



ARCUS

BASIC ASSESSMENT REPORT FOR THE PROPOSED ELECTRICAL GRID CONNECTION AND ASSOCIATED INFRASTRUCTURE FOR THE HIGHLANDS SOUTH WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

On behalf of

Highlands South Wind Energy Facility (RF) (PTY) Ltd

September 2018

DRAFT FOR PUBLIC COMMENT



Prepared By:

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PROJECT DETAILS

DEA Reference Number:	To be allocated upon submission
Arcus Reference No:	2780 South Grid
Title:	Basic Assessment Report for the Proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF, Eastern Cape Province
EAPs:	Ashlin Bodasing, Anja Albertyn and Ryan David-Andersen - Arcus Consultancy Services South Africa (Pty) Ltd
Project Team:	Andrew Pearson - Arcus Consultancy Services South Africa (Pty) Ltd Jonathan Aronson - Arcus Consultancy Services South Africa (Pty) Ltd Michael Reid – Arcus Consultancy Services Ltd Simon Todd – 3 Foxes Consulting Dr Brian Colloty / Patsy Scherman – Scherman Colloty and Associates Bernard Oberholzer Landscape Architect in association with Quinton Lawson Architect Jayson Orton and Dr John Almond – Asha Consulting Tony Barbour – Tony Barbour Environmental Consulting and Research Stephen Fautley - Techso
Project Applicant:	Highlands South Wind Energy Facility (RF) (Pty) Ltd
Report Status:	Draft Basic Assessment Report

EXECUTIVE SUMMARY

Introduction

WKN Windcurrent South Africa (Ltd) Pty (the Developer) is proposing the Highlands Wind Energy Facilities (WEFs), and associated infrastructure including grid connection infrastructure (the Proposed Development), located 20 km from the town of Somerset East in the Eastern Cape Province. The Proposed Development Site is situated within the Cookhouse Renewable Energy Development Zone (REDZ). The area of interest for development within these land parcels is approximately 9000 hectares (The Proposed Development Area). The Proposed Development aims to generate and produce electricity from renewable wind energy sources in order to supply electricity into the national grid by connecting to an existing Eskom transmission line within the Proposed Development Area.

Arcus Consultancy Services South Africa (Ltd) Pty ('Arcus') has been appointed to act as the independent environmental impact assessment practitioner (EAP) to undertake the environmental impact assessment (EIA) process for Environmental Authorisation under Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA) as amended, for the Proposed Development.

For the purpose of obtaining Environmental Authorisation (EA), and bidding requirements in the Department of Energy's Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), the project has been split into three phases: North, Central and South. A Special Purpose Vehicle (SPV) has been set up for each of the three phases. Each phase will consist of two applications: one for the wind energy facility and one for the respective grid connection. The proposed Development therefore consists of six components and six separate applications for EA:

- Highlands North Wind Energy Facility (RF) (PTY) Ltd:
 - The Highlands North WEF consisting of up to 17 turbines each with a generating capacity of up to 5 MW generating up to 85 MW (The Proposed Project);
 - Electrical Grid Connection and Associated Infrastructure for Highlands North WEF;
- Highlands Central Wind Energy Facility (RF) (PTY) Ltd:
 - The Highlands Central WEF: up to 14 turbines each with a generating capacity of up to 5 MW generating up to 70 MW;
 - Electrical Grid Connection and Associated Infrastructure for Highlands Central WEF;
- Highlands South Wind Energy Facility (RF) (PTY) Ltd:
 - The Highlands South WEF: up to 18 turbines each with a generating capacity of up to 5 MW generating up to 90 MW;
 - **Electrical Grid Connection and Associated Infrastructure for Highlands South WEF.**

This report pertains to the **Electrical Grid Connection and Associated Infrastructure for Highlands South WEF.**

Should the Proposed Development be bid in the REIPPPP two submissions will potentially be made: The Highlands North WEF will be combined with the Highlands Central WEF or be bid on its own, with the Highlands Central WEF being combined with Highlands South WEF. Due to these uncertainties the specialist studies have described the baseline environment of the entire Proposed Development Site as the affected environment. The impact assessments however assess the Proposed Project individually, as well as cumulatively.

Highlands South WEF Grid Connection Site Location and Proposed Development Description

The Proposed Highlands South Grid Connection would be located approximately 17 km west of the town of Somerset East, bordering the south of the R63 route, approximately 23 km south-east of Pearston, in the Eastern Cape Province. The Proposed Development site is located in the Blue Crane Route Local Municipality (BCRLM) in the Sarah Baartman District Municipality (SBDM), previously known as the Cacadu District Municipality. The main settlements in the municipality are Somerset East, which serves as the administrative and commercial centre, Cookhouse and Pearson. The most significant roads passing through the area are the N10, R61, R63, and the R390. The administrative seat of the SBDM is currently located in the Nelson Mandela Bay Metro area, with disaster centres located throughout the district.

A Feasibility Assessment was conducted by the specialist team prior to the Basic Assessment process. The results of these preliminary assessments advised the development of the proposed project layout for assessment (embedded mitigation). This layout was improved further by the results of the detailed specialist studies conducted, resulting in the Final Mitigated Layout, as the best practicable environmental option submitted for authorisation.

Environmental Legislative Requirements

The EIA Regulations 2014 as amended by GNR 326 of 2017 provide for the control of certain Listed Activities. These activities are listed in Government Notice No. R327 (Listing Notice 1 – Basic Assessment), R325 (Listing Notice 2 – Scoping & EIA Process) and R324 (Listing Notice 3 – Basic Assessment) of 7 April 2017, and are prohibited to commence until environmental authorisation has been obtained from the competent authority, in this case, the Department of Environmental Affairs (DEA).

Listed Activities applicable to this proposed project are presented in the table below. All potential impacts associated with these Listed Activities are considered and assessed in this BA.

Applicable Listed Activities in terms of the NEMA

LISTING NOTICE	ACTIVITIES
LN 1 GN R327 ¹	11(i); 19 and 27
LN 3 GN R324 ²	4(a)(i)(bb)(ee); 14(a)(c)(a)(i)(bb)(ff) and 23(a)(c)(a)(i)(bb)(ee).

Depending on the final design of the Highlands South WEF Grid Connection, there may be a requirement for the following additional permits/ authorisations:

- Waste Management License/s as required by the NEMA, Waste Act, 2008 (Act No. 59 of 2008);
- Mining Permits as required by the Minerals and Petroleum Resources Development Act, 2002 (MPRDA) (Act No. 28 of 2002)(MPRDA); and
- Water Use Licenses as required by the National Water Act, 1998 (Act No. 36 of 1998) (NWA).

¹ "Listing Notice 1 of the EIA Regulations, promulgated under Government Notice R983 of 4 December 2014, as amended by Government Notice R327 of 7 April 2017."

² "Listing Notice 3 of the EIA Regulations, promulgated under Government Notice R985 of 4 December 2014, as amended by Government Notice R324 of 7 April 2017."

These permits will be applied for should the project be authorised and be selected as a preferred bidder.

Results of Specialist Investigations

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Grid Alternative 1 and 2							
Construction and Decommissioning Phase							
Soil degradation	L	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Cumulative Phase							
Regional loss of agricultural land use	L	M	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Wetlands and freshwater							
Grid Alternative 1 and 2							
Increase in sedimentation and erosion	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Impact on localized surface water quality	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Cumulative Phase							
Cumulative Impact	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Terrestrial Ecological Impacts							
Grid Alternative 1 and 2							
Construction Phase							
Vegetation and listed plant species	L	H	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Faunal Impacts	L	L	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Operational Phase							
Soil Erosion	L	H	M	Negative	M	H	H

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Alien plant invasion	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Decommissioning Phase							
Faunal impacts	L	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Soil erosion	L	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Alien plant invasion	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Avifauna							
Grid Alternative 1 and 2							
Construction Phase							
Destruction of habitat	M	M	M	Negative	M	H	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Disturbance / Displacement	M	M	M	Negative	M	H	M
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Operational Phase							
Power line collisions	H	M	H	Negative	H	H	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>H</i>	<i>Negative</i>	M	<i>M</i>	<i>M</i>
Bird mortality from electrocution	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Disturbance / Displacement	M	M	M	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Decommissioning Phase							
Disturbance / Displacement	M	M	M	Negative	M	H	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Cumulative Phase							
Cumulative impact	H	M	H	Negative	H	M	M
<i>With Mitigation</i>	<i>H</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	M	<i>L</i>	<i>M</i>
Bats							

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Grid Alternative 1 and 2							
Construction Phase							
Roost disturbance	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Roost destruction	L	H	L	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Habitat Modification	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Operational Phase							
Collision with transmission lines	L	M	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	VERY L	<i>L</i>	<i>M</i>
Cumulative Phase							
Cumulative impact	H	M	H	Negative	H	M	L
<i>With Mitigation</i>	<i>H</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>M</i>	<i>M</i>	<i>M</i>
Heritage and Archaeology							
Grid Alternative 1 and 2							
Impacts on archaeological resources	L	H	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Impacts on graves (Alternative 1)	L	H	H	Negative	M	L	H
<i>With Mitigation (Alternative 1)</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Impacts on graves (Alternative 2)	L	H	H	Negative	M	L	H
<i>With Mitigation (Alternative 2)</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	M	<i>L</i>	<i>H</i>
Impacts to the cultural landscape	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	M	<i>H</i>	<i>H</i>
Cumulative Phase							
Impacts on archaeological resources	L	H	L	Negative	M	M	H

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Impacts on graves	L	H	H	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Impacts to the cultural landscape	M	M	M	Negative	M	H	H
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	M	<i>H</i>	<i>H</i>
Palaeontology							
Grid Alternative 1 and 2							
Impacts to palaeontological resources	L	H	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Visual							
Grid Alternative 1 and 2							
Rural sense of place - construction	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Rural sense of place - operation	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>Negative</i>	M	<i>H</i>	<i>H</i>
Rural sense of place - decommission	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Neutral</i>	L	<i>L</i>	<i>M</i>
Social							
Grid Alternative 1 and 2							
Construction Phase							
Employment and business opportunities	M	L	M	Positive	M	M	H
<i>With Mitigation</i>	<i>H</i>	<i>L</i>	<i>H</i>	<i>Positive</i>	M	<i>H</i>	<i>H</i>
Presence of construction workers	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Influx of job-seekers	M	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Risks to livestock and	M	L	M	Negative	M	M	H

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
farming infrastructure							
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Risk of grass fires	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Noise, dust, waste and safety impacts	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Establishment of access roads and the construction camp	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Operational Phase							
Employment and business opportunities	M	M	L	Positive	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>Positive</i>	M	<i>H</i>	<i>H</i>
Powerline pylons on the rural landscape	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>Negative</i>	M	<i>H</i>	<i>H</i>
Decommissioning Phase							
Loss of jobs and associated income	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Cumulative Phase							
Visual Impact	M	M	L	Negative	L	M	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	L	<i>M</i>	<i>M</i>
Employment opportunities	M	H	M	Positive	M	L	H
<i>With Mitigation</i>	<i>M</i>	<i>H</i>	<i>M</i>	<i>Positive</i>	H	<i>M</i>	<i>H</i>
Traffic							
Grid Alternative 1 and 2							
Construction Phase							
Vehicle Worker Crashes	L	L	H	Negative	M	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Minor road degradation	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Minor road dust	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Intersection safety	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>H</i>	<i>Negative</i>	<i>M</i>	<i>L</i>	<i>M</i>
Operational Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>Negative</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
Decommissioning Phase							
Minor road degradation	L	L	M	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Minor road dust	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Cumulative Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>Negative</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>

Summary of Findings and Conclusion

This BAR aims to capture the key issues for this proposal through a public participation process and through the findings of the specialists' studies.

The specialist reports document the assessment of environmental impacts that may occur within both the biophysical and social environments. All specialist reports are included in Volume II of this report.

All specialist studies have indicated that either of the alternatives proposed for the development grid connection from the proposed Highlands South WEF to the existing Eskom Transmission line would be acceptable from an environmental perspective.

Consideration must be given to the fact that this proposal is dependent on the approval and construction of the proposed Highlands South WEF (separate application), and should the latter not be approved, the likelihood of this proposal for the Highlands South Grid Connection being implemented is low. The reason for the separation of the project components in terms of the application process rests with the fact that the Environmental Authorisation for the proposed grid connection may become the property of Eskom, and would not be controlled by the applicant.

The area in which the site is found has been deemed a Renewable Energy Development Zone (REDZ) by the Council of Scientific Research (CSIR), earmarked through the

developing Strategic Environmental Assessments (SEAs) for the Department of Environmental Affairs.

Overall, it is recommended that the Highlands South Grid Connection be supported, subject to the implementation of the recommended mitigation measures and management actions contained in all the specialist reports.

ABBREVIATIONS, ACRONYMS AND UNITS

ATNS	Air Traffic and Navigation Services SOC Limited	MW	Megawatt
BA	Basic Assessment	NCR	Noise Control Regulations
BAR	Basic Assessment Report	NDP	National Development Plan
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)	NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
CBA	Critical Biodiversity Area	NFEPA	National Freshwater Ecosystem Priority Area
CSP	Concentrated Solar Power	NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
DAFF	Department of Agriculture, Forestry and Fisheries	NSD	Noise-sensitive Development
dB	Decibel	NWA	National Water Act, 1998 (Act No. 36 of 1998)
DEA	Department of Environmental Affairs (National)	PES	Present Ecological State
DEDEA	Eastern Cape Department: Economic Development Environmental Affairs, and Tourism	PGDS	Provincial Growth and Development Strategy
DMR	Department of Mineral Resources	PPA	Power Purchase Agreement
DoE	Department Of Energy	PPP	Public Participation Process
EAP	Environmental Assessment Practitioner	PV	Solar photovoltaic
ECA	Environment Conservation Act, 1989 No. 73 of 1989)	REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
EIA	Environmental Impact Assessment	SABAAP	South African Bat Assessment Advisory Panel
EMPr	Environmental Management Programme	SAHRA	South African Heritage Resources Agency
ESA	Ecological Support Area	SANBI	South African National Biodiversity Institute
ESA	Early Stone Age	SANRAL	South African National Roads Agency Limited
ESKOM	Eskom Holdings SOC Limited	SANS	South African National Standards
EWT	Endangered Wildlife Trust	SAPS	South African Police Service
GIS	Geographical Information Systems	SAWS	South African Weather Service
GNR	Government Notice Regulation	SCADA	Supervisory Control and Data Acquisition
HIA	Heritage Impact Assessment	SDF	Spatial Development Framework
I&AP	Interested and Affected Party	SEA	Strategic Environmental Assessment
IDP	Integrated Development Plan	SIA	Social Impact Assessment
IEM	Integrated Environmental Management	SPV	Special Project Vehicle
IPP	Independent Power Producer	WEF	Wind Energy Facility
IRP	Integrated Resource Plan	WHO	World Health Organisation
kV	Kilovolt	WTG	Wind Turbine Generator
kWh	Kilowatt Hours	WULA	Water Use License Application
LSA	Late Stone Age		
MSA	Middle Stone Age		

DEPARTMENT OF ENVIRONMENTAL AFFAIRS INFORMATION REQUIREMENTS FOR WIND FARM APPLICATIONS

The Department of Environmental Affairs' requirements for information for all applications for Grid Connections is included in this section of the report. Where this information is not provided in the tables below, the location of where it can be found in the report is indicated.

Table A: DEA Information Requirements – Grid Connection Technical Details

Component	Description/Dimensions
Height of pylons	Maximum of 30 m high
Length of transmission line	Max 20 km depending on the substation location and OHL route selected.
Type of poles used	Both monopoles and lattice structures are being considered at this point.
Area occupied by pylon servitude	Width of servitude = 31 m. Maximum total area occupied 62.0 ha
Transmission capacity	Either a 66 kV line, evacuating a maximum of 85MW and/or a 132 kV line, evacuating a maximum of 155 MW.
Area occupied by both permanent and construction laydown areas	Laydown areas used are the same as for the WEF.
Area occupied by buildings	Control and office buildings located next to the substation will cover a maximum of 0.5 hectares
Length of service road	20 km
Width of service road	3 - 4 m wide
Proximity to grid connection	20 km
Height of fencing	2.4 m only around on-site substation
Type of fencing	Wired mesh / chain link fence not electrified

Table B: DEA Information Requirements - Site Maps and GIS Information

Site Maps and GIS Information	Section of this Report
All maps/information layers are provided in ESRI Shapefile format.	
All affected farm portions must be indicated.	Figure 1.3 Highlands South Grid Connection
The exact site of the application must be indicated (the areas that will be occupied by the application).	Figure 1.1 Site Location Figure 1.3 Highlands South Grid Connection
A <i>status quo</i> map/layer must be provided that includes the following: Current use of land on the site including:	
Buildings and other structures	Volume II: Specialist Report
Agricultural fields	Volume II: Specialist Report
Grazing areas	Volume II: Specialist Report

Site Maps and GIS Information	Section of this Report
Natural vegetation areas (natural veld not cultivated for the preceding 10 years) with an indication of the vegetation quality as well as fine scale mapping in respect of Critical Biodiversity Areas and Ecological Support Areas	Volume II: Specialist Report
Critically endangered and endangered vegetation areas that occur on the site	Figure 12.1 Ecological Sensitivity
Bare areas which may be susceptible to soil erosion	No specific bare areas have been identified. During construction phase, vegetation removal will be confined to the smallest possible footprint, runoff will be controlled and site-specific measures will be devised for any potentially high risk areas.
Cultural historical sites and elements	Figure 12.1 Environmental Sensitivity
Rivers, streams and water courses	Volume II: Specialist Report
Ridgelines and 20 m continuous contours with height references in the GIS database	Volume II: Specialist Report
Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs	Volume II: Specialist Report
High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries	Volume II: Specialist Report
Buffer zones (also where it is dictated by elements outside the site): 500 m from any irrigated agricultural land 1 km from residential areas	Figure 12.1 Environmental Sensitivity
Indicate isolated residential, tourism facilities on or within 1 km of the site	Volume II: Specialist Report
A slope analysis map/layer that include the following slope ranges: Less than 8% slope (preferred areas for turbines and infrastructure) Between 8% and 12% slope (potentially sensitive to turbines and infrastructure) Between 12% and 14% slope (highly sensitive to turbines and infrastructure) Steeper than 18% slope (unsuitable for turbines and infrastructure)	Volume II: Specialist Report
A map/layer that indicate locations of birds and bats including roosting and foraging areas	Volume II: Specialist Report

Site Maps and GIS Information	Section of this Report
<p>A site development proposal map(s)/layer(s) that indicate:</p> <p>Turbine positions</p> <p>Foundation footprint</p> <p>Permanent laydown area footprint</p> <p>Construction period laydown footprint</p> <p>Internal roads indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve (to make commenting on sections possible).</p>	<p>Figure 1.3 Highlands South Grid Connection</p>
<p>River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used.</p>	<p>Figure 1.3 Highlands South Grid Connection</p>
<p>Substation(s) and/or transformer(s) sites including their entire footprint.</p>	<p>Figure 1.3 Highlands South Grid Connection</p>
<p>Cable routes and trench dimensions (where they are not along internal roads) Connection routes to the distribution/transmission network (the connection must form part of the EIA even if the construction and maintenance thereof will be done by another entity such as ESKOM).</p>	<p>Figure 1.3 Highlands South Grid Connection</p>
<p>Cut and fill areas at turbine sites along roads and at substation/transformer sites indicating the expected volume of each cut and fill</p>	<p>Pylons will be placed to minimise required cut and fill.</p>
<p>Borrow pits</p>	<p>No borrow pits on site. Licenced borrow pits will be used to source material.</p>
<p>Spoil heaps (temporary for topsoil and subsoil and permanently for excess material) Buildings including accommodation</p>	<p>Temporary and permanent spoil heaps will be kept within demarcated construction areas, and monitored by the ECO during the construction phase.</p>

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1 INTRODUCTION

Arcus Consultancy Services South Africa (Pty) Ltd was appointed by WKN Windcurrent South Africa (Pty) Ltd (the Developer) to conduct the Basic Assessment (BA) process as required by the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA), as amended, for the proposed establishment of an overhead power line which will form the grid connection for the proposed Highlands South Wind Energy Facility (WEF). The overall aim of the project is to generate electricity, which is likely to be sold through the Department of Energy's (DOE) Renewable Energy Independent Power Producer Procurement Programme (REIPPPP). The grid connection will deliver electricity from the proposed Highlands South WEF into the existing Eskom electricity grid. The proposed development site is situated within the Cookhouse Renewable Energy Development Zone (Figure 1.1).

By way of context, it should be noted that there are six components to the proposed Highlands Wind Energy Facility developments, comprising of three WEFs and their associated grid connections (Figure 1.2).

