFE for review and decision-making (for 57 days) whereby an Environmental Authorisation would be granted or refused. All registered I&APs will be notified of the outcome.

As per the requirements of NEMA, this BA has reviewed the array of potential environmental impacts associated with the proposed activities on the OHL. Table 8-1, below provides a summary of the description of the proposed project (Chapter 4).

Table 8-1: Summary of proposed OHL project description

Component	Description
Overhead Powerline (OHL)	132kV to 400kV single- or double-circuit Extending from the authorised Castle WEF collector substation to the Eskom Hydra MTS. OHL will be located within a servitude of up to 32m wide to be positioned within a 300m wide corridor (a 300m wide corridor assessed as part of this BA to allow micro-siting). Total Length ≈25,8km (+12.4km temporary) • Section A≈13,1km new OHL • Section B ≈12,4km upgrading existing 132kV OHL from the De Aar South WEF to an up to 400kV maximum capacity. – Temporary 132kV OHL bypass of ≈12,4km to be constructed alongside the existing De Aar South OHL to be upgraded (along Section B ≈18month lifespan). • Section C ≈300m from Section A to the proposed De Aar 2 South Switching Station
OHL Pylons	Up to 45m in height (most structures will be up to 32m tall, only increasing to up to 45m when crossing the railway line, existing overhead transmission line and public road (all adjacent the Hydra MTS), depending on the minimum clearance specified by the road, OHL and rail authorities). Monopole (Self-supporting or stayed, 132kV) and/or lattice (400kV) may be used. Disturbance footprint per pylon of up to 10m by 10m (100m^2)
OHL footprint	Length ≈25,8km+12.4km temporary = 36,2km Construction road / service track (jeep track) width ≈4m (or less) OHL footprint ≈14,48ha (25,8km x 4m), (consideration must be given that part of this road will use existing farm roads and/or WEF roads) Approximate number of pylons (based on average 150m average between pylons) ≈242 Pylon's disturbance footprint ~2,42ha (172 x 100m^2)
Laydown Areas	Temporary laydown area of ≈5000m^2 will be required (authorised Castle WEF Laydown areas to be utilised).
Site Access	The existing approved access roads to the Castle WEF substation will be used to access the proposed Section A adjacent the authorised Castle WEF. Section A and C may require a service track (jeep track) along the OHL route for construction and maintenance purposes. Section B (upgrade section) and the bypass OHL will use existing tracks as far as possible.

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10 ANNEXURES

Annexure A, Details of the EAP

Stand-alone document

Annexure B, Correspondence with DFFE

Stand-alone document

Annexure C, Public Participation

Stand-alone document

Annexure D, Specialist reports

Stand-alone documents

Annexure D.1, Agriculture and Soil Assessment

Annexure D.2, Terrestrial Ecology Assessment

Annexure D.3, Aquatic Ecology Assessment

Annexure D.4, Avifauna Assessment

Annexure D.5, Heritage (including Archaeology and Palaeontology)

Annexure D.6, Visual Impact Assessment

Annexure E, Screening Tool Report

Stand-alone document

Annexure F, Transmission line route coordinates

Start, end and bend point coordinates of the approximate centre line of the 300m corridor.

Section A Start	A: 30°35'41.88"S / 24°18'3.21"E
	B: 30°35'37.96"S / 24°17'27.63"E
	C: 30°35'8.81"S / 24°16'40.05"E
	D: 30°35'44.98"S / 24°16'14.80"E
Section A End and Section B Start	E: 30°38'45.90"S / 24°11'32.74"E
	F: 30°41'39.75"S / 24° 6'41.80"E
	G: 30°42'10.81"S / 24° 6'9.00"E
	H: 30°42'34.29"S / 24° 5'53.08"E
	I: 30°42'55.94"S / 24° 5'38.73"E
Section B End	J: 30°42'55.20"S / 24° 5'36.96"E
Section C Start	K: 30°35'17.99"S / 24°16'55.20"E
Section C End	L: 30°35'23.15"S / 24°16'51.34"E

Annexure G, Generic EMPr updated

Stand-alone document

Annexure H, Site photographs

Stand-alone document

Annexure I, Cumulative Project within 30km

Wind and Solar developments with an approved Environmental Authorisation or applications under consideration within 30 km of the proposed Castle to Hydra OHL.

Capture from DFFE data as per below.

South African Renewable Energy EIA Application Database (REEA)

Name of Data Set	Download Version	Release Date	File Format	Size
• REEA: Renewable Energy EIA Applications Database	REEA Quarter 4, 2021	2022-02-28	zip	4,76MB

DEA_REF	EIA_PROCES	PROJ_TITLE	TECHNOLOGY	PRJ_STATUS
12/12/20/2250/3/AM3	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2463/1/AM5	Amendment	The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	No Technology	Approved
12/12/20/2463/1/AM5	Amendment	The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/2/AM2	Amendment	The construction of a 75MW PV SEF on the Remaining Extent of the Farm Vetlaagte 4 in De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/5/AM3	Amendment	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/6/AM3	Amendment	The proposed construction of a 30MW PV SEF on the Remaining Extent of the Farm Vetlaagte 4 in De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/AM4	Amendment	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/483/AM1	Amendment	Proposed Badenhorst Dam solar PV3 plant near De Aar, Emthanjeni Local Municipality, Northern Cape	No Technology	In process
12/12/20/2313/AM2	Amendment	The Proposed Development Of A Photovoltaic Power Plant And Power Line Near De Aar, Northern Cape	No Technology	Approved
12/12/20/2500/AM2	Amendment	The Construction Of A 75-150mw Photovoltaic Solar Energy Facility And Associated Infrastructure On Paarde Valley Farm Near De Aar Within The Emthanjeni Local Municipality, Northern Cape Province	No Technology	Approved
12/12/20/2025/2/AM3	Amendment	The Construction Of A Photovoltaic (Pv) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/404	Scoping and EIA	The Proposed Renosterberg Wind Energy Facility Near De Aar, Northern Cape	Onshore Wind	Approved
14/12/16/3/3/2/382/1/AM2	Amendment	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	No Technology	In process
14/12/16/3/3/2/382/2/AM1	Scoping and EIA	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And	No Technology	Approved

DEA_REF	EIA_PROCES	PROJ_TITLE	TECHNOLOGY	PRJ_STATUS
		The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province		
14/12/16/3/3/2/382/3/AM3	Amendment	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/4/AM3	Amendment	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/403	Scoping and EIA	Proposed Renosterberg PV power plant near De Aar	Solar PV	Approved
14/12/16/3/3/2/640	Scoping and EIA	The Proposed Establishment of an 86mw Photovoltaic Solar Facility on Portion 4 of The Farm Rooilyf No. 389, Registration Division, Zf Mcgawu Local Municipality, in the Northern Cape Province	In Process	In process
14/12/16/3/3/2/663	Scoping and EIA	The Proposed Establishment of an 86mw Solar Facility on Portion 4 of the Farm Riet Fountain No. 6 in the Emthanjeni Local Municipality, Northern Cape Province	In Process	Approved
12/12/20/1651	Scoping and EIA	Proposed establishment of a wind power generating facility near De Aar, Northern Cape.	Onshore Wind	Approved
12/12/20/1651/A2	Amendment	Proposed establishment of a wind power generating facility near De Aar, Northern Cape.	No Technology	Approved
12/12/20/1673	Scoping and EIA	Proposed photovoltaic power generation facility near De Aar, Northern Cape	Solar PV	Approved
12/12/20/2025	Scoping and EIA	The Construction Of A Photovoltaic (Pv) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	Solar CSP	Approved
12/12/20/2025/1	Scoping and EIA	The Construction Of A Photovoltaic (Pv) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	Solar CSP	Approved
12/12/20/2025/2	Scoping and EIA	The Construction Of A Photovoltaic (Pv) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	Solar PV	Approved
12/12/20/2025/2/A	Scoping and EIA	The Construction Of A Photovoltaic (Pv) Plant On Portion 29 Of The Farm Paarde 145, De Aar Within Emthanjeni Local Municipality, Northern Cape Province	Solar PV	Approved
12/12/20/2048/1	Scoping and EIA	The Proposed Construction Of Ilanga Lethemba Pv Solar Energy Facility In De Aar, Northern Cape Province	Solar PV	Approved
12/12/20/2048/2	Scoping and EIA	Proposed construction of the Ilanga Lethemba 2 PV energy facility in De Aar, Northern Cape Province	Solar PV	Approved
12/12/20/2048/3	Scoping and EIA	The Proposed Ilanga Lethemba 4 Pv Solar Energy Facility Near De Aar, Northern Cape Province	Solar PV	Approved
12/12/20/2048/4	Scoping and EIA	Proposed construction of the Ilanga Lethemba 4 PV energy facility in De Aar, Northern Cape Province	Solar PV	Approved
12/12/20/2177	Scoping and EIA	Proposed Inca De Aar Solar Pty Ltd 30 MW Photovoltaic Solar Facility On A Site South-East Of De Aar, Northern Cape Province	Solar PV	Approved
12/12/20/2177/AM1	Amendment	Proposed Inca De Aar Solar Pty Ltd 30 MW Photovoltaic Solar Facility On A Site South-East Of De Aar, Northern Cape Province	No Technology	Approved