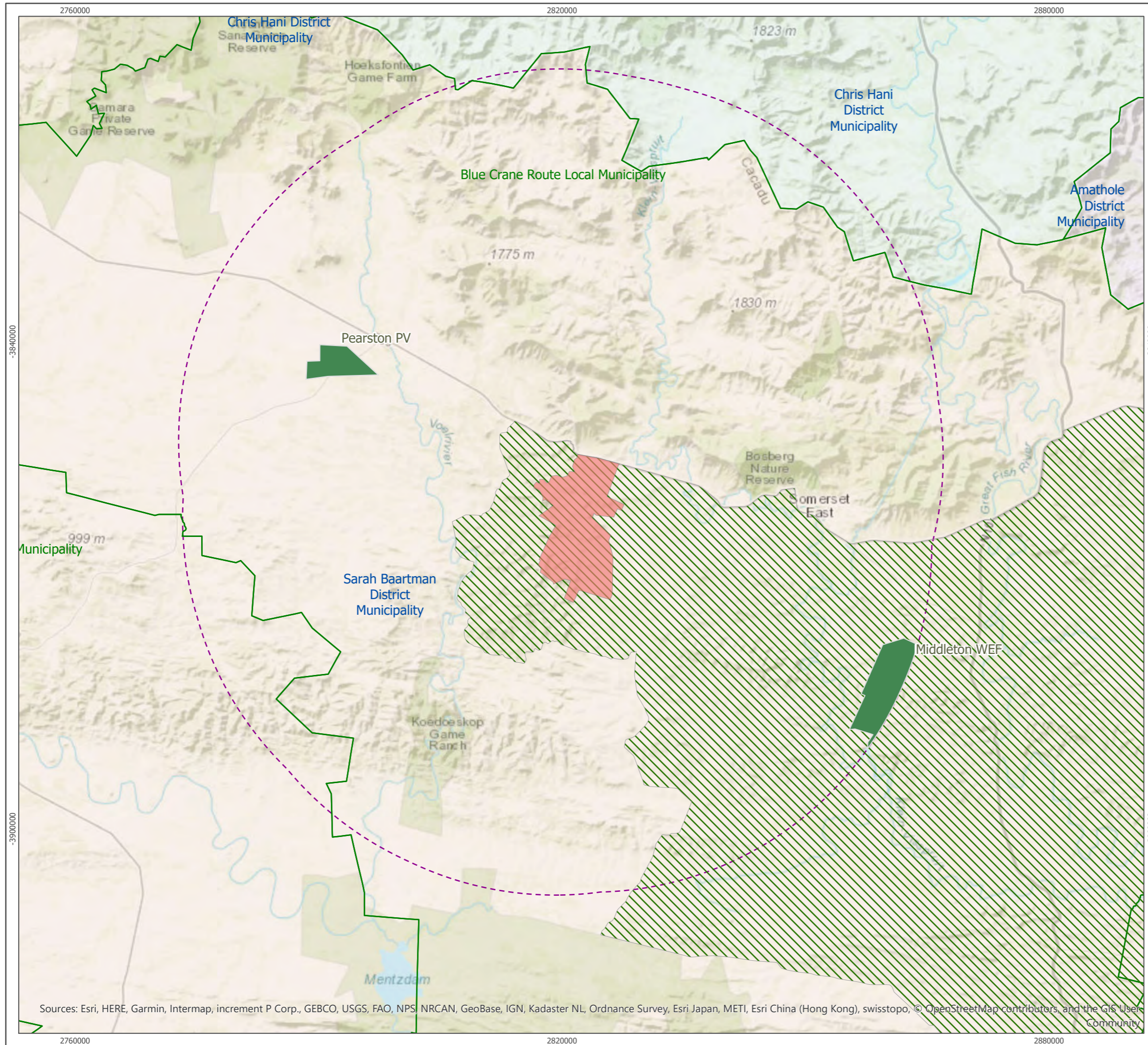
For the purpose of obtaining Environmental Authorisation (EA), and bidding requirements in the Department of Energy's Renewable Energy Independent Power Producers Procurement Programme (REIPPPP), the project has been split into three phases: North, Central and South. A Special Purpose Vehicle (SPV) has been set up for each of the three phases. Each phase will consist of two applications: one for the wind energy facility and one for the respective grid connection. The Proposed Development therefore consists of six components and six separate applications for EA:

- Highlands North Wind Energy Facility (RF) (PTY) Ltd:
 - Highlands North WEF consisting of up to 17 turbines with a generating capacity of up to 5 MW each;
 - Electrical Grid Connection and Associated Infrastructure for the Highlands North WEF;
- Highlands Central Wind Energy Facility (RF) (PTY) Ltd:
 - Highlands Central WEF: up to 14 turbines with a generating capacity of up to 5 MW each;
 - Electrical Grid Connection and Associated Infrastructure for the Highlands Central WEF;
- Highlands South Wind Energy Facility (RF) (PTY) Ltd:
 - Highlands South WEF: up to 18 turbines with a generating capacity of up to 5 MW each;
 - **Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF.**

This report pertains to the **Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF** (Figure 1.3).

1.1 Purpose and Structure of this Report

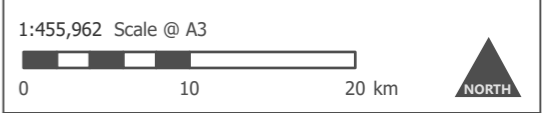
The purpose of this Basic Assessment (BA) Report is to present the environmental impact assessment process undertaken on the preferred alternative for the proposed development. The preferred site, layout, and technical specifications were assessed by the specialists and their findings and assessment are collated in this BA report. This BA report will provide sufficient information for the competent authority to make an informed decision on the



- Proposed Development Area
- DEA Renewable Energy Applications 2018 Q2
- Renewable Energy Development Zone (REDZ)
- Local Municipality Boundary
- 35 km Radius
- Amathole District Municipality
- Chris Hani District Municipality
- Sarah Baartman District Municipality



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

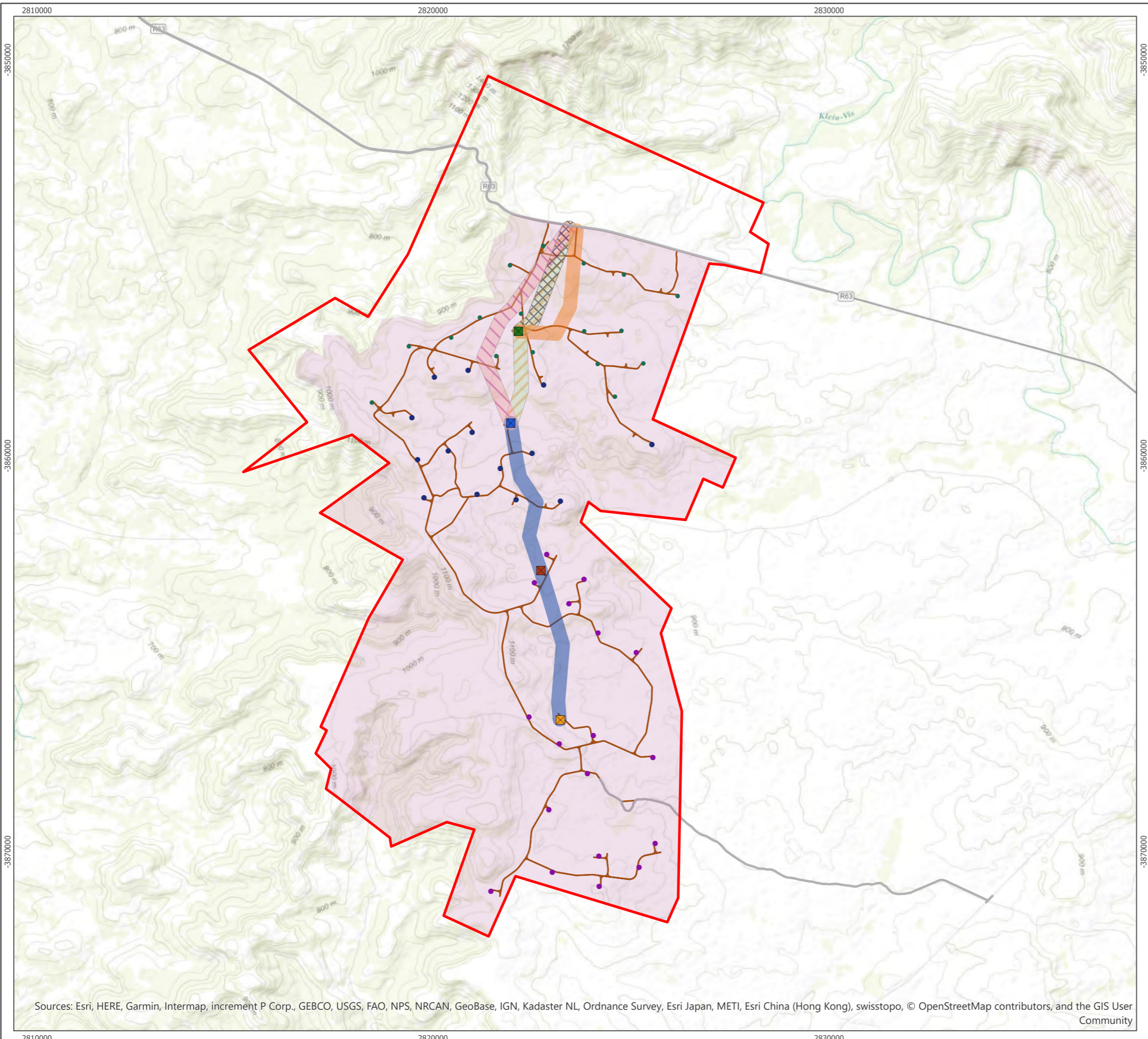


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Site Location
Figure 1.1

**Highlands South Grid
Basic Assessment Report**

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community



- Site Land Parcels Boundary
- Proposed Development Area
- Existing Road
- Proposed Roads
- North WEF Turbine Location
- Central WEF Turbine Location
- South WEF Turbine Location
- North WEF Substation (A)
- Central WEF Substation (B)
- South WEF Substation (C1)
- South WEF Substation (C2)
- North Grid Alternative 1
- North Grid Alternative 2
- Central Grid Alternative 1
- Central Grid Alternative 2
- South Grid Alternative 1
- South Grid Alternative 2
- South Grid Alternative 1&2

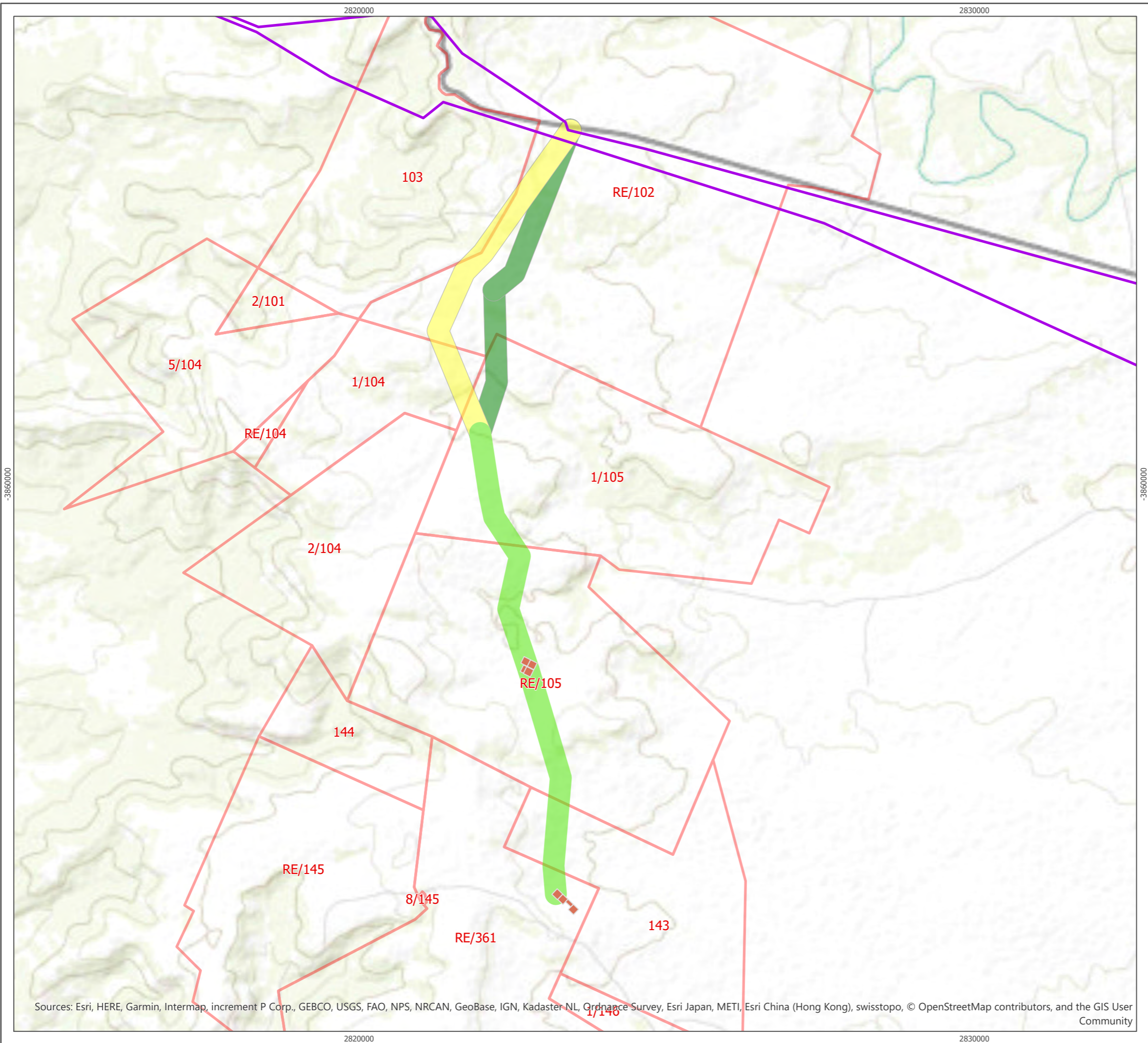
1:93,242 Scale @ A3
 0 2 4 km

Produced By: AA	Ref: 2780-REP-013
Checked By: SC	Date: 04/09/2018

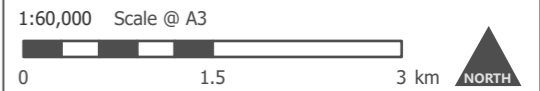
**Highlands WEFs Development Plan
Figure 1.2**

**Highlands South Grid
Basic Assessment Report**

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community



- Land Parcel Boundary
- Existing Eskom Transmission Line
- South Grid Alternative 1
- South Grid Alternative 2
- South Grid Alternative 1&2
- South WEF Substation Complex



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Checked By: SC	Date: 10/09/2018

**Highlands South Grid
Development Plan**
Figure 1.3

**Highlands South Grid
Basic Assessment Report**

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

proposed development. The report further addresses comment received during the public participation process.

The BA Report is set out in three volumes:

Volume I: BA Report

Volume II: Specialist Reports

Volume III: Comment & Response Report

Table 1.4: Structure of this Report

Section	Title	Containing
1	Introduction	Aims and Purpose of the BA Report, Overview of the BA process, the requirements of the DEA, the details of the developer, details of the EAP and the assumptions and limitations of the study.
2	Environmental Legal Framework	National Environmental Legislation, International Conventions and Treaties, Policies and Guidelines.
3	Methodology	Specialists Studies Methodology, Assessment Techniques for the BA
4	Public Participation	Initial Notification, BA Phase Public Participation, Summary of Issues.
5	Need and Desirability	Description of the Need and Desirability of the Proposed Development.
6	Assessment of Alternatives	A Comparative Analysis of Site, Technology, Location, Design and the No-Go Alternatives.
7	The Preferred Alternative	Description of the Proposed Development
8	Description of the Baseline Environment	A Detailed Description of the Affected Environment, including Freshwater and Wetlands, Flora, Fauna, Avifauna, Bat, Ambient Noise, Visual, Heritage, Social, Soil and Traffic.
9	Assessment of Potential Impacts	A Detailed Assessment of the Potential Impacts During the Construction, Operational and Decommissioning Phases.
10	Assessment of Cumulative Impacts	A Detailed Assessment of the Potential Cumulative Impacts.
11	Summary of Findings, Recommendations and Conclusions	A summary of the Finding of the Impact Assessment, Recommendations and Conclusions.
12	Impact Statement	A summary of the key findings of the environmental impact assessment of the proposed development.
Appendix A	EAP Declaration of Independence and CV	Commissioner of Oaths EAP Declaration of Independence and CV of the EAP.
Appendix B	Environmental Management Programme	The Environmental Management Programme, detailing the Proposed Mitigation Measures, and the Roles and Responsibility of Management during the Construction, Operation and

Section	Title	Containing
		Decommissioning of the Proposed Development.

1.2 Overview of the Basic Assessment Process

A Basic Assessment (BA) process is ultimately a decision-making process with the specific aim of selecting an option that will provide the most benefit, and cause the least impact. The BA process should identify activities which may have a detrimental effect on the environment, and which would therefore require Environmental Authorisation prior to commencement.

An independent Environmental Assessment Practitioner (EAP) and specific specialists identify potential negative and positive impacts that could arise as a result of the proposed project and mitigation measures are recommended which would allow for the avoidance or reduction of negative impacts or which may enhance positive impacts.

The key phases of this BA process are described below:

- **Initial Notification and Call to Register as I&APs through the following:** Advertisements, site notices, posters, letters to landowners and pre-identified I&APs. The aim of this step is to inform people of the proposed activity and to encourage initial comment and feedback.
- **Basic Assessment Process: Collation of initial comments and specialist investigations into a concise report (this document) which provides feedback on the following:**
 - Nature of the activity;
 - Description of the receiving environment;
 - Identification of potential feasible alternatives;
 - Identification of potential positive and negative impacts; and
 - Identification of knowledge gaps.

This Basic Assessment process has involved an initial feasibility investigation by the specialists of the proposed development area, which identified areas suitable for development as well as environmental constraints, which fed into the design of the proposed facility layout and grid connection alternatives. The proposed turbine layout and grid connection options therefore represents the preferred alternative layout.

The identified impacts have been assessed and relevant management and mitigation measures have been included in an Environmental Management Programme (EMPr). The findings are included in this Report.

- **Ongoing Public Consultation:** Throughout the process, registered Interested and Affected Parties (I&APs) are consulted. This involvement was initiated through the dissemination of information by means of advertisements, notification letters, posters and site notices. Opportunities are provided for I&APs to review and comment on the Draft and Final Basic Assessment Reports.

Following the completion of the relevant processes described above and the submission of documentation to the competent authority (DEA), the DEA will review the application and issue a decision (called an Environmental Authorisation). I&APs will be informed of the decision and their rights to appeal.

1.3 The Developer

WKN-Windcurrent South Africa (Pty) Ltd (WKN-WC) is a South African registered company dedicated to the development of wind energy projects to supply energy to the national grid.

In accordance with the REIPPP bid requirements WKN-WC has established Highlands South Wind Energy Facility (RF) (Pty) Ltd as a Special Purpose Vehicle (SPV) that will be used to own all the authorisations, contracts, permits and licenses required to lawfully build and operate the proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF.

1.4 The Environmental Assessment Practitioner

The co-ordination and management of this BA process is being conducted by Arcus Consultancy Services South Africa (Pty) Ltd ('Arcus') with the lead EAP being Ashlin Bodasing. Refer to Appendix A for the EAP's Declaration of Interest and *Curriculum Vitae*.

Ashlin Bodasing

Qualifications Bachelor of Social Science (Geography and Environmental Management)

Experience in Years 13 years

Experience Ashlin Bodasing is the Technical Director at Arcus, located in Cape Town. Having obtained her Bachelor of Social Science Degree from the University of Kwa-Zulu Natal; she has over 13 years' experience in the environmental consulting industry in southern Africa. She has gained extensive experience in the field of Integrated Environmental Management, environmental impact assessments and public participation. She has also been actively involved in a number of industrial and infrastructural projects, including electricity power lines and substations; road and water infrastructure upgrades and the installation of telecommunication equipment and as well green field coal mines, as well as renewable energy facilities, both wind and solar. Ashlin has major project experience in the development of Environmental Impact Assessments, Environmental Management Plans and the monitoring of construction activities. Her areas of expertise include project management, environmental scoping and impact assessments, environmental management plans, environmental compliance monitoring and environmental feasibility studies. Experience also includes International Finance Corporation Performance Standards and World Bank Environmental Guidelines environmental reviews. She has worked in Mozambique, Botswana, Lesotho and Zimbabwe.

Anja Albertyn

Qualifications Master of Science (Zoology)

Experience in Years 8 years

Experience Anja Albertyn has worked at Arcus since November 2013. She is registered with SACNASP as a professional natural scientist in the field of ecological science. She has worked as a consultant since February 2009, when she oversaw a large-scale ballast water treatment testing project for an environmental consultancy in Cape Town for over two years. Since then she has worked on over 22 renewable energy development projects. Anja is involved in all aspects of environmental impact assessments, avifaunal specialist studies, and also functions as Arcus' GIS specialist in Cape Town. She holds a Master of Science in Zoology (Ornithology) from the Percy FitzPatrick Institute of African Ornithology at the University of Cape Town. She is currently in the position of Avifauna Specialist and Environmental Assessment Practitioner.

Arcus is a specialist environmental consultancy providing environmental services to the renewable energy market. Arcus has advised on over 150 renewable energy projects in the United Kingdom and South Africa, with environmental management and in-house specialist services.

1.5 The Specialists

The EAPs have assembled a team of technical specialists to undertake studies for the proposed Highlands Wind Energy Facilities.

The specialists' fields of investigation are listed below. The areas of investigation have been identified as relevant to the proposed development as per the experience of the EAP, and consultation with the listed specialists who are familiar with the locality and nature of development.

These specialists have been selected based on their experience in the field of EIA and of renewable energy projects, and the locality of the proposed development.

Name	Organisation	Role
Andrew Pearson	Arcus Consultancy Services	Bird Impact Assessment and Monitoring
Jonathan Aronson	Arcus Consultancy Services	Bat Impact Assessment and Monitoring
Michael Reid	Arcus Consultancy Services	Noise Impact Assessment
Simon Todd	3 Foxes Consulting	Terrestrial Ecological Impact Assessment (Flora and Fauna)
Dr Jayson Orton	ASHA Consulting	Cultural Heritage and Archaeology Impact Assessment
Dr John Almond	via ASHA Consulting	Palaeontology Impact Assessment
Dr Brian Colloty	Scherman Colloty and Associates	Freshwater and Wetlands Impact Assessment
Quinton Lawson & Bernard Oberholzer	Quinton Lawson & Bernard Oberholzer Architects	Landscape and Visual Impact Assessment
Johann Lanz	Johann Lanz Soil Scientist	Geology, Soils and Agriculture Impact Assessment
Tony Barbour	Tony Barbour Environmental Consulting and Research	Socio-Economic Impact Assessment
Stephen Fautley	TechSO	Traffic Impact Assessment

1.6 Assumptions and Limitations

The following assumptions and limitations are applicable to the Highlands South Grid Connection:

- The assumption is made that the information on which this report is based (baseline studies and project information, as well as existing information) is accurate and correct.
- It should be emphasised that information, as presented in this report, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.
- The assumptions and limitations, presented in each specialist reports, Volume II of this report, are noted for the BA Report and the specialist studies conducted as part of the EIA process for the proposed development.
- It is assumed that the corridor investigated and assessed for the proposed powerline is technically suitable for such development.
- It is assumed that the connection to the national grid via Eskom's existing transmission line and nearby substations is technically adequate, feasible and viable.
- Power generation alternatives were not investigated due to the fact that this application is project specific i.e. electricity distribution from a renewable resource.

- The assumption is made that the information on which this report is based (specialist studies and project information, as well as existing information) is accurate and correct at the time of writing this report.
- It is assumed that the recommendations derived from this study would be included in all tender documentation and the EMP for implementation.
- This study does not analyse the impact of borrow pits. Contractors would be expected to provide services with all necessary approvals in place.

2 ENVIRONMENTAL LEGAL FRAMEWORK

2.1 The National Environment Management Act, 1998 (Act No 107 of 1998)

Section 2 of the National Environment Management Act, 1998 (NEMA) as amended, lists environmental principles that are to be applied by all organs of state regarding proposals that may significantly affect the environment. Included amongst the key principles is the principle that all development must be socially, economically and environmentally sustainable, environmental management must place people and their needs at the forefront of its concern, to serve their physical, psychological, developmental, cultural and social interests equitably.

NEMA also provides for the participation of I&APs and it stipulates that decisions must take the interests, needs and values of all I&APs into account.

Chapter 5 of NEMA outlines the general objectives and implementation of Integrated Environmental Management (IEM), the latter providing a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals. Section 24 provides a framework for the granting of environmental authorisations.

In order to give effect to the general objectives of IEM, the potential impacts on the environment of listed activities must be considered, investigated, assessed and reported to the competent authority. Section 24(4) outlines the minimum requirements for procedures for the investigation, assessment and communication of the potential impact of activities.

On 7 April 2017 the Minister of Environmental Affairs published amendments to the NEMA: EIA Regulations of 2014 (GNR 326) and the three Listing Notices (GNR 324, 325 and 327) in Government Gazette No. 40772. This amendment was promulgated under the NEMA: EIA Regulations 2014 published by the Minister of Environmental Affairs in Government Gazette No. 38282 on 8 December 2014. The 2014 EIA Regulations in turn were promulgated under the requirements of Chapter 5 of the NEMA.

The EIA Regulations 2014 as amended by GNR 326 of 2017 provide for the control of certain Listed Activities. These activities are listed in Government Notice No. R327 (Listing Notice 1 – Basic Assessment), R325 (Listing Notice 2 – Scoping & EIA Process) and R324 (Listing Notice 3 – Basic Assessment) of 7 April 2017, and are prohibited to commence until environmental authorisation has been obtained from the competent authority, in this case, the Department of Environmental Affairs (DEA).

The DEA is the competent authority for all renewable energy proposals, as NEMA states that:

"24C. (2) The Minister must be identified as the competent authority in terms of subsection (1) if the activity- (a) has implications for international environmental commitments or Relations;

This project has implications for international environmental commitments that South Africa has made in terms of climate change.

Environmental authorisation, which may be granted subject to conditions, will only be considered upon compliance with GNR982, as amended by GNR326 of 7 April 2017.

Any Environmental Authorisation obtained from the DEA applies only to those specific listed activities for which the application was made. To ensure that all Listed Activities that could potentially be applicable to this proposal are covered by the Environmental Authorisation, a precautionary approach is followed when identifying listed activities, that is, if an activity could potentially be part of the proposed development, it is listed.

The Listed Activities applicable to this proposed project are presented in Table 2.1 below. All potential impacts associated with these Listed Activities will be considered and adequately assessed in this BA process.

Table 2.1: NEMA Listed Activities in Relation to the Proposed Development

Listing Notices 1 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 GN R 327 Activity 11	<i>The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.</i>	132 kilovolt overhead powerlines will be installed to transfer electricity from the on-site substation to the existing on-site Eskom transmission line.
Listing Notice 1 GN R 327 Activity 19	<i>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</i>	The construction of the overhead powerline could include the excavation of soil in watercourses/drainage line areas, and infilling/deposition may exceed 5 cubic metres and in some instances may exceed 10 cubic metres. Borrow pits for the sourcing of aggregate material may be required. Figure shows the location of water crossings.
Listing Notice 1 GN R 327 Activity 27	<i>The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation</i>	The infrastructure associated with the overhead powerline may require clearing of more than 1 hectare of indigenous vegetation but less than 20 hectares.
Listing Notice 3 GN R 324 Activity 4	<i>The development of a road wider than 4 metres with a reserve less than 13,5 metres a. Eastern Cape i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i>	Servitude road may be wider than 4 m. The site falls outside of an urban area and parts of the site fall with a NPAESF and a Tier 2 CBA.
Listing Notice 3 GN R324 Activity 14	<i>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; a. Eastern Cape i. Outside urban areas:</i>	Bridges and infrastructure associated with the overhead powerline may be constructed within 32 m of a watercourse(s). The site lies outside of an urban area and a portion of the site falls with an NPAESF area and a Tier 2 Critical Biodiversity Area.

Listing Notices 1 and 3 07 April 2017	<i>Listed Activity</i>	<i>Description of project activity that triggers listed activity</i>
	<i>(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;</i>	
Listing Notice 3 GN R324 Activity 23	<i>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; a. Eastern Cape i. Outside urban areas: (bb) National Protected Area Expansion Strategy Focus areas; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</i>	The construction of the overhead powerline may include the expansion of existing infrastructure such as roads that are located within 32 m of a watercourse. The site lies outside of any urban area, and parts of the site fall within a Critical Biodiversity Area.

2.2 The National Heritage Resources Act, 1999 (Act No 25 of 1999)

Section 38 (1) of the National Heritage Resources Act, 1999 (NHRA) lists development activities that would require authorisation by the responsible heritage resources authority. Activities considered applicable to the proposed project include the following:

*“(a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(c) any development or other activity which will change the character of a site; and
(i) exceeding 5000 m² in extent.”*

The NHRA requires that a person intending to undertake such an activity must notify the relevant national and provincial heritage authorities at the earliest stages of initiating such a development.

The relevant heritage authority would then in turn, notify the person whether a Heritage Impact Assessment Report should be submitted. According to Section 38(8) of the NHRA, a separate report would not be necessary if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (No. 73 of 1989) (ECA) (now replaced by NEMA) or any other applicable legislation. The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA and take into account any comments and recommendations made by the relevant heritage resources authority. As such, a Heritage Impact Assessment (HIA) will form part of this Basic Assessment process.

In South Africa, the law is directed towards the protection of human made heritage, although places and objects of scientific importance are covered. The NHRA also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. Generally protected heritage, which must be considered in any heritage assessment, includes:

- *Any place of cultural significance (described below);*
- *Buildings and structures (greater than 60 years of age);*
- *Archaeological sites (greater than 100 years of age);*
- *Palaeontological sites and specimens;*
- *Shipwrecks and aircraft wrecks; and*
- *Graves and grave yards.*

Section 3(3) of the NHRA defines the cultural significance of a place or objects with regard to the following criteria:

- Its importance in the community or pattern of South Africa's history;*
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;*
- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;*
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;*
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;*
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;*
- Its strong or special association with a particular community or cultural group for social cultural or spiritual reasons;*
- Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and*
- Sites of significance relating to the history of slavery in South Africa.*

While not specifically mentioned in the NHRA, Scenic Routes are recognised as a category of heritage resources which requires grading as the Act protects area of aesthetic significance (clause "e" above).

The heritage impact assessment reports have been submitted to the SAHRA for comment.

2.3 Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)

The Conservation of Agricultural Resources Act (CARA), 1983 states that no degradation of natural land is permitted. The Act requires the protection of land against soil erosion and the prevention of water logging and salinisation of soils by means of suitable soil conservation works to be constructed and maintained. The utilisation of marshes, water sponges and watercourses are also addressed.

2.4 The Environment Conservation Act, 1989 (Act No.73 of 1989), the National Noise Control Regulations: GN R154 of 1992

The Environment Conservation Act, 1989 (ECA) allows the Minister of Environmental Affairs and Tourism ("now the Minister of Environmental Affairs") to make regulations regarding noise, amongst other concerns. The Minister has made noise control regulations under the ECA.

In terms of section 25 of the ECA, the national noise-control regulations (NCR) were promulgated (GN R154 in *Government Gazette* No. 13717 dated 10 January 1992). The NCRs were revised under Government Notice Number R. 55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations.

Subsequently, in terms of Schedule 5 of the Constitution of South Africa of 1996 legislative responsibility for administering the NCR was devolved to provincial and local authorities.

These regulations define "**disturbing noise**" as:

"Noise level which exceeds the zone sound level or, if no zone sound level has been designated, a noise level which exceeds the ambient sound level at the same measuring point by 7 dBA or more".

These Regulations prohibits anyone from causing a disturbing noise.

No provincial noise control regulations have been promulgated in the Eastern Cape Province and thus the National Noise Control Regulations are relevant for the construction phase of the Highlands South WEF Grid Connection.

2.5 National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

Section 34 of the Air Quality Act, 2004 (AQA) makes provision for:

- (1) The Minister to prescribe essential national noise standards -
 - (a) For the control of noise, either in general or by specified machinery or activities or in specified places or areas; or
 - (b) For determining –
 - (i) a definition of noise; and
 - (ii) The maximum levels of noise.
- (2) When controlling noise the provincial and local spheres of government are bound by any prescribed national standards.

This section of the Act is in force, but no such standards have yet been promulgated.

An atmospheric emission license issued in terms of Section 22 may contain conditions in respect of noise. This however will not be relevant to the WEF.

2.5.1 National Dust Control Regulations, 2013

The National Environmental Management: Air Quality Act, 2004 (Act 39 of 2004), makes provision for national dust control regulations. These regulations prescribe dust fall standards for residential and non-residential areas. These Regulations also provide for dust monitoring, control and reporting.

The acceptable dust fall out rates are:

Restriction Area	Dust Fall (D) (mg/m ² /day, 30 day average)	Permitted Frequency of exceedance
Residential	D < 600	Two within a year, not sequential months
Non- Residential	600 < D < 1200	Two within a year, not sequential months

2.6 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (NWA) provides for constitutional requirements including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State.

A water resource includes any watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse is interpreted as a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam into which or from which water flows; and any collection of water that the Minister may declare to be a watercourse.

Relevant water uses for the proposed construction of the proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF, which will require

access roads over watercourses and drainage channels, in terms of Section 21 of the Act include, but are not limited to, the following:

*Section 21(c): Impeding or diverting the flow of water in a watercourse; and
Section 21(i): Altering the bed, banks, course or characteristics of a watercourse.*

GN 1199 of 18 December 2009 grants general authorisation for the above water uses based on certain conditions. It is also stipulates that these water uses must be registered with the responsible authority.

Pollution of river water is a contravention of the NWA. Chapter 3, Part 4 of the NWA deals with pollution prevention and in particular the situation where pollution of a water resource occurs or might occur as a result of activities on land. The person who owns, controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources.

Chapter 3, Part 5 of the NWA deals with pollution of water resources following an emergency incident, such as an accident involving the spilling of a harmful substance that finds or may find its way into a water resource. The responsibility for remedying the situation rests with the person responsible for the incident or the substance involved.

Highlands South WEF (RF) (Pty) Ltd is applying for a Water Use License, and proof of the application process is provided in Appendix C.

2.7 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

2.7.1 Threatened or Protected Species List, 2015

Amendments to the Threatened or Protected Species (TOPS) list were published on 31 March 2015 in Government Gazette No. 38600 and Notice 256 of 2015. Certain bird species that occur on the site may be threatened or protected.

2.7.2 Alien and Invasive Species Regulations, 2016

The Act and Regulations set out various degrees of Invasive species (Plants, Insects, Birds, Animals, Fish and Water Plants) and requires that certain of those invasive species are documented and, in some cases, removed from properties in South Africa.

The Regulations list 4 categories of invasive species that must be managed, controlled or eradicated from areas where they may cause harm to the environment, or that are prohibited to be brought into South Africa.

2.8 Cape Nature and Environmental Conservation Ordinance 19 of 1974

These were developed to protect both animal and plant species which warrant protection. These may be species which are under threat or which are already considered to be endangered and species are listed in the relevant documents. The provincial environmental authorities are responsible for the issuing of permits in terms of this legislation.

2.9 Additional Relevant Legislation

The applicant must also comply with the provisions of other relevant national legislation. Additional relevant legislation that has informed the scope and content of this BA Report includes the following:

- *Constitution of the Republic of South Africa, 1996 (Act No. 108, 1996);*
- *Aviation Act, 1962 (Act No. 74, 1962);*
- *National Environmental Management: Waste Act, 2008 (Act No. 59, 2008);*
- *National Forest Act, 1998 (Act No. 84, 1998);*

- *National Environmental Management: Protected Areas Act, 2003 (Act No. 57, 2003);*
- *National Roads Act, 1998 (Act No. 7, 1998)*
- *Occupational Health and Safety Act, 1993 (Act No. 85 of 1993);*
- *National Veld and Forest Fire Bill of 10 July 1998;*
- *Fertiliser, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947);*
- *Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007);*
- *Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002); and*
- *Independent Communications Authority of South Africa Act, 2000 (Act No. 13 of 2000; as amended).*

2.10 Conventions and Treaties

2.10.1 The Convention on Biological Diversity (CBD) (1993)

This is a multilateral treaty for the international conservation of biodiversity, the sustainable use of its components and fair and equitable sharing of benefits arising from natural resources. Signatories have the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

The convention prescribes that signatories identify components of biological diversity important for conservation and monitor these components in light of any activities that have been identified which are likely to have adverse impacts on biodiversity. The CBD is based on the precautionary principle which states that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat and that in the absence of scientific consensus the burden of proof that the action or policy is not harmful falls on those proposing or taking the action.

2.10.2 The Ramsar Convention (1971)

The Convention on Wetlands, called the Ramsar Convention, as it was adopted in the Iranian city of Ramsar in 1971 and came into force in 1975, is an intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources. Under the three pillars of the convention the Contracting Parties commit to work towards the wise use of all their wetlands through national plans, policies and legislation, management actions and public education; designate suitable wetlands for their list of Wetlands of International Importance (the "Ramsar List") and ensure their effective management; and Cooperate internationally on transboundary wetlands, shared wetland systems, shared species, and development projects that may affect wetlands.

2.10.3 The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) (1983)

An intergovernmental treaty, concluded under the sponsorship of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. The fundamental principles listed in Article II of this treaty state that signatories acknowledge the importance of migratory species being conserved and agree to take action to this end "*whenever possible and appropriate*", "*paying special attention to migratory species the conservation status of which is unfavourable and taking individually or in cooperation appropriate and necessary steps to conserve such species and their habitat*".

2.10.4 The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (1999)

An intergovernmental treaty developed under the framework of the Convention on Migratory Species (CMS), concerned with the coordinated conservation and management of migratory waterbirds throughout their entire migratory range. Signatories of the Agreement have expressed their commitment to work towards the conservation and sustainable management of migratory waterbirds, paying special attention to endangered species as well as to those with an unfavourable conservation status. The assessment of the ecology and identification of sites and habitats for migratory waterbirds is required to coordinate efforts that ensure that networks of suitable habitats are maintained and investigate problems likely posed by human activities.

2.11 Policies and Guidelines

2.11.1 Environmental Impact Assessment Guidelines

Relevant guidelines and policies as applicable to the management of the EIA process and to this application have also been taken into account, as indicated below:

- IEM Guideline Series (Series 3): Stakeholder engagement (2002);
- IEM Guideline Series (Series 4): Specialist studies (2002);
- IEM Guideline Series (Series 5): Impact Significance (2002);
- IEM Guideline Series (Guideline 5): Companion to the EIA Regulations 2010 (October 2012);
- IEM Guideline Series (Series 7): Cumulative Effects Assessment (2002);
- IEM Guideline Series (Guideline 7): Public Participation in the EIA process (October 2012);
- IEM Guideline Series (Series 7): Alternatives in the EIA process (2002);
- IEM Guideline Series (Guideline 9): Draft guideline on need and desirability in terms of the EIA Regulations 2010 (October 2012);
- DEA (2017) Guideline on Need and Desirability, Department of Environmental Affairs (DEA) Pretoria, South Africa (2017);
- IEM Guideline Series (Series 12): Environmental Management Plans (EMP) (2002);
and
- IEM Guideline Series (Series 15): Environmental impact reporting (2002).

2.12 Impact Assessment and Reporting

The primary objective of the basic assessment process is to present sufficient information to the competent authority (CA) and interested and affected parties (I&APs) on predicted impacts and associated mitigation measures required to avoid or mitigate negative impacts, as well as to improve or maximise the benefits of the project.

In terms of legal requirements, NEMA EIA Regulations regulate and prescribe the content of the BA Report and specify the type of supporting information that must accompany the submission of the report to the authorities. Table 2.2 shows how and where the legal requirements are addressed in this BA Report. Volume III of this BA Report contains the PPP undertaken to date. As the comments are received on the Draft BA Report these will be collated and included in the comments and response report.

The BA Report presents a summary of the findings and recommendations of all specialists.

As per the EIA Regulations 2014, as amended, *“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; 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 risk that need to be managed or monitored.*

The above activities are completed through consultation with:

- The lead authorities involved in the decision-making for the BA application (in this case, the DEA);
- The public, I&APs and other relevant organisations to ensure that local issues are well understood; and
- The specialist team to ensure that technical issues are identified.

The existing environment within which a proposed development is to be located is investigated, through a review of relevant background literature and ground-truthing.

A primary objective is to present key stakeholders with the findings of the assessments, obtain and document feedback and address all issues raised.

Table 2.2: Legislative Requirements for Scope of Assessment and Content of Basic Assessment Reports

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<i>details of-</i> <i>(i) the EAP who prepared the report; and</i> <i>(ii) the expertise of the EAP, including a curriculum vitae;</i>	Section 1.4 Appendix A
<i>the location of the activity, including-</i> <i>(i) the 21 digit Surveyor General code of each cadastral land parcel;</i> <i>(ii) where available, the physical address and farm name;</i>	Table A Figure 1.3 Table 7.1

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<i>(iii) where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;</i>	
<i>a plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is-</i> <i>(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or</i> <i>(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;</i>	Figure 1.3 Table 7.1
<i>a description of the scope of the proposed activity, including-</i> <i>(i) all listed and specified activities triggered and being applied for; and</i> <i>(ii) a description of the activities to be undertaken including associated structures and infrastructure;</i>	Table 2.1 Section 7
<i>a description of the policy and legislative context within which the development is proposed including-</i> <i>(i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and</i> <i>(ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools framework, and instruments;</i>	Section 2 Section 5
<i>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;</i>	Section 5
<i>a motivation for the preferred site, activity and technology alternative;</i>	Section 6
<i>a full description of the process followed to reach the proposed preferred alternative within the site, including-</i> <i>(i) details of the alternatives considered;</i>	Section 6
<i>(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</i>	Section 4 Volume III
<i>(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;</i>	Section 4
<i>(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;</i>	Section 9
<i>(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-</i> <i>(aa) can be reversed;</i> <i>(bb) may cause irreplaceable loss of resources; and</i> <i>(cc) can be avoided, managed or mitigated;</i>	Section 9
<i>(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;</i>	Section 3.3 Volume II: Specialist Reports
<i>(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;</i>	Section 9

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<i>(viii) the possible mitigation measures that could be applied and level of residual risk;</i>	Section 9
<i>(ix) the outcome of the site selection matrix;</i>	Section 6
<i>(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</i>	Section 6
<i>(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;</i>	Section 6 Section 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> <i>(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and</i> <i>(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;</i>	Section 3 Section 9
<i>an assessment of each identified potentially significant impact and risk, including-</i> <i>(i) cumulative impacts;</i> <i>(ii) the nature, significance and consequences of the impact and risk;</i> <i>(iii) the extent and duration of the impact and risk;</i> <i>(iv) the probability of the impact and risk occurring;</i> <i>(v) the degree to which the impact and risk can be reversed;</i> <i>(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and</i> <i>(vii) the degree to which the impact and risk can be avoided, managed or mitigated;</i>	Section 9 Section 10
<i>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;</i>	Section 11
<i>an environmental impact statement which contains-</i> <i>(i) a summary of the key findings of the environmental impact assessment;</i> <i>(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</i> <i>(iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</i>	Section 11 Section 12 Figure 11.1
<i>based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management outcomes, and the impact management outcomes for the development for inclusion in the EMPr;</i>	Section 9 Appendix B: EMPr
<i>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;</i>	Section 12.1
<i>a description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;</i>	Section 1.6
<i>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;</i>	Section 12
<i>where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, the date on</i>	

Appendix 1 Requirements NEMA, 1998 (Act No. 107 of 1998)	Location in BAR
<i>which the activity will be concluded, and the post construction monitoring requirements finalised;</i>	
<i>an undertaking under oath or affirmation by the EAP in relation to-</i> <i>(i) the correctness of the information provided in the reports;</i> <i>(ii) the inclusion of comments and inputs from stakeholders and I&APs;</i> <i>(iii) the inclusion of inputs and recommendations from the specialist reports where relevant; and</i> <i>(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; and</i>	Appendix A
<i>where applicable, details of any financial provision for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;</i>	n/a
<i>any specific information that may be required by the competent authority; and</i>	n/a
<i>any other matters required in terms of section 24(4)(a) and (b) of the Act.</i>	n/a

3 METHODOLOGY

3.1 Feasibility Assessment

The Developer appointed Arcus to conduct a Feasibility Study for the Highlands Wind Energy Facilities in 2017.