DEA_REF	EIA_PROCES	PROJ_TITLE	TECHNOLOGY	PRJ_STATUS
12/12/20/2250	Scoping and EIA	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	Approved
12/12/20/2250/1	Scoping and EIA	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	Approved
12/12/20/2250/1/AM1	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/1/AM2	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/2	Scoping and EIA	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	Approved
12/12/20/2250/2/A1	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/2/AM3	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/3	Scoping and EIA	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	Approved
12/12/20/2250/4	Scoping and EIA	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	Approved
12/12/20/2250/4/A1	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/4/AM2	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/4/AM3	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/5	Scoping and EIA	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	Solar PV	Approved
12/12/20/2250/5/A1	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/5/AM2	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2258/4	Scoping and EIA	The Proposed Establishment Of Photovoltaic (Solar Power) Farms In The Northern Cape Province	Solar PV	Approved
12/12/20/2313	Scoping and EIA	The Proposed Development Of A Photovoltaic Power Plant And Power Line Near De Aar, Northern Cape	Solar PV	In process
12/12/20/2313/A1	Amendment	The Proposed Development Of A Photovoltaic Power Plant And Power Line Near De Aar, Northern Cape	No Technology	In process
12/12/20/2463/1	Scoping and EIA	Longyuan Mulilo De Aar 2 North Wind Energy Facility	Onshore Wind	Approved

DEA_REF	EIA_PROCES	PROJ_TITLE	TECHNOLOGY	PRJ_STATUS
12/12/20/2463/1/2	Scoping and EIA	Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility	Onshore Wind	Approved
12/12/20/2463/1/A2	Amendment	The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	No Technology	Approved
12/12/20/2463/2	Amendment	Longyuan Mulilo De Aar Maanhaarberg Wind Energy Facility	No Technology	Approved
12/12/20/2497	Scoping and EIA	Proposed Construction Of The Inyanga Energy Project 2, Farm Riet Fountain No 6, De Aar, Northern Cape	Solar PV	Withdrawn/Lapsed
12/12/20/2498	BAR	The Photovoltaic (Pv) Solar Energy Facility On The Farm Annex Du Plessis Dam (Pv4) Near De Aar Within The Emthanjeni Local Municipality, Northern Cape Province	Solar PV	In process
12/12/20/2498/A1	Amendment	The Photovoltaic (Pv) Solar Energy Facility On The Farm Annex Du Plessis Dam (Pv4) Near De Aar Within The Emthanjeni Local Municipality, Northern Cape Province	No Technology	Approved
12/12/20/2498/AM3	Scoping and EIA	Amendment to the proposed 19.9MW PV solar energy facility (PV4) on the Farm Annex Du Plessis dam near De Aar, Northern Cape	Solar PV	Approved
12/12/20/2500	Scoping and EIA	The Construction Of A 75-750mw Photovoltaic Solar Energy Facility And Associated Infrastructure On Paarde Valley Farm Near De Aar Within The Emthanjeni Local Municipality, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/278	Scoping and EIA	Proposed Castle wind energy facility project, located near De Aar, Northern Cape	Onshore Wind	In process
14/12/16/3/3/2/278	Scoping and EIA	Proposed Castle wind energy facility project, located near De Aar, Northern Cape	Onshore Wind	In process
14/12/16/3/3/2/310	Scoping and EIA	Proposed Naumanni Wind Energy Facility project located near De Aar in Northern Cape	Onshore Wind	Withdrawn/Lapsed
14/12/16/3/3/2/311	Scoping and EIA	Proposed Oasis wind energy facility project located near De Aar, Northern Cape	Onshore Wind	Withdrawn/Lapsed
14/12/16/3/3/2/382/1	Scoping and EIA	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/1/A1	Amendment	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/2	Scoping and EIA	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/3	Scoping and EIA	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/3/A2	Amendment	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/4	Scoping and EIA	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/4/A1	Amendment	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	No Technology	Approved