This feasibility assessment involved:

- Conducting site visits to confirm desktop reviews, where necessary;
- Adding environmental and planning designations (e.g., landscape, nature conservation, archaeology);
- Identifying other designations of relevance; e.g.; regional renewable targets;
- Identifying nearby windfarm proposals and status;
- Identifying key biophysical constraints and / opportunities and potential red flags;
- Identifying key socio-economic constraints and / opportunities and potential red flags;
- Production of a preliminary overall environmental sensitivity map;
- Production of a preliminary biophysical sensitivity map; and
- Comment on the feasibility of the proposed development given the potential environmental impact and constraints and buffers applied.
- Identifying the potentially developable area within the available land; and
- Providing a list of key issues and conclusions.

The results of the feasibility assessment were used to develop the proposed site layout.

3.2 Specialist Study Assessment

Specialists were appointed by Arcus to provide a detailed report based on the requirements of this proposed development.

Methodology of each specialist used to collate the report(s) can be seen in each Specialist Report attached to this BA as Volume II.

3.3 Assessment Techniques for the BA

Each of the specialist assessments follows a systematic approach to the assessment of impacts, with the principal steps being:

- Description of existing environment/baseline conditions;
- Prediction of likely potential impacts, including cumulative impacts (both positive and negative);
- Assessment of likely potential impacts (positive and negative);
- Identification of appropriate mitigation measures; and
- Assessment of residual (potential) environmental impacts.

3.3.1 Baseline Description

In order to evaluate the potential environmental impacts, information relating to the existing environmental conditions were collected through field and desktop research; this is known as the baseline. Climate change is expected to affect the proposed development site over the lifetime of the proposed development; however, the nature, scale and severity of climate change effects are uncertain. Given this uncertainty, the existing environment is assumed to remain constant throughout the lifetime of the proposed development, and forms the current and future baseline for the impact assessments.

The baseline was used to determine the sensitivity of receptors on and near the proposed development site and what changes may take place during the construction, operation and decommissioning of the proposed development and the impacts, if any, that these changes may have on these receptors.

Data was collected from public records and other archive sources and where appropriate field surveys were carried out as detailed.

3.3.2 Identification of Potential Impacts

The identification of potential impacts covers the three phases of the proposed development: construction, operation and decommissioning. During each phase, the potential environmental impacts may be different.

The project team have experience from environmental studies for other projects in the locality of the proposed development as well as other WEFs. The team are therefore able to identify potential impacts addressed in the BA based on their experience and knowledge of the type of development proposed and the local area. Their inputs informed the scope for the BA.

Each specialist assessment considered:

- The extent of the impact (local, regional or (inter) national);
- The intensity of the impact (low, medium or high);
- The duration of the impact and its reversibility;
- The probability of the impact occurring (improbable, possible, probable or definite);
- The confidence in the assessment; and
- Cumulative impacts.

Following identification of potential environmental impacts, the baseline information was used to predict changes to existing conditions, and undertake an assessment of the impacts associated with these changes.

3.3.3 Assessment of Potential Effects

The potential impact that the proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF may have on each environmental receptor could be influenced by a combination of the sensitivity and importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (and importance) may be categorised by a multitude of factors, such as the rarity of the species; transformation of natural landscapes or changes to soil quality and land use.

The overall significance of a potential environmental impact is determined by the interaction of the above two factors (i.e. sensitivity/importance and predicted degree of alteration from the baseline).

Specialists, in their terms of references were supplied with a standard method with which to determine the significance of impacts to ensure objective assessment and evaluation, while enabling easier multidisciplinary decision-making. The methodology³ is outlined below.

The table below, taken from the above guideline, indicates the categories for the rating of impact magnitude and significance.

The assessment methodology that was used is in accordance with the revised 2014 EIA Regulations (as amended). The significance of environmental impacts is a function of the environmental aspects that are present and to be impacted on, the probability of an impact occurring and the consequence of such an impact occurring before and after implementation of proposed mitigation measures.

3.3.3.1 Extent (spatial scale)

L	M	H
Impact is localised within site boundary	Widespread impact beyond site boundary; Local	Impact widespread far beyond site boundary; Regional/national

3.3.3.2 Duration

L	M	H
Quickly reversible, less than project life, short term	Reversible over time; medium term to life of project	Long term; beyond closure; permanent; irreplaceable or irretrievable commitment of resources

3.3.3.3 Intensity (severity)

Type of Criteria	Negative			Positive		
	H-	M-	L-	L+	M+	H+
Qualitative	Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes.	Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration	Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration.	Minor improvement, restoration, improved management	Moderate improvement, restoration, improved management, substitution	Substantial improvement, substitution
Quantitative	Measurable deterioration Recommended level will often be	Measurable deterioration Recommended level will	No measurable change; Recommended level will never be violated	No measurable change; Within or better than	Measurable improvement	Measurable improvement

³ Adapted from T Hacking, AATS – Envirolink, 1998: An innovative approach to structuring environmental impact assessment reports. In: IAIA SA 1998 Conference Papers and Notes.

	violated (e.g. pollution)	occasionally be violated		recommended level.		
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3.3.3.4 Probability of Occurrence

L	M	H
Unlikely; low likelihood; Seldom No known risk or vulnerability to natural or induced hazards.	Possible, distinct possibility, frequent Low to medium risk or vulnerability to natural or induced hazards.	Definite (regardless of prevention measures), highly likely, continuous High risk or vulnerability to natural or induced hazards.

3.3.3.5 Status of the Impact

The specialist should describe whether the impact is positive, negative or neutral for each parameter. The ranking criteria are described in negative terms. Where positive impacts are identified, use the opposite, positive descriptions for criteria.

3.3.3.6 Degree of Confidence in Predictions:

The degree of confidence in the predictions, based on the availability of information and specialist knowledge, is to be stated.

3.3.3.7 Consequence: (Duration x Extent x Intensity)

Having ranked the severity, duration and spatial extent, the overall consequence of impacts is determined using the following qualitative guidelines:

Intensity = L				
Duration	H			
	M			Medium
	L	Low		
Intensity = M				
Duration	H			High
	M		Medium	
	L	Low		
Intensity = H				
Duration	H			
	M			High
	L	Medium		
	L		M	H
	Extent			

Positive impacts are ranked in the same way as negative impacts, but result in high, medium or low positive consequence.

3.3.3.8 Overall Significance of Impacts

Combining the consequence of the impact and the probability of occurrence provides the overall significance (risk) of impacts.

PROBABILITY	Definite Continuous	H	MEDIUM		HIGH
	Possible Frequent	M		MEDIUM	
	Unlikely Seldom	L	LOW		MEDIUM
			L	M	H
			CONSEQUENCE		

3.3.3.9 Mitigation

Measures to avoid, reduce or remedy significant adverse impacts were identified; these are termed mitigation measures. Where the assessment process identified any significant adverse impacts, mitigation measures were proposed to reduce those impacts where practicable. Such measures include the physical design evolutions such as movement of turbines and management and operational measures. Design alterations such as the route of the servitude to avoid certain sensitive receptors are mitigation embedded into the design of the proposed development, i.e., embedded mitigation.

This strategy of avoidance, reduction and remediation is a hierarchical one which seeks:

- First to avoid potential impacts;
- Then to reduce those which remain; and
- Lastly, where no other measures are possible, to propose compensatory measures.

Each specialist consultant identified appropriate mitigation measures (where relevant).

3.4 Cumulative Impact Assessment

In accordance with the EIA Regulations, consideration is also given to 'cumulative impacts'.

By definition, cumulative impacts are those that result from incremental changes caused by past, present or reasonably foreseeable future actions together with the proposed development. Cumulative impacts are the combined impacts of several developments that are different to the impacts from the developments on an individual basis. For example the landscape impact of one WEF may be insignificant, but when combined with another it may become significant.

For the purpose of this assessment cumulative impacts is defined and has been assessed in the future baseline scenario, i.e. Cumulative impact of the proposed development = change caused by proposed development when added to the cumulative baseline (The cumulative baseline includes all other identified developments. In the cumulative assessment the effect of adding the proposed development to the cumulative baseline is assessed.)

In line with best practice, the scope of this assessment will include all operational, approved or current and planned renewable energy applications (including those sites under appeal), within a 35 km radius of the site (as a minimum).

The WEF sites included in the assessment of cumulative impacts has been based on the knowledge and status of the surrounding areas at the time of writing the BA Report.

Each of the specialists used existing publicly available information for the developments that occur within 35 km of the proposed Electrical Grid Connection and Associated Infrastructure for the Highlands South WEF, in order to assess the cumulative impacts.

Cumulative impacts that have been considered are those residual impacts that remain medium to high post mitigation. It should be noted that this assessment is highly qualitative and based on specialists' knowledge.

4 PUBLIC PARTICIPATION

The primary aims of the public participation process are:

- To inform Interested and Affected Parties (I&APs) of the proposed development;
- To identify issues, comments and concerns as raised by I&APs;
- To promote transparency and an understanding of the project and its potential consequences;
- To facilitate open dialogue and liaise with all I&APs;
- To assist in identifying potential environmental (biophysical and socio-economic) impacts associated with the proposed development; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in a Comments & Response Report.

Volume III of this report contains the Comments & Response Report which includes copies and proof of all correspondence.

4.1 Initial Notification

On 14 June 2018 initial notification letters (email and registered mail in English and Afrikaans) were sent to landowners, surrounding landowners, identified organs of state and pre-identified I&APs, informing them of the intention of the applicant to apply for Environmental Authorisations for the proposed development. This included a locality map, proposed development plan and project descriptions. Details of how to submit comments and queries were included.

Site notice boards in English and Afrikaans were placed where the site boundary meets the R63 at 32°41'23.8"S 25°21'54.7"E and 32°41'23.8"S 25°21'54.7"E on 15 June 2018.

Notification posters in English and Afrikaans were placed on notice boards in Pearston at the post office, municipality, library, SAPS and a local supermarket on 15 June 2018. In Somerset East notification posters were placed on notice boards at the SAPS, Langenhoven library, municipality, Spar supermarket, a hardware shop and a café. Photographs and coordinates of all placements are presented in Volume III.

Newspaper advertisements in English and Afrikaans were placed in *The Daily Sun* Eastern Cape and *The Mid Karoo Express* on 21 June 2018.

4.2 BA Process Public Participation

I&APs are able to register as I&APs throughout the duration of the process and all registered I&APs are kept informed about the progress of the application.

The following tasks will be undertaken during the Basic Assessment process:

- Notification letters are sent out to registered I&APs, key stakeholders, and organs of state to inform them of the availability of the Basic Assessment Report (BAR) for review and comment (30 days);
- Focus Group and/or One-on-One Meetings will be held during the public review period when required;
- A Comments and Responses Report is compiled, recording comments and/or queries received and the responses provided;
- Notification letters will be sent to all registered I&APs, key stakeholders, and organs of state to inform them of the decision by the DEA and the appeal procedure; and

- Placement of advertisements in the same local and regional newspapers (in English and Afrikaans) to inform I&APs of the decision taken by the DEA.

4.3 Summary of Issues Raised

All comments received from the public during the process, the review of the Draft Basic Assessment Report, and public meetings will be collated in Volume III (Comments and Responses Report), which will document the issues raised and project team responses to the comments received.

To date no comments related to the proposed grid connection have been received.

5 NEED AND DESIRABILITY

The proposed grid connection is required to transfer electricity generated by the Highlands South WEF to the national grid. The proposed grid connection and Highlands South WEF therefore rely on authorisation of the other to move forward.

The need for the proposed grid connection is linked to the need for the Highlands South WEF. The questions for need and desirability of the proposed grid connection are therefore answered in the context of being a component of a renewable energy facility.

Reference is made to the Department of Environmental Affairs (DEA) 2017 Guideline on Need and Desirability⁴ which states that while the "concept of need and desirability relates to the type of development being proposed, essentially, the concept of need and desirability can be explained in terms of the general meaning of its two components in which need refers to time and desirability to place – i.e. is this the right time and is it the right place for locating the type of land-use/activity being proposed? Need and desirability can be equated to wise use of land – i.e. the question of what is the most sustainable use of land."

The need and desirability assessment answers the question of whether the activity or development is being proposed at the right time in the right place. The guidelines pose questions that should be considered in this investigation, which are addressed in Table 5.1 and Table 5.2 below.

⁴DEA (2017) Guideline on Need and Desirability. Department of Environmental Affairs (DEA), Pretoria, South Africa, ISBN: 978-0-9802694-4-4.

Table 5.1: Ecological Considerations of Need and Desirability for Highlands WEF

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Question	Answer	Reference	
<i>How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?</i>	<p>An independent Ecological Specialist forms part of the project team. The Ecological Specialist's approach and methodology applied complies with NEMA: EIA Regulations 2014 as amended as well as best practise guidelines and principles for biodiversity assessment as outlined by Brownlie (2005) and De Villiers <i>et al.</i> (2005).</p> <p>The ecological specialist study states: Although there are extensive areas of sensitive habitat within the wider Highlands site, the development footprint is restricted to the medium and low sensitivity parts of the site. These areas are considered suitable for development and there are no impacts associated with the Highlands WEF that cannot be mitigated to a low level. As such there are no fatal flaws or high post-mitigation impacts that should prevent the development from proceeding. Based on the layouts provided for the assessment, the Highlands North, Central and South WEFs can be supported from a terrestrial ecology point of view.</p>	Volume II: Fauna & Flora Specialist Basic Assessment	
<i>How were the following ecological integrity considerations taken into account?</i>	<i>Threatened Ecosystems</i>	<p>The National List of Threatened Ecosystems (2011) was used to identify and map listed ecosystems in need of protection.</p> <p>No threatened ecosystem falls within the site boundary.</p>	Volume II: Fauna & Flora Specialist Basic Assessment
	<i>Sensitive, vulnerable, highly dynamic or stressed ecosystems, such as coastal shores, estuaries, wetlands, and similar systems require specific attention in management and planning procedures, especially where they are subject to significant human resource usage and development pressure</i>	<p>An ecological sensitivity map of the site was produced by integrating information collected on-site with available ecological and biodiversity information. Sensitive features such as wetlands, drainage lines, water bodies, steep slopes and rocky outcrops were mapped and appropriately buffered.</p> <p>The proposed layout avoids all areas of high and very high ecological sensitivity.</p>	Volume II: Fauna & Flora Specialist Basic Assessment
	<i>Critical Biodiversity Areas ("CBAs") and Ecological Support Areas ("ESAs")</i>	<p>Critical Biodiversity Areas (CBAs) were extracted from the Eastern Cape Conservation Plan.</p> <p>The portion of the Highlands South Grid Connection falls within a Tier 2 CBA aimed at maintaining the broad-scale connectivity of the landscape;</p>	Volume II: Fauna & Flora Specialist Basic Assessment

⁵Section 24 of The Constitution of South Africa refers.

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Question		Answer	Reference
		Even though the development would result in some habitat loss within the CBA this is not likely to compromise the overall functioning of the CBA as it is very large and the development occupies a very small portion of the CBA.	
	<i>Conservation targets</i>	The majority of the development footprint falls within the Camdeboo Escarpment NPAES Focus Area, indicating that the area has been identified as a potential target for the protected area expansion. The Camdeboo Escarpment Focus area is over 421 000 ha in extent and the loss of less than 10 000 ha from this focus area is not considered highly significant	Volume II: Fauna & Flora Specialist Basic Assessment
	<i>Ecological drivers of the ecosystem</i>	The key ecological drivers of ecosystems on the site and in the vicinity were assessed by the Ecological Specialist. The specialist concludes that the potential for disruption of broad-scale ecological processes and their drivers is low with recommended mitigation measures.	Volume II: Fauna & Flora Specialist Basic Assessment
	<i>Environmental Management Framework</i>	No area-specific Environmental Management Framework exists for the site. The Sarah Baartman District Municipality IDP and the Cacadu District Municipality SDF provide environmental management goals and strategies. The proposed Highlands South Grid Connection complies with all policies and planning tools.	Volume II: Social Impact Assessment
	<i>Spatial Development Framework</i>	The Cacadu District Municipality SDF highlights the following points relevant to the development: <ul style="list-style-type: none"> • The districts economy is dependent on the natural resources of the area; • The SDF should identify areas for renewable energy production; • Spatial planning must recognise that game reserves and farming are playing a bigger role in the economy; • Inappropriate land use change can have a negative impact on district resources and the economy; • The introduction of alternative energy generation infrastructure and the associated land use change will provide both economic opportunities but may also have a negative impact on the ecotourism of the district. (Potential changes to the visual and cultural landscapes); • The protected area network together with the intended expansion areas (Nature reserves and parks) provide significant and expanding ecotourism opportunities within the District; 	Volume II: Social Impact Assessment page 19-21

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Question	Answer	Reference
	<ul style="list-style-type: none"> Both the tourism and productive components of the economy are dependent on effective access. (Transportation infrastructure). <p>The location of the proposed WEF does not appear to conflict with the land use planning objectives contained in the SDF. The site does not appear to be located within a Tourism Focus Area or a Protected and Critical Biodiversity Area. In terms of land use, the site is located in an area designated as grazing potential. The area to the north of the site is however identified as a Tourism Focus area.</p>	
	<p><i>Global and international responsibilities relating to the environment (e.g. RAMSAR sites, Climate Change, etc.)</i></p> <p>All global responsibilities to which South Africa is signatory or party to were assessed within this report. Applicable international treaties and conventions are:</p> <ul style="list-style-type: none"> UNFCCC Paris Agreement (2016) The Convention on Biological Diversity (CBD) (1993) The Convention on the Conservation of Migratory Species of Wild Animals (CMS or Bonn Convention) (1983) The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) (1999) <p>The proposed development complies with all international responsibilities.</p>	<p>Volume II: Social Impact Assessment; Bird Impact Assessment; Bat Impact Assessment</p>
<p><i>How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity? What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</i></p>	<p>Before the start of the Basic Assessment process detailed specialist feasibility studies were conducted to identify areas most environmentally suitable for development within the proposed development site boundary. As a result of these studies a development layout was produced that avoids sensitive areas and identified constraints. This layout was then assessed by the specialists in their Basic Assessment specialist reports presented here.</p> <p>The specialists proposed mitigation measures to further reduce residual risks or enhance opportunities during construction, operation and decommissioning phases of the development. With implementation of these mitigation measures, all identified negative impacts are expected to be reduced to acceptable levels of medium or low negative significance. All mitigation measures proposed by the specialists are included in the EMPr for each phase of the project.</p>	<p>Volume I App B: EMPr Volume II Specialist reports</p>
<p><i>How will this development pollute and/or degrade the biophysical environment? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</i></p>	<p>On a national level the development will lessen the country's dependency on coal, and contribute to lowering water consumption, pollution and environmental degradation per kW of electricity produced;</p> <p>The EMPr provides measures for avoidance and minimisation of pollution, as well as enhancing any potential positive impacts.</p>	<p>Volume I App B: EMPr</p>

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Question	Answer	Reference
<p><i>What waste will be generated by this development? What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste? What measures have been explored to safely treat and/or dispose of unavoidable waste?</i></p>	<p>The generation of waste will largely be restricted to the construction phase of the project and consist of normal construction phase solid waste streams.</p> <p>The EMPr details specific mitigation measures that must be implemented for the appropriate management and minimisation of waste, during all phases of the project.</p> <p>Registered service providers will be utilised to transport solid waste to registered landfills.</p>	
<p><i>How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</i></p>	<p>A visual feasibility study was conducted to identify no go areas and areas most visually suitable for development. Visual buffers were applied to prominent topographic features, steep slopes, water features, roads, nature reserves and protected areas, private nature reserves, game farms, guest farms and resorts, farmsteads, towns, settlements and cultural landscapes / heritage sites. The development layout was produced by avoiding turbine placement within these visual buffers.</p> <p>A Heritage Impact Assessment and a Visual Impact Assessment were conducted to assess the developed layout. Comment from the relevant heritage authorities is being sought.</p> <p>Mitigation measures have been identified by the heritage specialists to minimise and remedy residual impacts, and enhance positive impacts, including:</p> <ul style="list-style-type: none"> • Monitoring of all substantial excavations for fossil material on an on-going basis during construction; • Application of Chance Fossil Finds Procedure; • A 30 m buffer around all graves, ruins and buildings to be maintained and if not possible features to be cordoned off for their protection • Final walkdown survey of the authorised footprints to be carried out at least 6 months prior to start of construction in order for any archaeological mitigation to be carried out if required; • If any archaeological material or human burials are uncovered then work in the immediate area is to be halted. The fund is to be reported to the heritage authorities and may require inspection, excavation and curation in an approved institution; • Substation & O&M buildings to be located in visually unobtrusive positions or screened with earth berms and planting; • Location of the construction camp, batching plant and related storage/stockpile areas in unobtrusive positions in the landscape, away from arterial or district roads, or alternatively screening measures utilized. • Clear demarcation of construction camps, limited in size to only that which is essential. 	<p>Volume II: Heritage Impact Assessment & Visual Impact Assessment</p>

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Question	Answer	Reference
	<ul style="list-style-type: none"> • Employment of dust suppression and litter control measures. Formulation and adherence to an Environmental Management Programme (EMPr), monitored by an Environmental Control Officer (ECO). • Areas disturbed during construction to be rehabilitated to original state. 	
<i>How will this development use and/or impact on non-renewable natural resources? What measures were explored to ensure responsible and equitable use of the resources? How have the consequences of the depletion of the non-renewable natural resources been considered? What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts? What measures were explored to enhance positive impacts?</i>	<p>Wind is a renewable resource and will be the 'fuel' for the WEF to generate electricity. Therefore the development will have a minimal impact on non-renewable resources.</p> <p>Some non-renewable resources will be consumed during the construction phase. These include hydrocarbons to be used as fuel, and soil to be removed for turbine foundations and compacted for hard-standings. Relatively few non-renewable resources will be consumed during operation.</p>	
<i>How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part? Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds? What</i>	<p>The WEF will use the renewable energy resource of wind to generate power.</p> <p>Construction of the WEF will require use of water, a renewable natural resource.</p> <p>Operation of the WEF will consume relatively small quantities of water when compared to alternative energy technologies such as coal.</p> <p>Impacts on the ecosystem caused by use of these renewable energy resources has been evaluated.</p>	
<i>Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. de-materialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate,</i>	<p>The proposed WEF will reduce South Africa's dependency on non-renewable resources, particularly coal, as an energy source.</p> <p>Wind as an energy source is not dependant on water, as compared to the massive water requirements of conventional power stations, has a limited footprint and does not impact on large tracts of land, and poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.</p> <p>The proposed WEF lies within a Renewable Energy Development Zone for wind energy.</p>	

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Question		Answer	Reference
<p><i>measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources? What measures were explored to enhance positive impacts?</i></p>	<p><i>without compromising their quest to improve their quality of life)</i></p>		
	<p><i>Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)</i></p>	<p>The current land use is low-intensity grazing and the land is not suitable for other agricultural uses.</p> <p>The proposed development will increase yield as the landowners will be paid for the use of their land. This will improve cash flow and financial sustainability of farming enterprises on site.</p> <p>The proposed development itself will not cause a significant change in land use, as the development site is primarily low intensity agriculture (grazing), which can still proceed once the development is constructed.</p> <p>The opportunity cost of not proceeding with the proposed development is therefore likely to be high.</p>	<p>Agricultural Impact Assessment; Social Impact Assessment</p>
	<p><i>Do the proposed location, type and scale of development promote a reduced dependency on resources?</i></p>	<p>The proposed WEF is predicted to reduce dependency on coal as an energy source. Wind as an energy source is not dependant on water, as compared to the massive water requirements of conventional power stations), has a limited footprint and does not impact on large tracts of land, and poses limited pollution and health risks, specifically when compared to coal and nuclear energy plants.</p> <p>The proposed WEF lies within a Renewable Energy Development Zone for wind energy, and a comprehensive cumulative impact assessment has been conducted.</p>	
<p><i>How were a risk-averse and cautious approach applied in terms of ecological impacts?</i></p>	<p><i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</i></p>	<p>The faunal component of the study is based on field observations of species and habitats as well as the results the camera trapping. This is supplemented with species records obtained from the various spatial databases and coverages. In many cases, these databases are not intended for fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which the area has been sampled in the past. Many remote areas have not been well sampled with the result that the species lists for an area do not always adequately reflect the actual fauna and flora present at the site</p>	<p>Volume II: Fauna & Flora Specialist Basic Assessment</p>
	<p><i>What is the level of risk associated with the limits of current knowledge?</i></p>	<p>The risk associated with assumptions and limits of current knowledge is the potential for information being assessed to be incorrect. This would translate to erroneous impact identification and mitigation measures. However, due to the amount of site work conducted the risk associated with this is considered to be low.</p>	<p>Volume II: Fauna & Flora Specialist Basic Assessment</p>

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Question		Answer	Reference
	<i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i>	<p>In order to counter the likelihood that the area has not been well sampled in the past and in order to ensure a conservative approach, the species lists derived for the site from the literature were obtained from an area significantly larger than the study area and are likely to include a much wider array of species than actually occur at the site. This is a cautious and conservative approach which takes the study limitations into account.</p> <p>Adopting a risk-averse and cautious approach in all stages of the impact assessment allows one to minimise the chance of assessing incorrect information and identifying erroneous impacts. This precautionary approach was utilised throughout the process by all specialists.</p>	Volume II: Fauna & Flora Specialist Basic Assessment
<p><i>How will the ecological impacts resulting from this development impact on people's environmental right in terms following:</i></p>	<p><i>Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i></p>	<p>Impacts on people's rights have been identified and assessed by the social specialist, visual specialist and noise specialist.</p> <p>A visual feasibility study was conducted to identify no go areas and areas most visually suitable for development. Visual buffers were applied to prominent topographic features, steep slopes, water features, roads, nature reserves and protected areas, private nature reserves, game farms, guest farms and resorts, farmsteads, towns, settlements and cultural landscapes / heritage sites. The proposed development layout was produced by avoiding turbine placement within these visual buffers.</p> <p>The significance of the potential negative health risks posed by the development (noise, shadow flicker, electromagnetic radiation) is low.</p> <p>The noise impact assessment found the level of noise impacts for the Highlands South Grid Connection to be of low to medium significance without mitigation and of low significance with mitigation. Mitigation measures proposed are the installation of turbines with lower noise emission than those assumed (worst case scenario), shutdown of selected turbines at night under relevant wind directions; removal of selected turbines; and /or relocation of farm workers from properties with the greatest noise impact.</p>	Volume II: Visual Impact Assessment; Social Impact Assessment; Noise Impact Assessment
	<p><i>Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</i></p>	<p>The social impact assessment concluded that wind energy has fewer negative health effects than other forms of traditional energy generation and will have overall positive health benefits.</p>	Volume II: Social Impact Assessment
<p><i>Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-</i></p>		<p>The findings of the Social Impact Assessment (SIA) indicate that the development of the proposed Highlands WEF will create employment and business opportunities for locals during both the construction and operational phase of the project. The establishment of a Community Trust will also benefit the local community. The proposed development also</p>	Volume II: Social Impact Assessment

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Question	Answer	Reference
<i>economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?</i>	<p>represents an investment in clean, renewable energy infrastructure, which, given the negative environmental and socio-economic impacts associated with a coal based energy economy and the challenges created by climate change, represents a significant positive social benefit for society as a whole. The findings of the SIA also indicate that the Renewable Energy Independent Power Producers Procurement Programme (REIPPPP) has resulted in significant socio-economic benefits, both at a national level and at a local, community level. These benefits are linked to foreign Direct Investment, local employment and procurement and investment in local community initiatives.</p> <p>The Highlands WEF site is also located within the Cookhouse Wind REDZ. The area has therefore been identified as suitable for the establishment of renewable energy facilities. However, a key concern identified during the SIA relates to the visual impacts associated with the wind turbines and the potential impact on existing, well established game farming and hunting operations in the area, specifically the area to the north, east and south of the site. The majority of these operations cater for up-market overseas visitors and the existing "African veld" sense of place represents a key component of their marketing strategy. The establishment of a wind farm on their western boundary would impact on the areas current sense of place, which in turn, may negatively impact on their operations and property values. The potential impacts will be largely confined to four to five existing game farming operations. The potential localised impacts would therefore need to be considered within the context of the location of the Highlands WF within the Cookhouse Wind REDZ and the significant socio-economic benefits associated with the establishment of a renewable energy facility.</p>	
<i>Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?</i>	<p>The ecology, avifauna, bat and aquatic specialists have all concluded that the development can proceed without having any unacceptable negative impacts that cannot be mitigated to a low or medium level of significance.</p> <p>The portion of the Highlands South Grid Connection lies within a tier 2 CBA aimed at maintaining the broad-scale connectivity of the landscape. Although the development would result in some habitat loss within the CBA, this is not likely to compromise the overall functioning of the CBA as it is very large and the development occupies a very small proportion of the CBA.</p>	Volume II: Fauna & Flora Specialist Basic Assessment
<i>Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of</i>	The initial specialist site feasibility studies identified the most suitable areas for development for which a development layout was then produced for assessment. The results of the specialist's studies and assessments of this layout further refined and improved the proposed development layout resulting in the Final Mitigated Layout, as the best practicable environmental option.	Volume II: Specialist Reports

"securing ecological sustainable development and use of natural resources"⁵		
Question	Answer	Reference
<i>the "best practicable environmental option" in terms of ecological considerations?</i>		
<i>Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?</i>	<p>Given that the renewable energy projects in the area are not within viewing distance of each other and that they form part of a REDZ, the cumulative visual impact significance is considered to be Low (Negative) in the local context.</p> <p>The habitat loss resulting from the development is not likely to be significant, given the low total footprint of wind farm development in relation to the large extent of the affected NPAES focus area. With mitigation, the impact of habitat loss and future ability to meet conservation targets is likely to be of <u>Low Significance</u>.</p> <p>The cumulative effect of all impacts on the avifauna can be mitigated to levels of medium significance.</p> <p>All of the projects have indicated that aquatic impact avoidance as part of their layouts design process coupled mitigation, i.e. selecting the best possible routes to minimise the local and regional impacts while improving the drainage or hydrological conditions within these rivers has been included to result in a cumulative impact that would be negligible. In the worst case scenario the significance of cumulative impacts during construction and operation is expected to be medium without mitigation, and low with mitigation.</p>	Volume II: Visual Impact Assessment

Table 5.2: Socio-economic Considerations of Need and Desirability

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Question	Answer	Reference
<i>What is the socio-economic context of the area, based on, amongst other considerations, the following considerations?:</i>	<p>The IDP (and its sector plans' vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,</p> <p>A Strategic Environmental Assessment (SEA) for wind and solar PV energy in South Africa identified eight Renewable Energy Development Zones (REDZs). The REDZs identified areas where large scale wind energy facilities can be developed in a manner that limits significant negative impacts on the environment while yielding the highest possible socio-economic benefits to the country. The proposed Highlands WF falls within the Cookhouse Wind REDZ.</p> <p>The Eastern Cape Provincial Growth and Development Plan (PGDP) states that development of infrastructure is a necessary condition to eradicate poverty. Energy demands and electricity infrastructure rollout forms part of the Strategic Infrastructure Programme of the PGDP. The PGDP states that the, "...economic and logistics infrastructure – energy, roads, rail, ports, and air transport among others –</p>	Volume II: Social Impact Assessment;

⁶Section 24 of The Constitution of South Africa refers.

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Question	Answer	Reference
	<p>is a necessary condition for economic growth and development." Infrastructure development, in turn, will have strong growth promotion effects on the agriculture, manufacturing and tourism sectors by improving market access and by "crowding in" private investment. Poverty alleviation should also be promoted through labour-intensive and community based construction methods. The high-level objectives of the Strategic Infrastructure Programme include consolidating and building upon the strengths of the Province's globally-competitive industrial sector through the development of world-class infrastructure and logistics capability in the East London and Coega IDZs. A reliable energy supply will be critical to achieving these objectives. The proposed WEF will assist to contribute to the future energy requirements of the Eastern Cape, and its proximity to the Coega IDZs will also benefit these key initiatives.</p> <p>The Sarah Baartman District Municipality IDP states that opportunities exist in the renewable energy sector with the area having been identified as one of three preferred locations in the country. It highlights the importance of investing in natural capital, including "creating new generation green jobs and local income streams rooted in renewable energy", developing the skills base, improving connectivity and utility infrastructure, and economic development in the green economy, tourism and skills development and education;</p> <p>The Blue Crane Route IDP notes that "wind generation initiatives in the Sarah Baartman District are fast growing with a large number of generation facilities under investigation" and the "the importance of wind energy generation in the district has been confirmed by the announcement by the Department of Energy in terms of successful wind farm developments, as three of the eight approved wind farm developments are to be developed in the district, with an additional wind farm to be developed in Nelson Mandela Bay Municipality." As part of the strategy to address challenges facing the rural areas the Development Bank of Southern Africa initiated the Rural Economic Development Initiative (REDI). The Sarah Baartman REDI, one of three pilot sites in South Africa, is a partnership between SBDM, the Development Bank of Southern Africa (DBSA) and other major stakeholders in the region aimed at identifying and unlocking economic potential to realize the latent economic growth potential of the district. Areas of intervention include (a) agri-innovation primarily in the areas of agro-processing, aquaculture, natural fibre beneficiation; <i>renewable energy</i> and agri-tourism and (b) strategy and institutional development. The REDI process has identified a number of catalytic factors that could accelerate economic growth in the District including <i>renewable energy</i>, fibre innovation, the potential for agro-processing in key niches, tourism development and growing the education</p>	

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Question	Answer	Reference
	<p>sector. The BCRLM IDP identifies a number of deliverables emanating from REDI. Of relevance to the proposed development are:</p> <ul style="list-style-type: none"> • Renewable Energy Rapid Assessment and Audit; • Provincial Renewable Energy Coordinating Forum; • Land Use and Location Policy for Renewable Energy Projects; • Preparation of a Project Plan for the Establishment of a Wind Research and Training Centre in BCRM; • Investigation into the Social Economy and Identification of Interventions to Address Poverty and Unemployment. <p>The primary sector focus of REDI in BCRLM will be on improving the performance of agriculture-related sectors (including priority sectors from phase one research, <i>renewable energy</i>, land restoration, agro-tourism and aquaculture).</p> <p>The IDP notes that the BCRLM has identified Local Economic Development (LED) as a key factor in the development of the BCRLM economy and all of its communities</p> <p>The LED strategy identifies six main pillars aimed at stimulating local economic development in Blue Crane Route Municipality. The following are of relevance to the proposed development:</p> <ul style="list-style-type: none"> • Alternative sources of energy; • Enterprise Development; • Agricultural Development; • Tourism Development; • Investment in Human Capital. 	
<p><i>Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</i></p>	<p>The Sarah Baartman Spatial Development Framework highlights the following:</p> <ul style="list-style-type: none"> • The districts economy is dependent on the natural resources of the area;; • The SDF should identify areas for renewable energy production; • Spatial planning must recognise that game reserves and farming are playing a bigger role in the economy; • Inappropriate land use change can have a negative impact on district resources and the economy; • The introduction of alternative energy generation infrastructure and the associated land use change will provide both economic opportunities but may also have a negative impact on the ecotourism of the district. (Potential changes to the visual and cultural landscapes); 	<p>Volume II: Social Impact Assessment</p>

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Question	Answer	Reference
	<ul style="list-style-type: none"> The protected area network together with the intended expansion areas (Nature reserves and parks) provide significant and expanding ecotourism opportunities within the District; Both the tourism and productive components of the economy are dependent on effective access. (Transportation infrastructure). 	
<p><i>Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</i></p>	<p>The location of the proposed project does not appear to conflict with the land use planning objectives contained in the SDF. In this regard the site does not appear to be located within a Tourism Focus Area or a Protected and Critical Biodiversity Area (Tier 1). In terms of land use, the site is located in an area designated as grazing potential. The area to the north of the site is however identified as a Tourism Focus area.</p> <p>Impacts to the cultural landscape are visual/contextual in nature and, if development goes ahead, would definitely occur. The significance of this impact calculates to medium. Although mitigation measures can be suggested to reduce the overall intensity of the impacts, these will have no real effect on the impact significance which remains medium after mitigation. There are no fatal flaws in terms of the cultural landscape, especially since the area is a REDZ which encourages an accumulation of impacts in one area (admittedly far larger than the area considered for this assessment) and discourages a widespread proliferation of impacts across the wider landscape.</p> <p>The impacts to heritage resources are not significant enough to outweigh the social and economic impacts to be realised by the proposed project.</p>	<p>Volume II: Social Impact Assessment; Heritage Impact Assessment</p>
<p><i>Municipal Economic Development Strategy ("LED Strategy").</i></p>	<p>The BCRLM has identified Local Economic Development (LED) as a key factor in the development of the BCRLM economy and all of its communities. The objectives for the Blue Crane Route LED Strategy that are relevant to the proposed development include:</p> <ul style="list-style-type: none"> Promote investor confidence in BCRLM through the provision of sound infrastructure and reliable services; Promote SMMEs to increase employment opportunities; Promote the development of the tourism sector. <p>The LED strategy identifies six main pillars aimed at stimulating local economic development in Blue Crane Route Municipality. The following are of relevance to the proposed development:</p> <ul style="list-style-type: none"> Alternative sources of energy; 	<p>Volume II: Social Impact Assessment;</p>

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Question	Answer	Reference	
	<ul style="list-style-type: none"> • Enterprise Development; • Agricultural Development; • Tourism Development; • Investment in Human Capital. 		
<p><i>Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</i></p>	<p>The impact of creation of employment and opportunities during the construction phase is rated as of medium positive significance. The negative impacts associated with construction (impacts on family structures and social networks, influx of job seekers, risks to safety, livestock and farming operations, risk of fires, impacts from construction vehicles and impacts on farmland) can all be mitigated to levels of low negative significance.</p> <p>Positive impacts of the operation of the proposed facility are rated as high positive (clean renewable energy, creation of a community trust) and medium positive (creation of employment and business opportunities, support for local economic development, income generated for affected farmers) significance with enhancements.</p> <p>Negative impacts associated with the operation of the proposed facility are rated as medium with mitigation (impact on rural sense of place for adjacent game farm operations; impact on adjacent property values and operations; impact on adjacent game farming and hunting tourism) to low (impact on sense of place for others, impact on tourism in the region)</p> <p>The Socio-Economic Development and Enterprise Development commitments of the REIPPPP require a percentage of gross revenue from the operating wind farm to be invested in education, health, small business development etc. Projects are required to commit at least 1% of gross revenue towards socio-economic development. As an indication, 1% of gross revenue of a hypothetical 140 MW wind farm, with a capacity factor of 35% and a tariff of 80 c/kWh would equal approximately R3.5 m/year (and R68 million over the 20 year operation period of a project).</p>	<p>Volume II: Social Impact Assessment;</p>	
	<p><i>Will the development complement the local socio-economic initiatives (such as local economic development (LED) initiatives), or skills development programs?</i></p>	<p>The proposed development will contribute towards the BCRLM LED strategy and skills development programs through the creation of employment and business opportunities, and the opportunity for skills development and on-site training during both construction and operation phases.</p>	<p>Volume II: Social Impact Assessment;</p>
<p><i>How will this development address the specific physical,</i></p>	<p>The Sarah Baartman DM IDP identifies a number of key challenges including water supply, housing and services and maintenance of the road network.</p>	<p>Volume II: Social Impact Assessment;</p>	

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Question	Answer	Reference
<p><i>psychological, developmental, cultural and social needs and interests of the relevant communities?</i></p>	<p>The initiatives for identified in the IDP that could benefit from the Community Trust include:</p> <p><u>Increasing agricultural income:</u></p> <ul style="list-style-type: none"> • Facilitating investments in local and regional agro-processing operations; • Investing in research and knowledge sharing to improve the quality and resilience of crops and livestock; • Supporting local and regional food systems that keep wealth in rural communities. <p><u>Investing in Natural Capital:</u></p> <ul style="list-style-type: none"> • Promoting and incentivising natural resource restoration and conservation including alien vegetation clearing; • Creating new generation green jobs and local income streams rooted in renewable energy; • Growing the rural tourism economy based on natural capital through agri-, adventure- and eco-tourism initiatives. <p><u>Broadening economic participation</u></p> <ul style="list-style-type: none"> • Promoting BBBEE, SMME and cooperative development; • Linking up with and maximising the opportunities for Extended Public Works Programme (EPWP) and Community Work programme opportunities; • Establishing community-based beneficiation projects; • Facilitating community and worker participation in share ownership; • Promoting social development investments. <p><u>Developing the skills base</u></p> <ul style="list-style-type: none"> • Improving the quality and quantity of school education and early childhood development (ECD) through partnerships; • Creating further education opportunities linked to work opportunities in the region; • Developing skills transfer partnerships between established and emerging farmers and between established and emerging businesses. <p><u>Improving connectivity and utility infrastructure</u></p> <ul style="list-style-type: none"> • Assisting with the development of rural broadband and mobile phone connectivity. 	