DEA_REF	EIA_PROCES	PROJ_TITLE	TECHNOLOGY	PRJ_STATUS
14/12/16/3/3/2/382/4/A3	Amendment	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/5	Scoping and EIA	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/5/A1	Amendment	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/6	Scoping and EIA	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/7	Scoping and EIA	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	Solar PV	Approved
14/12/16/3/3/2/382/A1	Amendment	Proposed Solar Power Generation Facility in the remaining extent of the farm Vetlaagte 4, De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/404	Scoping and EIA	The Proposed Renosterberg Wind Energy Facility Near De Aar, Northern Cape	Onshore Wind	Approved
14/12/16/3/3/2/454	Scoping and EIA	The Proposed Photovoltaic (Solar) Energy Facilities On Du Plessis Dam Farm Near De Aar, Emthanjeni Local Municipality, Northern Cape Province.	Solar PV	In process
14/12/16/3/3/2/455	Scoping and EIA	The Proposed Photovoltaic (Solar) Energy Facilities On Du Plessis Dam Farm Near De Aar, Emthanjeni Local Municipality, Northern Cape Province.	Solar PV	In process
14/12/16/3/3/2/456	Scoping and EIA	The Proposed Photovoltaic (Solar) Energy Facilities On Du Plessis Dam Farm Near De Aar, Emthanjeni Local Municipality, Northern Cape Province.	Solar PV	In process
14/12/16/3/3/2/483	Scoping and EIA	Proposed photovoltaic solar energy fascility PV3 on Badenhorst Dam Farm near De Aar, Emthanjeni Local Municipality, Northern Cape	Solar PV	In process
14/12/16/3/3/2/485	Scoping and EIA	Proposed photovoltaic solar energy facility PV5 on Badenhorst Dam Farm near De Aar, Emthanjeni Local Municipality, Northern Cape	Solar PV	In process
14/12/16/3/3/2/504	Scoping and EIA	Proposed photovoltaic Solar energy facility (PV2) on Badenhost Dam Farm near De Aar in the Northern cape	Solar PV	In process
14/12/16/3/3/2/506	Scoping and EIA	Proposed photovoltaic Solar energy facility (PV4) on Badenhost Dam Farm near De Aar in the Northern cape	Solar PV	In process
14/12/16/3/3/2/740	Scoping and EIA	Proposed 300MW Solar Power Plant in Philipstown area in Renosterberg Local Municipality	Solar PV	Approved
14/12/16/3/3/2/741	Scoping and EIA	Proposed PV facility on farm Caroluspoort near De Aar	Solar PV	In process
14/12/16/3/3/2/742	Scoping and EIA	Proposed PV facility on farm Blaauwkratz near De Aar	Solar PV	In process
14/12/16/3/3/2/743	Scoping and EIA	Proposed PV facility on farm Loskop near De Aar	Solar PV	In process
14/12/16/3/3/2/744	Scoping and EIA	Proposed PV facility on farm Jakhalsfontein near De Aar	Solar PV	In process
12/12/20/2252/2/AM4	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved

DEA_REF	EIA_PROCES	PROJ_TITLE	TECHNOLOGY	PRJ_STATUS
12/12/20/2252/2/AM4	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/2/AM2	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/2/AM4	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/2/AM5	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2250/4/AM4	Amendment	The Proposed Construction Of A Solar Energy Facility in The Emthanjeni Local Municipality In The Northern Cape Province	No Technology	Approved
12/12/20/2463/1/AM3	Amendment	The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	No Technology	Approved
12/12/20/2463/1/AM4	Amendment	The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/1/AM2	Amendment	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	No Technology	Approved
14/12/16/3/3/2/382/3/AM4	Amendment	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape	No Technology	Approved
14/12/16/3/3/2/403	Scoping and EIA	Proposed Renosterberg PV power plant near De Aar	Solar PV	Approved
14/12/16/3/3/2/744	Scoping and EIA	Proposed PV facility on farm Jakhalsfontein near De Aar	In Process	Approved
14/12/16/3/3/2/280	Scoping and EIA	Proposed Zingesele wind energy facility project, located near De Aar, Northern Cape	No Technology	Withdrawn/Lapsed
14/12/16/3/3/2/382/AM3	Amendment	The Proposed Construction Of Seven Photovoltaic Solar Energy Facilities, Six Facilities Will Be Generating 75mw And The Other Facility 30mw On The Remaining Extent Of The Farm Vetlaagte 4 In De Aar, Northern Cape Province	No Technology	Approved
12/12/20/2463/2/AM2	Amendment	The Wind Energy Facility (North And South) Situated On The Plateau Near De Aar, Northern Cape Province	No Technology	Approved
12/12/20/2500/AM3	Amendment	The Construction Of A 75-150mw Photovoltaic Solar Energy Facility And Associated Infrastructure On Paarde Valley Farm Near De Aar Within The Emthanjeni Local Municipality, Northern Cape Province	Solar PV	Approved
12/12/20/2499	Amendment	Proposed photovoltaic (solar) energy plant on Vetlaagte Farm near De Aar, Northern Cape	Solar PV	In process
12/12/20/2499	Scoping and EIA	Proposed photovoltaic (solar) energy plant on Vetlaagte Farm near De Aar, Northern Cape	Solar PV	In process