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Question	Answer	Reference	
<i>Will the development result in equitable (intra- and inter-generational) impact distribution, in the short- and long-term? Will the impact be socially and economically sustainable in the short- and long-term?</i>	The Green Jobs Study found that wind energy facilities are socially and economically sustainable in the short and long term. IPP projects require a minimum ownership of 2.5% by local communities which represents a significant injection of capital into mainly rural areas of South Africa for the lifespan of the facility. In addition local content minimum thresholds result in a substantial stimulus for establishing local manufacturing capacity. A target requirement for BBBEE of 60% of procurement spend has raised employment opportunities for black South African citizens and local communities. Social economic development contributions are concentrated in the immediate vicinity of the IPPs and as such there is a lack of equity across geographical areas with some communities benefitting more than others.	Volume II: Social Impact Assessment;	
<i>In terms of location, describe how the placement of the proposed development will:</i>	<i>result in the creation of residential and employment opportunities in close proximity to or integrated with each other,</i>	During the construction phase of the Highlands Wind Energy Facilities approximately 200-250 employment opportunities will be created, of which 55% will be for low-skilled workers, 30% for semi-skilled and 15% for skilled personnel. Members from the local communities (Pearston, Somerset East, and Cookhouse) are likely to be in a position to qualify for the majority of the low skilled and a proportion of the semi-skilled positions.	Volume II: Social Impact Assessment;
	<i>reduce the need for transport of people and goods,</i>	The need for transport of people and goods will be increased during the construction phase. Lower per capita carbon footprints are predicted due to the commercial forms of transport that will be employed to move the workforce (e.g. public transport, contractor buses).	Volume II: Traffic Impact Assessment;
	<i>result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),</i>	During the construction phase opportunities will be created for local transport companies. The need for transport of people and goods will be increased during construction. Lower per capita carbon footprints are predicted due to the commercial forms of transport that will be employed to move the workforce (e.g. public transport, contractor buses). A Transport Management Plan will be developed prior to construction.	Volume II: Traffic Impact Assessment
	<i>compliment other uses in the area,</i>	Local communities and their service providers will benefit from the socio-economic development provided by the WEF associated with the proposed project.	Volume II: Social Impact Assessment;
	<i>be in line with the planning for the area,</i>	The proposed WEF is in line with applicable international, national, provincial and local planning strategies.	Volume II: Social Impact Assessment

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Question	Answer	Reference
<i>for urban related development, make use of underutilised land available with the urban edge,</i>	The proposed development occurs approximately 20 km beyond the urban edge of the nearest town, Somerset East	Volume II: Social Impact Assessment
<i>optimise the use of existing resources and infrastructure,</i>	Wind energy is a renewable, clean resource and reduces pollution and the reliance on non-renewable fossil fuels and water for electricity generation. Existing access roads will be utilised wherever possible. The existing Eskom transmission lines have the capacity to support this development. It is expected that any construction water required will be delivered by tankers. Waste removal will be in accordance with best practice as per the EMPr by qualified waste removal contractors to the nearest registered landfill. Portable sanitation facilities will be utilised during construction, so that no connection to the local sewerage system will be required. Any additional infrastructure required will be constructed by the developer.	Volume II: Social Impact Assessment
<i>opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),</i>	No opportunity costs in terms of bulk infrastructure expansions in non-priority areas are predicted due to the proposed development. The proposed WEF is not located within a bulk infrastructure expansion area.	Volume II: Social Impact Assessment
<i>discourage "urban sprawl" and contribute to compaction/densification,</i>	Not applicable due to the proposed development being outside urban areas.	Volume II: Social Impact Assessment
<i>contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,</i>	The existing Eskom transmission bordering the proposed development site grid has capacity for additional energy generation. The proposed development will utilise this existing capacity. The project will contribute to economic and infrastructure development in the Eastern Cape Province, in line with the Eastern Cape Provincial Growth and Development Plan	Volume II: Social Impact Assessment
<i>encourage environmentally sustainable land development practices and processes,</i>	Construction of the renewable energy Highlands WEF project will assist South Africa in transitioning from a carbon-intensive resource use economy to a sustainable low carbon footprint economy. Sustainable land development is an overarching aspect of the proposed project development.	Volume II: Social Impact Assessment

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Question	Answer	Reference	
<i>take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),</i>	Feasibility of access for wind turbine delivery, the site is easily accessible from the national road; Proximity to the Eskom grid with available evacuation capacity; Viable wind resource; The proposed site is transformed agricultural land and current land use is grazing; Willingness of landowners to host a wind farm on their properties; and Position within a Renewable Energy Development Zone for wind energy.	Section 6.2: Site Selection	
<i>the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),</i>	The proposed development will create jobs and contribute towards socio-economic development in an area that does not have high economic potential. The WEF is likely to result in significant positive socio-economic opportunities.	Volume II: Social Impact Assessment	
<i>impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and</i>	Impacts to the cultural landscape are unavoidable but only of a medium significance and no other aspects of heritage are expected to be impacted significantly.	Volume II: Social Impact Assessment; Visual Impact Assessment; Heritage Impact Assessment	
<i>in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?</i>	The proposed development aligns with the Sarah Baartman DM IDP. One of the strategies of the IDP is implementing an integrated human settlement plan. Thus the proposed development is predicted to support the creation of a more integrated settlement.	Volume II: Social Impact Assessment	
<i>How were a risk-averse and cautious approach applied in terms of socio-economic impacts?:</i>	<i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</i>	The information contained in some key policy and land use planning documents, such as Integrated Development Plans etc., is based on the 2011 Census. Where relevant, information from the 2016 Community Survey has been added. The strategic importance of promoting wind energy is supported by the national and provincial energy policies. However, this does not mean that site related issues can be ignored or overlooked.	Volume II: Social Impact Assessment
	<i>What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources,</i>	The risk due to limits of current knowledge is considered to be low due to the positive socioeconomic impact expected from the proposed WEF.	Volume II: Social Impact Assessment

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Question	Answer	Reference	
<p><i>economic vulnerability and sustainability) associated with the limits of current knowledge?</i></p>			
<p><i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i></p>	<p>The approach to the SIA study is based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (DEADP, 2007).</p>	<p>Volume II: Social Impact Assessment</p>	
<p><i>How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following:</i></p>	<p><i>Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i></p>	<p>Negative impacts were identified by the Social Specialist. These are:</p> <ul style="list-style-type: none"> • Impacts associated with the presence of construction workers on local communities; • Impacts related to the potential influx of job-seekers; • Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site; • Increased risk of grass fires associated with construction related activities; • Noise, dust, waste and safety impacts of construction related activities and vehicles. • Visual impacts and associated impact on sense of place; <p>The SIA details mitigation measures including locals first policy, establishment of a Monitoring fund, code of conduct, HIV/AIDS awareness programme; compensation policy with landowners, waste and fire management procedures part of EMPr,</p>	<p>Volume II: Social Impact Assessment</p>
	<p><i>Positive impacts. What measures were taken to enhance positive impacts?</i></p>	<p>Creation of employment and business opportunities, and the opportunity for skills development and on-site training:</p> <ul style="list-style-type: none"> • Locals first policy, use local BBBEE contractors, establish a local skills database; • Inform local authorities and community representatives of final decision and potential job opportunities • Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members; • Maximise opportunities for local content, procurement and community shareholding; 	<p>Volume II: Social Impact Assessment</p>

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Question		Answer	Reference
		<ul style="list-style-type: none"> Establish a visitor centre. As indicated in the literature review, visitor centers in Scotland have attracted large numbers of visitors to wind farms. Establish database of local service providers, specifically BBEEE companies, and notify of tender process and assist local BBEEE companies to complete and submit required tender forms SBDM and BCRLM in conjunction with local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project. 	
<p><i>Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</i></p>		<p>Some impacts are expected on ecological processes, vegetation and fauna. These impacts are considered to be of low significance and manageable.</p>	<p>Volume II: Social Impact Assessment; Fauna & Flora Specialist Basic Assessment</p>
<p><i>What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?</i></p>		<p>A suitable site within a REDZ was selected.</p>	<p>Volume II: Social Impact Assessment; Section 6.2: Site Selection</p>
<p><i>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?</i></p>	<p><i>Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be selected, or is there a need for other alternatives to be considered?</i></p>	<p>The proposed development aligns with a variety of planning policies that consider environmental and spatial justice. It falls within a REDZ</p>	<p>Volume II: Social Impact Assessment</p>

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Question	Answer	Reference	
<i>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</i>	The proposed development will contribute to equitable access by supplying electricity to the national grid, and by providing local and regional socioeconomic benefits in terms of the REIPPPP Economic Development requirements, which includes BBBEE scorecard on which wind projects are evaluated.	Volume II: Social Impact Assessment	
<i>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?</i>	Construction, operation and decommissioning of the proposed development will be done according to environmental health and safety legislative requirements and applicable guidelines.	App B: EMPr	
<i>What measures were taken to:</i>	<i>ensure the participation of all interested and affected parties,</i>	Public participation is being undertaken according to NEMA: EIA Regulations (2014) as amended and DEA (2017) Public Participation Guidelines.	Volume III; Comments & Response Report
	<i>provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</i>	The PPP is being undertaken in terms of legislative requirements and best practise guidelines. A Public Meeting will be held to present the findings of the Basic Assessment Report. All notifications have been provided in English and Afrikaans. Further languages are made available upon request.	Section 4; Volume III
	<i>ensure participation by vulnerable and disadvantaged persons,</i>	The PPP is being undertaken according to best practise guidelines; Notification of initiation of the PPP was provided in all required channels, i.e. newspaper adverts, site notices, local posters and written notifications.	Section 4; Volume III
	<i>promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,</i>	The proposed development fits into the various planning policies including Contribution to the SBDM IDP and the implementation of a Community trust will assist the local strategies, including improving education facilities and youth development.	Volume II: Social Impact Assessment
	<i>ensure openness and transparency, and access to information in terms of the process,</i>	Legislative requirements and best practise guidelines are followed throughout the process. The PPP is being undertaken in terms of legislative requirements and best practise guidelines.	Section 4
	<i>ensure that the interests, needs and values of all interested and affected parties were taken into</i>	A PPP is being undertaken in terms of legislative requirements and best practise guidelines.	Section 4; Volume III

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Question		Answer	Reference
	<i>account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge, and</i>	A Social Impact Assessment forms part of the BA process. The independent Social Specialist ensures that all needs and values are taken into account.	
	<i>ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein were be promoted?</i>	The Social Impact Assessment and PPP that are conducted according to legislation and guidelines will ensure that women and youth are recognised and involved in the process. REIPPPP requirements place specific responsibilities on IPPs in terms of women and youth development.	Volume II: Social Impact Assessment
	<i>Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g. a mixture of low-, middle-, and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?</i>	The proposed WEF has a good planning fit with all applicable policies and will result in substantial local socio-economic opportunities. The key challenges facing the BCRLM are poverty and inequality in the rural areas and a shortage of skills. As such the proposed development will be of benefit to the local area by creating job and business opportunities, particularly for unskilled and semi-skilled local workers. To date the only negative impact for I&APs of the proposed development is a potential reduction in revenue for the adjacent local hunting industry (middle and high income community) through a change in sense of place for tourists, which is rated as of medium significance in the local context and of low significance in the regional context. Landowners of the proposed development site itself will benefit from an increase of revenue from low grazing potential land.	Volume II: Social Impact Assessment
	<i>What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been</i>	Future workers on the proposed development will be educated on their rights to refuse work.	

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Question		Answer	Reference
<i>taken to ensure that the right of workers to refuse such work will be respected and protected?</i>			
	<i>the number of temporary versus permanent jobs that will be created,</i>	200-250 (full-time equivalent) employment opportunities will be created for 20-24 months during the construction phase. 20 full time employment opportunities will be created for the operational phase of the proposed development (minimum of 20 years).	Volume II: Social Impact Assessment
	<i>whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),</i>	Members from the local community in the area are likely to be in a position to qualify for the majority of the low skilled and a proportion of the semi-skilled jobs. 55% of construction phase jobs will be for low-skilled workers, and 30% for semi-skilled.	Volume II: Social Impact Assessment
	<i>the distance from where labourers will have to travel,</i>	It is expected that most workers will reside in the nearby towns Pearston, Somerset East and Cookhouse.	Volume II: Social Impact Assessment
<i>Describe how the development will impact on job creation in terms of, amongst other aspects:</i>	<i>the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and</i>	<p>The majority of employment opportunities associated with the operational phase is likely to benefit HD members of the community. It will also be possible to increase the number of local employment opportunities through the implementation of a skills development and training programme linked to the operational phase.</p> <p>A percentage of permanent employees who are not locally based may purchase houses in one of the local towns in the area, such as Somerset East or Cookhouse, others may decide to rent. Both options would represent a positive economic benefit for the region. In addition, a percentage of the monthly wage bill earned by permanent staff would be spent in the regional and local economy. This will benefit local businesses in the relevant towns. The benefits to the local economy will extend over the anticipated 20 year operational lifespan of the project.</p> <p>The local hospitality industry is also likely to benefit from the operational phase. These benefits are associated with site visits by company staff members and other professionals (engineers, technicians etc.) who are involved in the company and the project but who are not linked to the day-to-day operations.</p> <p>Procurement during the operational phase will also create opportunities for the local economy and businesses.</p> <p>The potential negative visual impact on the areas sense of place and rural character were identified as key concerns by surrounding hunting and game farm owners, whereas surrounding livestock farmers were less concerned about the visual impacts.</p>	Volume II: Social Impact Assessment

"promoting justifiable economic and social development"⁶			
Question	Answer	Reference	
<i>the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</i>	<p>Potential opportunity costs of the proposed development will be restricted to the 4 or 5 surrounding game farm and hunting operations. All of the operations cater for up-market overseas visitors and the existing "African veld" sense of place represents a key component of their marketing strategy for overseas hunters and visitors. The establishment of a wind farm on their western boundary would impact on the areas sense of place, which in turn, may impact on the ability to attract overseas visitors. This would in turn have a potential impact on their operations. The impact on their operations would in turn impact on other local sectors of the economy in the area that benefit from the game farming sector. As indicated in the SBDM IDP, the game farming sector has become an increasingly important sector in the area. The significance of this impact was rated as of medium negative significance.</p> <p>The creation of 200-250 temporary (20-24 month) jobs and 20 permanent jobs associated with the proposed development proceeding was rated as of high and medium positive significance.</p>	Volume II: Social Impact Assessment	
<i>What measures were taken to ensure:</i>	<i>that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</i>	<p>All applicable planning policies and legislation were considered. The proposed development fits with all planning policies.</p> <p>Organs of State were pre-identified and registered on the I&AP database.</p>	Volume II: Social Impact Assessment
	<i>that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</i>	As registered I&APs all public correspondence including notifications of reports availability are provided.	Volume III
<i>What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?</i>	The proposed development aims to uphold the principles of sustainable development. The project team consists of suitably qualified individuals that comply with all legal requirements.	Section 1 Volume II	
<i>Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</i>	<p>Specialist input provides realistic mitigation measures.</p> <p>Rehabilitation to be undertaken after decommissioning of the proposed development will significantly reduce any potential legacy effects. Specific mitigation and rehabilitation measures are provided in the EMPr.</p>	Appendix B: EMPr	
<i>What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing,</i>			

"promoting justifiable economic and social development"⁶		
Question	Answer	Reference
<i>controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</i>		
<i>Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?</i>	The alternative selection process included the assessment of the No Development alternative, site alternatives, design layout alternatives and technology alternatives.	Section 6
<i>Describe the positive and negative cumulative socio-economic impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and other planned developments in the area?</i>	<p><u>Cumulative Impact on Sense of Place:</u></p> <p>Given that the renewable energy projects mentioned above are not within viewing distance of each other and that they form part of REDZ, the cumulative visual impact is considered to be of low negative significance in the local context.</p> <p>While certain stakeholders are opposed to the proposed development, others either support the development and or do not have an objection to the establishment of a WEF on the proposed site. This will also have implications for the perceptions of different people towards the nature and significance of the cumulative impacts associated with wind farms on sense of place. However, the potential impact of wind energy facilities on the landscape is an issue that does need to be considered, specifically given South African's strong attachment to the land and the growing number of wind facility applications. The Environmental Authorities should therefore be aware of the potential cumulative impacts when evaluating applications and the potential implications for other land uses, specifically game farming and associated tourist activities.</p> <p><u>Cumulative impact on local services and accommodation</u></p> <p>The establishment of the proposed 140 MW Highlands WF and the other renewable energy facilities in the SBDM and BCRLM may place pressure on local services, specifically medical, education and accommodation. This pressure will be associated with the influx of workers to the area associated with the construction and operational phases of renewable energy projects proposed in the area, including the proposed WF. The potential impact on local services can be mitigated by employing local community members. The presence of non-local workers during both the construction and operation phase will also place pressure on property prices and rentals. As a result, local residents, such as government officials, municipal workers, school teachers, and the police, may no longer be able to buy or afford to rent accommodation in towns such as Somerset East, Bedford and Cookhouse. The LED</p>	Volume II: Visual Impact Assessment; Social Impact Assessment

"promoting justifiable economic and social development" ⁶		
Question	Answer	Reference
	<p>Manager for the BCRLM interviewed as part of the Spitskop West WF SIA indicated that rental prices in Somerset East and Cookhouse had been driven up during the construction phase of the Amakhala Emoyeni Wind Farm. This impact is rated as of low negative significance.</p> <p>However, the potential impacts should also be viewed within the context of the potential positive cumulative impacts for the local economy associated with the establishment of renewable energy as an economic driver in the area. These benefits will create opportunities for investment in local towns, such as Somerset East and Cookhouse, including the opportunity to up-grade and expand existing services and the construction of new houses. In this regard the establishment of a renewable energy will create an opportunity for economic development in the area. The Community Trusts associated with each project will also generate revenue that can be used by the SBDM and BCRLM in consultation with the Eastern Cape Provincial Government, to invest in up-grading local services where required. It should also be noted that it is the function of national, provincial and local government to address the needs created by development and provide the required services. The additional demand for services and accommodation created by the establishment of renewable energy projects should therefore be addressed in the Integrated Development Planning process undertaken by the SBDM and BCRLM.</p> <p><u>Cumulative impact on local economy</u></p> <p>In addition to the potential negative impacts, the establishment of the proposed 140 MW WF and other renewable energy facilities in the area has the potential to result in significant positive cumulative socio-economic opportunities for the region, which, in turn, will result in a positive social benefit. There are a large number of renewable energy projects proposed in the study area. The positive cumulative impacts include creation of employment, skills development and training opportunities, and downstream business opportunities. The Community Trusts associated with each project will also create significant socio-economic benefits.</p> <p>The Overview of the IPPP (2017) confirms the benefits associated with renewable energy projects for local and regional economies. The total projected procurement spend for BW1 to BW4, 1S2 and 1S2 during the construction phase was R75 billion, while the operational procurement over 20 years is estimated to be in the region of R72 billion. The reports note that the construction spend of R75 billion has resulted in a substantial stimulus for establishing local manufacturing capacity. Actual local content spend reported for IPPs that have started construction amounts to R38.1 billion against a corresponding project value (as realised to date) of R75.8 billion. This means 50% of the project value has been locally procured, exceeding the 45% commitment from IPPs and the thresholds for BW1 – BW4 (25%-45%). The report</p>	

"promoting justifiable economic and social development" ⁶		
Question	Answer	Reference
	<p>also notes that the REIPPPP has prompted several technology and component manufacturers to establish local manufacturing facilities.</p> <p>The potential cumulative benefits for the local and regional economy are therefore associated with both the construction and operational phase of renewable energy projects and extend over a period of 20-25 years. This impact is rated as of high positive significance with enhancements.</p>	

5.1 Need and Desirability Conclusion

The need for the proposed grid connection development is to transfer electricity from the proposed Highlands South WEF to the national grid. Grid connection is necessary for the Highlands WEF project and as such should be viewed in the context of a renewable energy development. Renewable energy is supported in terms of meeting the country's climate change goals, and in terms of reducing the country's dependence on fossil fuels as the main source of meeting the country's electricity requirements. Both national and provincial policies and planning documents support the development of renewable energy facilities. The need and desirability for these types of developments play a role in meeting energy and climate change targets and also provide a socioeconomic boost at the local level in areas that are in need of it.

The proposed development site is currently used for low intensity grazing and has little potential for other types of land use. Grazing could continue on the site during the construction and operation of the development. Therefore the change to a mixed land use of grazing and renewable energy would be an improvement to the area.

As discussed in detail above the proposed development represents the best practicable environmental option.

A requirement of the REIPPPP is that in the development of any WEF and associated infrastructure, the local economy must benefit through employment opportunities, skills development, and the development or enhancement of community infrastructure. The cumulative effect of the proposed development and other developments in the area has the potential to result in highly significant positive socio-economic opportunities for the region.

6 ASSESSMENT OF ALTERNATIVES

Alternatives are different means of meeting the general purpose and need of a proposed development and may include alternative sites, alternative layouts/designs, alternative technologies and/or the No Development alternative.

The EIA Regulations indicate that alternatives that are considered in an assessment process should be reasonable and feasible and that I&APs should be provided with an opportunity to provide inputs into the process of formulating alternatives.

The assessment of alternatives should, as a minimum, include the following:

- The consideration of the No Development alternative as a baseline scenario;
- A comparison of reasonable and feasible selected alternatives; and
- The provision of reasons for the elimination of an alternative.

Two grid connection 300 m corridor alternatives (Figure 1.3) were provided to the specialists for their impact assessment.

6.1 The No Development Scenario

The No Development scenario assumes that the proposed development does not proceed. It is equivalent to the future baseline scenario in the absence of the proposed development.

Relative to the proposed grid connection, the main implication of the No Development scenario is that the Highlands South WEF cannot be constructed. Evacuation of the electricity generated by the Highlands South WEF is necessary for the project to proceed. The result will include the following:

- The land-use remains agricultural with no further benefits derived from the implementation of a complementary land use;
- There is no change in the current landscape or environmental baseline;
- Whilst no WEF development will occur on site, other wind energy projects go ahead as planned for other areas locally;
- No additional electricity will be generated onsite or supplied through means of renewable energy resources. This would have implications for the South African Government in achieving its proposed renewable energy target;
- There is no opportunity for additional employment (albeit temporary) in the local area where job creation is identified as a key priority; and
- The local Economic Development benefits associated with the WEF development's REIPPPP commitments will not be realised.

South Africa, like many nations in the world, faces serious electricity and water shortages due to its heavy dependency on fossil fuels and increase in demand. There is therefore a strong need for additional electricity generation options to be developed and to diversify the sources of energy that feed into the national grid.

The purpose of the proposed grid connection is to allow the Highlands South WEF to generate renewable electricity and export this to the national grid. Many other socio-economic and environmental benefits will result from this such as:

- Reduced air pollution emissions - burning fossil fuels generates CO₂ emissions which contributes to global warming. In addition burning fossil fuels produces emissions of sulphurous and nitrous oxides which are hazardous to human health and impact on ecosystem stability;
- Water resource saving – conventional coal fired power stations use large quantities of water during their cooling processes. WEFs require limited amounts of water during construction and almost no water during operation. As a water stressed country South Africa should be conserving such resources wherever possible;

- Improved energy security – renewables can often be deployed in a decentralised way close to consumers improving grid strength while reduce expensive transmission and distribution losses. They also contribute to a diverse energy portfolio;
- Exploit significant natural renewable energy resources – biomass, solar and wind resources remain largely unexploited;
- Sustainable energy solution – The uptake of renewable energy technology addresses the country’s energy needs in a sustainable manner, generating electricity to meet growing demands in a manner which is sustainable for future generations.
- Employment creation and other local economic benefits associated with support for a new industry in the South African economy.

The ‘No Development’ alternative will not assist the government in addressing climate change, nor will it assist in supplying the increasing electricity demand within the country, and the renewable energy targets set by the government.

Climate change is widely considered by environmental professionals as one of the single largest threats to the environment on a local, national and global scale. As such, the ‘No Development’ alternative is not a preferred alternative.

6.2 Electrical Grid Connection Alternatives

Two transmission line alternative corridors of 300 m, 150 m either side of the centreline, of either a 132 kV or 66 kV overhead powerline, were assessed. A description of each of these two alternatives is provided below and illustrated in Figure 1.3.

Alternative 1 (Preferred)

The Preferred Alternative is the shortest, most centrally located, and most direct of the two alternatives. This alternative traverses less drainage lines.

Alternative 2

Alternative 2 is slightly longer than the Preferred Alternative and crosses more sensitive drainage features.

6.2.1 Grid Connection Layout Assessment

The two grid connection alternatives have been assessed by each of the specialists. The table below provides a comparative assessment of each of the alternatives by the specialists.

Table 6:1 Grid Connection Alternatives Specialist Assessment

Specialists	Alternative 2	Alternative 1 (Preferred)
Aquatic	No impacts on the aquatic environment will occur based on the proposed alignments and the alternatives. This is based on the assumption that during the final design process all transmission line towers will be located outside of the delineated water courses and the 32m buffer. This alternative is acceptable.	No impacts on the aquatic environment will occur based on the proposed alignments and the alternatives. This is based on the assumption that during the final design process all transmission line towers will be located outside of the delineated water courses and the 32m buffer. This alternative is acceptable.
Terrestrial Flora and Fauna	This power line alternative is similar to the other alternative in terms of sensitivity but is longer and traverses more drainage lines with the result that it is less preferred.	Although the sensitivity of the majority of the route is similar to the other option, the route is shorter and traverses less drainage features with the result that it is the preferred alternative.

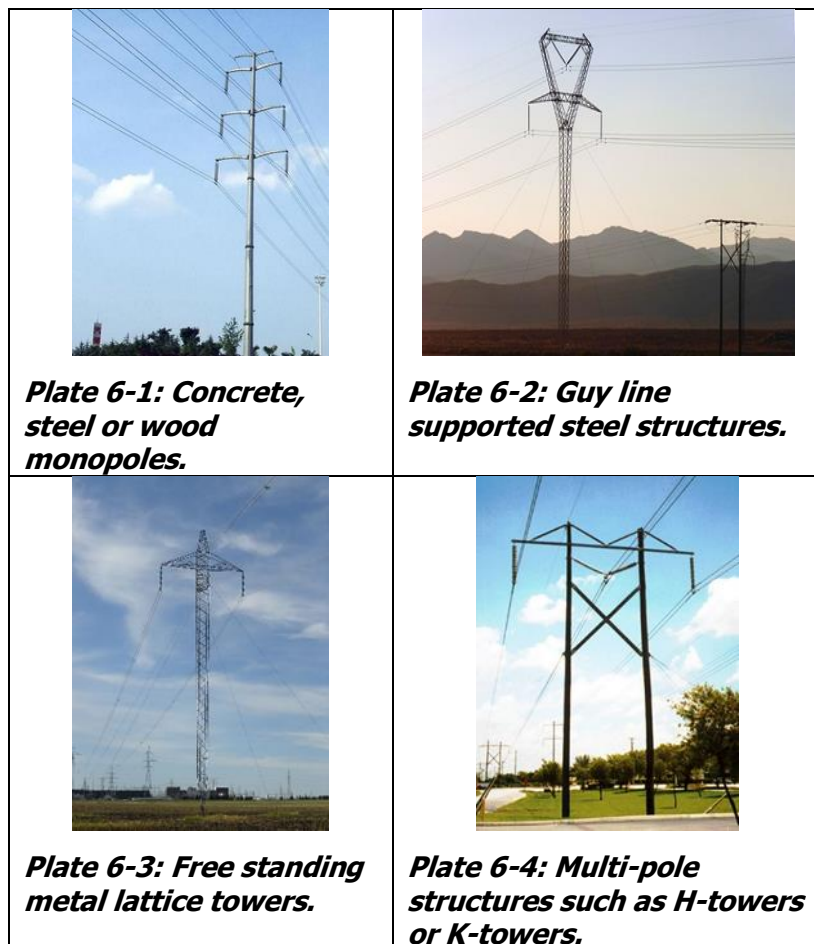
Specialists	Alternative 2	Alternative 1 (Preferred)
Avifauna	The potential impacts of Alternative 1 and the Alternative 2 were found to be the same. Either alternative is acceptable with mitigation.	The potential impacts of Alternative 1 and the Alternative 2 were found to be the same. Either alternative is acceptable with mitigation.
Bats	This alternative is preferred from the perspective of Bats due to greater distance from roosts and less woody vegetation along the route.	Alternative 1 is not preferred from the perspective of Bats due to roost proximity and woody vegetation along the route. However electrical infrastructure has low Significance potential impacts on Bats. Thus both route options are acceptable.
Noise	No issues with this alternative from a noise perspective.	No issues with this alternative from a noise perspective.
Visual	Except for a short section of the R63 Route, all the viewpoints are more than 2 km from the proposed powerlines and therefore the visibility would be marginal.	Except for a short section of the R63 Route, all the viewpoints are more than 2 km from the proposed powerlines and therefore the visibility would be marginal.
Heritage and Palaeontology	No significant heritage resources have been identified within any of the corridors and both grid connection options would therefore have the same potential impacts. No preference on palaeontological grounds for one or other route alignment.	No significant heritage resources have been identified within any of the corridors and both grid connection options would therefore have the same potential impacts. No preference on palaeontological grounds for one or other route alignment.
Social	Both Alternatives are acceptable to the land owner.	Both Alternatives are acceptable to the land owner.

6.2.2 Grid Connection Technology Alternatives

The main purpose of the overhead powerline is to connect the proposed Highlands South WEF to the national grid. Technologies change on a regular basis and the most environmentally friendly, reliable, cost effective and safest technology that is available and meets industry standards will be used. Alternatives are proposed for the type of structures which will support the overhead lines. These may include:

- Concrete, steel or wood monopoles (preferred);
- Guy line supported steel structures (small footprint);
- Free standing metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

Refer to **Plates 6-1 to 6-4** for typical examples of these tower types. All aspects of the grid connection, including powerline and supporting structures would need to adhere to industry standards.



Alternative Structure 1 (Preferred Alternative)

The preferred supporting structure would be a concrete or steel monopole as these are the Eskom standard and are cost effective. This preferred structure would be subject to line design and engagement with Eskom.

Alternative Structures 2 to 4

Free standing metal lattice towers or guy-line supported steel structures would be beyond the need of the conductor in this case. In addition, these structures are expensive.

The visual and heritage specialists have recommended that lattice structures are also acceptable for use as they are visually more permeable and almost invisible at a distance. Should the proposed power line be parallel with any existing power lines then the same pylons should be used.

6.3 The Preferred Alternative (Alternative 1)

The preferred alternative is the Highlands Alternative 1 Grid Connection, the more direct of the two servitude routes that run from Highlands South WEF on-site substation to the existing on-site Eskom transmission line (Figure 1.3). This alternative is only possible if Highlands South WEF is successful in the REIPPPP and is constructed. The electricity generated by the WEF would then be exported from the on-site substation to the existing transmission lines along an overhead powerline of approximately 20 km in length and into the national grid. This Preferred Alternative will minimise the environmental impacts on sensitive drainage features due to having fewer drainage line crossings than Alternative 2. This alternative is not preferred by Bats due to roost proximity and woody vegetation along

the route. However electrical infrastructure has low Significance potential impacts on Bats and as such either route option is acceptable.

6.4 Highlands South Grid Connection Route Alternative 2

The Highlands Alternative 2 Grid Connection is approximately 500 m longer than the preferred alternative (Figure 1.3). Environmental impacts associated with the proposed grid connection are proportional to its length. The Highlands Alternative 2 Grid Connection is slightly longer than the preferred Alternative 1 Grid Connection, therefore any negative environmental impacts will be greater than for this alternative than for the preferred alternative. This route Alternative 2 will require a greater number of sensitive drainage line crossings than the preferred alternative.

6.5 Alternative Assessment Summary

Based on the assessment of alternatives, it was decided that the proposed Highlands Alternative 1 Grid Connection is considered as the preferred alternative. The two alternatives were compared by each specialist and based on the environmental constraints identified by the specialists the preferred alternative was identified. This preferred alternative will form part of the Final Mitigated Layout to be submitted to the DEA (Figure 1.3), and if approved and awarded preferred bidder status, this layout will further be developed through micro siting of pylons with the assistance from the relevant specialists.

7 THE PREFERRED ALTERNATIVE

7.1 Project Description of the Proposed Grid Connection

The proposed grid connection is one of six components of the proposed Highlands WEF development which comprises the following:

1. Highlands North WEF;
2. Electrical Grid Connection and Associated Infrastructure for the Highlands North WEF (the 'proposed grid connection');
3. Highlands Central WEF;
4. Electrical Grid Connection and Associated Infrastructure for Highlands Central WEF;
5. Highlands South WEF; and
6. **Electrical Grid Connection and Associated Infrastructure for Highlands South WEF.**

This report and application pertains to the **Highlands South WEF Grid Connection.**

The proposed grid connection will fall wholly within the Highlands WEF site boundary and within the proposed grid corridors, each of 300 m in width (Figure 1.2).

The proposed grid connection will consist of either 66 kV or 132 kV power lines that will run from the on-site substation to the existing on-site Eskom transmission lines and the national grid.

7.1.1 Construction Phase

7.1.1.1 Establishment of a Servitude

A servitude is by definition "the right to use someone else's land for a specified purpose", in this case the right to erect, operate and maintain a power line, as well as access rights to carry out these activities. Ownership of the land remains with the original landowner who signs a servitude agreement and keeps overall responsibility for the land.

A topographical survey will be conducted along the preferred alternative to inform the final route, location and design of the tower foundations, pylons and structures. Once the final

servitude route has been confirmed construction of the power line begins. The servitude is generally cleared of wooded plant species and any protruding alien vegetation to reduce fire risk and prevent shortages with vegetation, in line with the Environmental Management Programme (EMPr) and Eskom requirements and guidelines.

Although existing roads and tracks will be used as much as possible, access roads for minor vehicles may be created for the construction phase as well as for periodic maintenance, in negotiation with the relevant landowner.

7.1.1.2 Construction of Power Line Tower Structures

The type of structures which will support the overhead lines is yet to be determined and may include:

- Concrete, steel or wood monopoles;
- Guy line supported steel structures;
- Free standing metal lattice towers; or
- Multi-pole structures such as H-towers or K-towers.

The preferred type of tower is dependent on a variety of factors, including the terrain, cost, conductor size, live line compatibility and required electrical characteristics. Tower type selection will therefore be based on additional on-site investigations during the detailed design phase of the project. Similarly, the foundation size and type will depend on the type of tower selected as well as conditions of the local terrain. Tower steel is typically delivered on a 24-ton truck, or on smaller vehicles in difficult terrain. The tower structures are assembled on the ground and erected on the constructed foundations using an 8-ton crane truck. Following this the power lines and conductors are strung from tower to tower. The average span between two 132 kV towers is 200 m but can vary between 150 and 375 m depending on the terrain and ground profile.

7.1.1.3 Stringing High Voltage Cables

Power lines to be strung are delivered to the site on cable drums that are placed along the servitude at regular intervals. If the area is inaccessible these may be delivered by helicopter. A pilot cable is then lain down by a pilot tractor driven along the route of the power line. This is used to string the conductors between towers in sections from bend to bend by the means of a pulley system. The correct tension required to reduce sagging and comply with minimum clearance distances is then obtained before clamping the conductors and cutting off any excess cabling.

7.1.1.4 Rehabilitation of disturbed areas and protection of erosion sensitive areas

Following the construction of the grid connection all areas outside of the servitude and other areas required for maintenance will be rehabilitated in accordance with the EMPr.

7.1.2 Operational Phase

The life span of the power line is approximately 25 years, during which time ongoing maintenance is required. Eskom will be responsible for the operational phase and decommissioning phase and will undertake maintenance in accordance with the EMPr and Eskom Standard for Bush Clearance and Maintenance within Overhead Powerline Servitudes (Eskom 2003) and the Transmission Vegetation Management Guideline (Eskom 2009). The guideline promotes minimising the removal of vegetation other than alien vegetation unless it poses a fire hazard.

7.1.3 Decommissioning Phase

Eskom will be responsible for the decommissioning phase. This will include unstringing the power line cables, disassembling the towers, removing the foundations and rehabilitating the servitude according to the EMP.

7.2 Site Description and Location of the Proposed Grid Connection

The Proposed Highlands South Grid Connection would be located approximately 20 km west of the town of Somerset East, bordering the south of the R63 route, approximately 23 km south-east of Pearston, in the Eastern Cape Province. The Proposed Development site is located in the Blue Crane Route Local Municipality (BCRLM) in the Sarah Baartman District Municipality (SBDM), previously known as the Cacadu District Municipality. The main settlements in the municipality are Somerset East, which serves as the administrative and commercial centre, Cookhouse and Pearson. The most significant roads passing through the area are the N10, R61, R63, and the R390. The administrative seat of the SBDM is currently located in the Nelson Mandela Bay Metro area, with disaster centres located throughout the district.

The Proposed Development site lies at the eastern end of the Camdeboo Region and at the foot of the Bruitjieshoogte Mountain. Its land parcels cover an area of approximately 11 180 hectares. The area of interest for development within these land parcels is approximately 9000 hectares (The Proposed Development Area), but the development footprint of all six components will only occupy approximately 2% of this area. The Proposed Project is situated entirely within the Cookhouse REDZ (Figure 1.1).

The site is located in broken terrain associated with the transition to the Great Escarpment north of the site (of which Groot Bruitjieshoogte is a southern outlier). A minor, north-south aligned escarpment is located south of Bruitjieshoogte, effectively running across the western-most portion of the site and further south. The bulk of the site consists of hilly to undulating terrain. East of the site the terrain gradually levels out into a relatively flat, large plain. The drainage in the area drains into the Voël River and Little Fish Rivers located 10-15 km west and east (of the site) respectively. Few natural surface water features are located on the site and immediate surrounds.

The coordinates of the proposed grid site corridor are given in Figure 1.3. The proposed grid connection passes through of two farm parcels, the Remainder of the Farm Rietfontein 102 and Portion 2 of Farm Doornrivier 105.

The electricity generated by the proposed Highlands South WEF will be transferred from the turbines via cabling to the on-site substation. The substation will house electrical infrastructure such as transformers and switch gear to enable the energy to be transferred via the proposed grid connection into the Eskom national grid.

An Eskom corridor (66 kV and 132 kV line) runs parallel to the R63 approximately 3 km north of the proposed substation site and traverses the northernmost portion of the site approximately 200 m south of the R63. The proposed development intends to connect to this grid infrastructure on site.

The route for the 66 kV or 132 kV lines will include a servitude corridor of 31 m in width.

Municipal services for the proposed grid connection will not be required. Water required for construction will be brought in with tanker trucks, and waste will be removed to the nearest registered landfill. The EMP will include measures for the reduction, reuse and the recycling of wastes during the construction phase. Portable toilets will be used during construction of the grid connection.

7.2.1 Farm Rietfontein

Farm 102 Rietfontein is owned by Mr Zirk Jordaan. The inhabited portion of the farm (**Error! Reference source not found.**) lies north of the R63 and is excluded from the Proposed Development Area. There are no farmsteads on the farm that form part of the proposed development.



Figure 7.1: Sheep and farmstead on portion of Rietfontein located north of the R63

Rietfontein currently employs 10 tenured households and is used for extensive livestock farming of beef cattle, sheep and angora goats. Labour is based elsewhere and transported in by the owner when required for farming operations. No commercial hunting or tourism activities are taking place on the property. A substation is proposed on Rietfontein in an area not considered to be of agriculture value to the owner. Rietfontein is accessed directly off the R63.

7.2.2 Farm Doorn Rivier and Nels Kraal

Portion 2 of Farm Doornrivier 105 and The Remaining Extent of Nels Kraal 143 is owned by National Government and rented by the Fani Brothers who farm the land.

Doornrivier currently employs 4 tenured households (Figure 7.2) and is used for livestock farming. The farmsteads located on Doornrivier do not form part of the Highlands site. Labour is based elsewhere and transported in by the owner when required for farming operations. No commercial hunting or tourism activities are taking place on the property.



Figure 7.2: Currently uninhabited farm house on Doornrivier. Four worker households live permanently on the farm.

Doornrivier is accessed via a farm road off the Waterford Road. The road also provides access to farms such as Geluk and Tevere and terminates at Doornrivier farmstead. Access control is by means of locked gates. This road is proposed as access road for the Central Phase. Apart from Doornrivier the road does not traverse any farm yards (Figure 7.3).



Figure 7.3: View north-west from access road to Doornrivier onto area associated with Central Phase (on hills)

7.2.3 Farm Spaarwater

The farm 103 Spaarwater is owned by GKW Gebou Trust (Mr Renier Kemp) who resides in Graaf Reinet. The western portion of Spaarwater does not form part of the proposed development site as it consists of steep terrain associated with the western escarpment. The farmstead is located on the excluded portion of the site and no staff reside on the property. The farm is used for extensive beef, sheep and goat farming with labour only brought in when required. No commercial hunting or tourism is conducted on the farm.



Photograph 7.4 (left) and 7.5 (right): Spaarwater farm yard (middle distance) located to the west of the site viewed from Bruintjieshoogte Pass; Stockpens on Spaarwater

7.2.4 Farm Coetzeesfontein

The farm 104 Coetzeesfontein is owned by the Jakkie Nel Trust (Mr Jakkie Nel). The western and southern section of the farm do not form part of the proposed development area and consist of largely steep terrain associated with the western escarpment. Only skeleton supervisory staff reside on the property.

7.2.5 Farm Highlands

The farm Highlands is owned by Mr Bill Brown and used for extensive livestock grazing. Only one household resides on the farm in a supervisory capacity, with labour being brought in by the farmer when required (Photograph 7.5). Carrying capacity varies across the site from around 9-14 hectares per Large Stock Unit and is a function of grass-veld occurrence and type. The grazing resource is sufficiently productive to allow for year-round grazing. Properties are therefore typically stocked year-round. Cropping activities are very limited and limited to small plantings of fodder for own use near farmsteads.



Photograph 7.6: Labourer's house on Highlands Farm

8 DESCRIPTION OF THE BASELINE ENVIRONMENT

The section below is a summary of the baseline environmental in relation to the proposed Highlands South Grid Connection. Detailed description of the entire Proposed Development area (comprising all six components) can be found in Volume II – Specialist Studies.

The Highlands Wind Farm, within which the proposed grid connection site occurs, consists of a large ridge system which grades gently to the east and more sharply to the west. The western valleys and slopes are dominated by Camdeboo Escarpment Thicket and are considered generally sensitive and unsuitable for development. The plateau and eastern slopes and low hills consist of Bedford Dry Grassland and are generally considered less sensitive than the western slopes. The footprint is largely restricted to the lower-lying eastern slopes and gentle hills of the site and are considered generally suitable for development. The abundance of plant species of conservation concern in these areas is low and species of high conservation concern were not observed within the development footprint.

Although there are a variety of mammals of conservation concern known from the broader area including Vaal Rhebok (NT), South African Hedgehog (NT), Black-footed cat (VU), Serval (NT), Brown Hyena (NT) and African Striped Weasel (NT), it is not likely that the affected areas are of high significance for these species and long-term impacts on listed fauna are likely to be low.

Species that may be affected on the proposed development site include Blue Crane, Ludwig's Bustard, Secretarybird, and Southern Black Korhaan. Ludwig's Bustard and Blue Crane are known to be particularly prone to collision.

A few large birds susceptible to electrocution (particularly in the absence of safe and mitigated structures) occur in the area and may occasionally be present on the proposed development site namely: Cape Vulture, Verreaux's Eagle and Martial Eagle. Electrocution

is also possible on electrical infrastructure within the substation particularly for species such as crows and owls.

The Highlands South Grid Connection is partly within a tier 2 CBA aimed at maintaining the broad-scale connectivity of the landscape. Although the development would result in some habitat loss within the CBA, this is not likely to compromise the overall functioning of the CBA as it is very large and the construction of the grid connection will occupy a very small proportion of the CBA.

The proposed development occur within the following catchments within the Great Karoo and Drought Corridor Ecoregions both located within the Mzimvubu-Tsitsikamma Water Management Area:

- Q80D – Klein Vis catchment
- Q80F – Brak River catchment
- N30B – Slotspruit, Klipplaat and Voël Rivers catchments

These catchments are characterised by perennial water courses and drainage lines associated with these mainstem systems listed above, and most flow only after high rainfall events. The Klein Vis (Little Fish) does however form part of the Fish-Sundays River Canal scheme that receives a constant supply of water from the Gariep Dam. According to the National Freshwater Ecosystems Priority Area (NFEPA) wetland data, no natural wetland could occur within the study area.

The initial ~7 km portion of both Alternative 1 and 2 for the South Phase up to the proposed substation location is shared. North of the Central substation, the alignments are identical to those followed by Alternatives 1 and 2 of the Central Phase, i.e. with Alternative 1 marginally shorter (~500 m) than Alternative 2. South of the Central substation, the South Phase Alternatives (single alignment) traverse additional portions of Doornrivier as well as the northernmost portion of Highlands. Neither alternative is located in significant proximity to any farmsteads.

9 ASSESSMENT OF POTENTIAL IMPACTS

9.1 Soil

The focus and defining question of an agricultural impact assessment is to determine to what extent a proposed development will compromise (negative impacts) or enhance (positive impacts) current and/or future agricultural production. The significance of an impact is therefore a direct function of the degree to which that impact will affect current or future agricultural production. Although the development may include impacts on the resident farming community, for example visual impacts, such lifestyle impacts do not necessarily impact agricultural production and are therefore not relevant to and within the scope of an agricultural impact assessment. Such impacts are better addressed within the impact assessments of other disciplines.

The assessment of impacts is identical for the two alternatives in the South Grid Connection, as there is nothing materially different that would result in different impacts between any of the two alternatives.

The significance of all potential agricultural impacts is kept low by two important factors.

Electricity grid infrastructure has minimal impact on agriculture after construction because all viable agricultural activities in the project area can continue, undisturbed below power lines.

The proposed site is on land of limited agricultural potential that is only viable for grazing.

Only one agricultural impact has been identified. It is a direct, negative impact that applies to two of the phases of the development (construction and decommissioning). It is assessed in table format below.

Grid Alternative 1 and 2

Impact Phase: Construction and Decommissioning Phase							
Impact description: Soil degradation							
Soil degradation can result from erosion and topsoil loss. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance and vegetation removal. Loss of topsoil can result from poor topsoil management during construction related soil profile disturbance. Soil degradation will reduce the ability of the soil to support vegetation growth.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?		Soil degradation can be reversed only to some extent and only with substantial inputs over a significant period of time.					
Will impact cause irreplaceable loss or resources?		No, because only a very small amount of grazing land is impacted and such land is not a scarce resource.					
Can impact be avoided, managed or mitigated?		Yes					
Mitigation measures:							
<ul style="list-style-type: none"> Implement an effective system of storm water run-off control using bunds and ditches, where it is required - that is at all points of disturbance where water accumulation might occur. The system must effectively collect and safely disseminate any run-off water from all hardened surfaces and it must prevent any potential down slope erosion. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface. 							

9.2 Ecology

Impact Phase: Construction							
Impact description: Impact on vegetation and listed plant species							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?		No. Transformation is a necessary outcome of the development and while some areas will become revegetated, some long-term habitat loss is likely.					
Will impact cause irreplaceable loss or resources?		No. No critical or rare habitats are within the development footprint.					
Can impact be avoided, managed or mitigated?		Possibly, through avoidance, but some residual impact is likely.					
Mitigation measures:							

- Preconstruction walk-through of the approved development footprint to ensure that sensitive habitats and species are avoided where possible.
- Ensure that lay-down and other temporary infrastructure is within low- sensitivity areas, preferably previously transformed areas if possible.
- Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development.
- A large proportion of the impact of the power line would stem from access roads and these should be minimized as far as possible and not be larger than required.
- Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes topics such as no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc.
- Demarcate sensitive areas in close proximity to the development footprint as no-go areas with construction tape or similar and clearly mark as no-go area.

Residual Impact	The will be some habitat loss that is an unavoidable impact of the development and cannot be effectively mitigated.
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Impact Phase: Construction

Impact description: Faunal impacts due to construction activities

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	Construction-phase disturbance will be transient, but some habitat loss would be long term.
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Will impact cause irreplaceable loss or resources?	Not likely as there do not appear to be any significant populations of species of conservation concern within the affected area.
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Can impact be avoided, managed or mitigated?	Only partly as noise and construction phase disturbance and habitat loss cannot be entirely avoided or mitigated.
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Mitigation measures:

- Preconstruction walk-through of the facility to identify areas of faunal sensitivity.
- During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person.
- The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site.
- No fires should be allowed on site as there is a risk of uncontrolled fires.
- If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs) as far as practically possible, which do not attract insects and which should be directed downwards.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- No unauthorized persons should be allowed onto the site and site access should be strictly controlled.
- All construction vehicles should adhere to a low speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site.
- All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often needlessly persecuted.

Residual Impact	Noise and disturbance during construction cannot be well mitigated, but would be transient. Some habitat loss for fauna would persist for the operational lifetime of the facility.
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Impact Phase: Operation							
Impact description: Soil erosion							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	The loss of large amounts to topsoil would potentially be an irreplaceable loss of resources, but with mitigation, this can be avoided.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, erosion risk can be well mitigated.						
Mitigation measures:							
<ul style="list-style-type: none"> Erosion management at the site should take place according to the Erosion Management Plan and Rehabilitation Plan. All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance, as per the Erosion Management and Rehabilitation Plans for the project. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. All cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow. 							
Residual Impact	With mitigation there would be negligible residual impact.						

Impact Phase: Operation							
Impact description: Alien plant invasion							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	With mitigation there would no loss of resources.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, alien plants can be controlled and reduced to very low impact.						
Mitigation measures:							
<ul style="list-style-type: none"> Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented. Problem woody species such as Prosopis are already present in the area and are likely to increase rapidly if not controlled. Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as these are also likely to be prone to invasion problems. 							

- Regular alien clearing should be conducted, as needed, using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

Residual Impact With mitigation there would be little to no residual impact.

Impact Phase: Operation

Impact description: Impact on Critical Biodiversity Areas and Broad-Scale Ecological Processes

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	L	L	H

Can the impact be reversed? The impact would last for the lifetime of the development.

Will impact cause irreplaceable loss or resources? Unlikely

Can impact be avoided, managed or mitigated? To a large extent, but some residual impact would persist for the lifetime of the infrastructure.

Mitigation measures:

- Minimise the development footprint, especially within the high sensitivity areas.
- Specific avoidance and mitigation may be required to reduce the impact on certain habitats of limited extent and high ecological or conservation significance as may be informed by the preconstruction walk-through of the power line route and associated infrastructure.

Residual Impact Some of the impact results from the presence of the infrastructure and would therefore persist for as long as it was present.

Impact Phase: Decommissioning

Impact description: Faunal impacts due to decommissioning phase activities

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H

Can the impact be reversed? The impact would be transient and persist for the decommissioning period only

Will impact cause irreplaceable loss or resources? No

Can impact be avoided, managed or mitigated? Most of the impacts can be mitigated and those that cannot would be transient.

Mitigation measures:

- Any potentially dangerous fauna such as snakes or fauna threatened by the decommissioning activities should be removed to a safe location prior to the commencement of decommissioning activities.
- All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill.
- All vehicles accessing the site should adhere to a low speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises.
- No excavated holes or trenches should be left open for extended periods as fauna may fall in and become trapped.
- All above-ground infrastructure should be removed from the site.

Residual Impact	Decommissioning would in principle return the site to its former state, but in practice, some degradation of the development footprint can be anticipated, which would reduce its long-term value as faunal habitat.
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Impact Phase: Decommissioning							
Impact description: Soil erosion risk							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	The loss of large amounts of topsoil would potentially be an irreplaceable loss of resources, but with mitigation, this can be avoided.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, erosion risk can be well mitigated.						
Mitigation measures:							
<ul style="list-style-type: none"> Any roads that will not be rehabilitated should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. There should be regular monitoring for erosion for at least 2 years after decommissioning by the applicant to ensure that no erosion problems develop as result of the disturbance, and if they do, to immediately implement erosion control measures. All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area. 							
Residual Impact	With mitigation, there would be little residual impact.						

Impact Phase: Decommissioning							
Impact description: Alien plant invasion							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	With appropriate mitigation the impact can be ameliorated.						
Will impact cause irreplaceable loss or resources?	With mitigation there would be no loss of resources.						
Can impact be avoided, managed or mitigated?	With appropriate control measures, alien plants can be controlled and reduced to very low impact.						
Mitigation measures:							
<ul style="list-style-type: none"> Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after decommissioning activities are complete to encourage natural regeneration of the local indigenous species. Due to the disturbance at the site alien plant species are likely to be a long-term problem following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. Regular monitoring for alien plants within the disturbed areas for at least two years after decommissioning or until alien invasives are no longer a problem at the site. 							

- Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.

Residual Impact	With mitigation there would be little to no residual impact.
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9.3 Aquatic

If no towers are located within the waterbodies and watercourses, it is anticipated that the overall impacts with mitigation would be low to none, based on the assumption that existing tracks, cattle pathways and roads are used as construction access routes as far as possible and where new access roads are required they must avoid sensitive aquatic areas. Further all erosion mitigation measures recommended in this report must be effectively implemented for runoff generated by these tracks as well as the substations. This must be confirmed during a post approval walk down or inspection of the final tower positions and access routes by the aquatic specialist.

Grid Alternative 1 and 2

Impact Phase: Construction and Operational Phase							
Impact description: Increase in sedimentation and erosion within the development footprint during the construction phase and to a lesser degree the operational phase							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		Yes					
Will impact cause irreplaceable loss or resources?		No					
Can impact be avoided, managed or mitigated?		Yes					
Mitigation measures:							
<ul style="list-style-type: none"> Any stormwater within the site must be handled in a suitable manner, i.e. trap sediments and reduce flow velocities. 							
Residual Impact		During flood events, any unstable banks (eroded areas) and sediment bars (sedimentation downstream) already deposited downstream. However due to low mean annual runoff within the region this is not anticipated due to the nature of the development together with the proposed layout.					

Impact Phase: Construction and Operational Phase							
Impact description: Impact on localized surface water quality mainly during the construction phase							
During construction and to a limited degree the operational activities, chemical pollutants (hydrocarbons from equipment and vehicles, cleaning fluids, cement powder, wet cement, shutter-oil, etc.) associated with site-clearing machinery and construction activities could be washed downslope via the ephemeral systems.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?		Yes					
Will impact cause irreplaceable loss or resources?		Yes					

Can impact be avoided, managed or mitigated?	Yes
Mitigation measures: <ul style="list-style-type: none"> • Strict use and management of all hazardous materials used on site. • 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. • Strict control over the behaviour of construction workers. • Working protocols incorporating pollution control measures (including approved method statements by the contractor) should be clearly set out in the Construction Environmental Management Plan (CEMP) for the project and strictly enforced. • Appropriate ablution facilities should be provided for construction workers during construction and on-site staff during the operation of the facility. 	
Residual Impact	Residual impacts will be negligible after appropriate mitigation.

9.4 Avifauna

The key potential impact types on avifauna associated with grid connection infrastructure are:

- Habitat destruction;
- Disturbance and displacement;
- Collision with power lines;
- Electrocution; and
- Disruption of bird movements.

Grid Alternative 1 and 2

Impact Phase: Construction Phase							
Impact description: Destruction of habitat used by birds							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	H	M
With Mitigation	L	M	L	Negative	L	L	M
Can the impact be reversed?	Yes, areas disturbed during construction can be rehabilitated after construction and after decommissioning.						
Will impact cause irreplaceable loss or resources?	No, rehabilitation of habitat is possible.						
Can impact be avoided, managed or mitigated?	Yes, the total area of impact (and thus the intensity rating) can be minimised. The servitude can be rehabilitated after project close.						
Mitigation measures: <ul style="list-style-type: none"> • Existing roads and farm tracks should be used where possible; • The minimum footprint areas of infrastructure should be used wherever possible, including access road widths and lengths; • A site specific Construction Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. ECOs to oversee activities and ensure that the site specific construction environmental management plan (CEMP) is implemented and enforced; • Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final power line routes to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded; • Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the CEMP; 							

- Construction of grid infrastructure (within the WEF site) must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible;
- Any clearing of stands of alien trees on site should be approved first by an avifaunal specialist;
- Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and to this end a habitat restoration plan is to be developed by a specialist and included within the Construction Environmental Management Plan (CEMP); and
- The Grid Connection route should, where possible, follow existing linear infrastructure such as roads and power lines, and should be constructed as close as practically possible to the existing infrastructure.

Impact Phase: Construction Phase

Impact description: Disturbance to birds resulting in temporary/permanent displacement or disrupting breeding success

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M

Can the impact be reversed? Partially, in some areas, birds disturbed during construction may return to their activities after completion of construction.

Will impact cause irreplaceable loss or resources? Unlikely, disturbance and potential displacement of birds may impact breeding and thus impact on the population of a species.

Can impact be avoided, managed or mitigated? Partially, some disturbance is inevitable with the activities associated with construction.

Mitigation measures:

- A CEMP must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. ECOs to oversee activities and ensure that the site specific CEMP is implemented and enforced;
- Prior to construction, the avifaunal specialist should conduct a site walkthrough, covering the final power line route to identify any nests/breeding/roosting activity of sensitive species as well as any additional sensitive habitats. The results of which may inform the final construction schedule, including abbreviating construction time, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise; and
- Sensitive zones and no-go areas are to be designated by the specialist (e.g. nesting sites) and must be avoided.

Impact Phase: Operational Phase

Impact description: Bird mortality from power line collision

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M

Can the impact be reversed? Possibly, bird fatalities are irreversible. However local populations may recover if the occurrence of deaths is low.

Will impact cause irreplaceable loss or resources? Possibly, collisions with overhead power lines causes bird fatalities which could significantly impact populations of certain species.

Can impact be avoided, managed or mitigated? Yes, reducing the total distance of overhead power lines and increasing their visibility by fitting bird flight diverters (BFD's) can reduce the number of collisions.

Mitigation measures:

- Grid infrastructure should not be constructed in No-Go areas;

- Construction of grid infrastructure must consider avifaunal sensitivity zones and avoid areas of higher sensitivities where possible;
- Wherever possible, place new overhead power lines adjacent to existing power lines or linear infrastructure (e.g. roads and fence lines). Where the new power line is adjacent to an existing line, ensure that new pylons are staggered so that they are not in line with existing pylons wherever possible;
- Prior to construction, the avifaunal specialist must conduct a site walkthrough to determine the power line spans that will require marking devices [Bird Flight Diverters (BFDs)] to increase visibility. It is likely that the specialist may recommend all, or the vast majority of spans will need to be mitigated, and suitable financial allowance should be made for this;
- Install bird flight diverters as per the instructions of the specialist following the site walkthrough, which may include the need for modified BFDs fitted with solar powered LED lights on certain spans.
- Develop and implement a carcass search programme for large terrestrial birds, covering the Grid Connection line (or strategic locations along the line selected by the specialist), to be implemented as a minimum over the course of the first two years of operations.
- Any mortalities should be reported to the Endangered Wildlife Trust (EWT).

Impact Phase: Operational Phase							
Impact description: Bird mortality from electrocution							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	M	Negative	M	M	H
With Mitigation	L	M	M	Negative	L	L	H
Can the impact be reversed?		Possibly, bird fatalities are irreversible. However local populations may recover if the occurrence of deaths is low.					
Will impact cause irreplaceable loss or resources?		Unlikely, electrocution from overhead power lines causes bird fatalities, although this is unlikely to happen and therefore won't significantly impact populations.					
Can impact be avoided, managed or mitigated?		Yes, reducing the total length of overhead power lines and using a safe pylon design can reduce the risk of electrocution.					
Mitigation measures:							
<ul style="list-style-type: none"> • Any new overhead power lines must be of a design that minimizes electrocution risk by using adequately insulated 'bird friendly' structures (in line with standard Eskom guidelines), with clearances between live components of 1.8 m or greater and which provides a safe bird perch; • All electrical infrastructure, including transformers and substations, must be designed in line with Eskom's standards that ensure adequate insulation of all components to prevent electrocution of birds; and • Develop and implement a carcass search programme for large terrestrial birds, covering the Grid Connection line (or strategic locations along the line selected by the specialist), to be implemented as a minimum over the course of the first two years of operations. Any mortalities should be reported to the EWT. 							

Impact Phase: Operational Phase							
Impact description: Disturbance to birds resulting in temporary/permanent displacement or disrupting breeding success							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M
Can the impact be reversed?		Possibly, after decommissioning and rehabilitation displaced species will possibly return.					

Will impact cause irreplaceable loss or resources?	Unlikely, disturbance and potential displacement of birds may impact breeding and thus impact on the population of a species.
Can impact be avoided, managed or mitigated?	Partially, some disturbance is inevitable with the operational activities, but these can be minimised.
Mitigation measures: <ul style="list-style-type: none"> A site specific Operational Environmental Management Plan (OEMP) must be implemented, which gives appropriate and detailed description of how operational and maintenance activities must be conducted to reduce unnecessary disturbance. All contractors are to adhere to the OEMP and should apply good environmental practice during all operations; No bird nests must be disturbed or removed from any pylon or substation infrastructure prior to consultation with and approval from the avifaunal specialist; The Manager and field staff responsible for maintenance and repairs on the grid connection line (or a suitably appointed Environmental Manager) must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possibly breeding by these species. If a priority species or Red Data species is found to be breeding (e.g. a nest site is located) on the operational Grid Connection site, the nest/breeding site must not be disturbed and an avifaunal specialist must be contacted for further instruction; and Operational phase bird monitoring, in line with applicable guidelines, must be implemented to include monitoring of the Grid Connection route and must include monitoring of all raptor nest sites for breeding success. 	

Impact Phase: Decommissioning Phase							
Impact description: Disturbance to birds resulting in temporary/permanent displacement or disrupting breeding success							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	L	M	M	Negative	L	L	M
Can the impact be reversed?	Possibly, after decommissioning and rehabilitation some displaced species may possibly return.						
Will impact cause irreplaceable loss or resources?	Unlikely.						
Can impact be avoided, managed or mitigated?	Partially, some disturbance is inevitable with the decommissioning activities, but these can be minimised.						
Mitigation measures: <ul style="list-style-type: none"> An EMP must be implemented, which gives appropriate and detailed description of how decommissioning activities must be conducted. All contractors are to adhere to the EMP and should apply good environmental practice during decommissioning; ECOs to oversee activities and ensure that the CEMP for decommissioning is implemented and enforced; The appointed ECO must be trained by an avifaunal specialist to identify the potential priority species and Red Data species as well as the signs that indicate possible breeding by these species. The ECO must then, during audits/site visits, make a concerted effort to look out for such breeding activities of Red Data species, and such efforts may include the training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species. If any of the Red Data species are confirmed to be breeding (e.g. if a nest site is found), decommissioning activities within 500 m of the breeding site must cease, and an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed; and Prior to decommissioning, an avifaunal specialist should conduct a site walkthrough, covering the entire power line route to identify any nests/breeding/roosting activity of sensitive species, as well as any additional sensitive habitats. The results of which may inform the final decommissioning schedule in close proximity to that specific area, including abbreviating activity times, scheduling activities around avian breeding and/or movement schedules, and lowering levels of associated noise. 							

9.5 Bats

Impact Phase: Construction Phase							
Impact description: Roost disturbance							
The grid connection infrastructure may impact bats directly through the disturbance of roosts during construction. Excessive noise and dust during the construction phase could result in bats abandoning their roosts, depending on the proximity of construction activities to roosts. This impact will vary depending on the species involved; species that may roost in trees are likely to be impacted more (e.g. Cape serotine and Egyptian free-tailed bats; Monadjem et al. 2010) because tree roosts are less buffered against noise and dust compared to roosts in buildings and rocky crevices. Roosts are limiting factors in the distribution of bats and their availability is a major determinant in whether bats would be present in a particular location. Reducing roosting opportunities for bats is likely to have negative impacts.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?			Unknown				
Will impact cause irreplaceable loss or resources?			No				
Can impact be avoided, managed or mitigated?			Yes				
Mitigation measures:							
<ul style="list-style-type: none"> It may be possible to limit roost disturbance and abandonment by avoiding construction activities near roosts. These include trees, caves, rocky crevices and buildings along the grid connection route. It is recommended that a bat specialist survey the confirmed grid connection route for the presence of roosts before any construction activities commence. A no-go buffer zone of 200 m, in which no construction activities may take place or no infrastructure is to come within must be applied around any roosts or potential roosts identified. 							
Will this impact contribute to any cumulative impacts?			The cumulative impact of bats abandoning their roosts is dependent on the number of roosts affected, the species involved and extent of the impact across the assessed region. With effective management of the construction process across the cumulative developments and limiting roost disturbance, the cumulative impacts can be reduced to low.				

Impact Phase: Construction Phase							
Impact description: Roost destruction							
The grid connection infrastructure may impact bats directly through the physical destruction of roosts during construction. Roosts are limiting factors in the distribution of bats and their availability is a major determinant in whether bats would be present in a particular location. Reducing roosting opportunities for bats is likely to have negative impacts. Potential roosts that may be impacted by construction activities include trees, rocky crevices and buildings. Roost destruction can impact bats either by removing potential roosting spaces which reduces available roosting sites or, if a roost is destroyed while bats are occupying the roost, this could result in bat mortality. It is likely that roost destruction will occur if construction activities require the removal of trees, buildings and blasting rocky outcrops. If bats are occupying such roosts at the time they are destroyed it is likely this could result in mortality. However, a low numbers of roosts will likely need to be destroyed resulting in the significance of this impact being low after mitigation.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M

Can the impact be reversed?	No
Will impact cause irreplaceable loss or resources?	Yes
Can impact be avoided, managed or mitigated?	Yes
Mitigation measures: <ul style="list-style-type: none"> The grid connection route can be designed and constructed in such a way as to avoid the destruction of potential roosts, particularly trees, caves, rocky crevices (if blasting is required) and buildings. No construction activities with the potential to physically affect any bat roosts will be permitted without the express permission of a suitably qualified bat specialist following appropriate investigation and mitigation. It is recommended that a bat specialist survey the confirmed grid connection route for the presence of roosts before any construction activities commence. A no-go buffer zone of 200 m, in which no construction activities may take place or no infrastructure is to come within must be applied around any roosts or potential roosts identified (limited to rocky crevices and buildings). A site-specific Construction Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction. During construction, laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation, while designated no-go areas must be enforced i.e. no off-road driving. Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the Construction Environmental Management Plan (CEMP). 	
Will this impact contribute to any cumulative impacts?	The cumulative impact of destroying multiple roosts across a region will be negative. With mitigation, effective design of WEFs and preventing roost destruction, the cumulative impacts can be reduced to low.

Impact Phase: Construction Phase							
Impact description: Habitat modification							
Bats can be impacted indirectly through the modification or removal of habitats (Kunz et al. 2007b). The removal of vegetation during the construction phase will impact bats by removing cover and linear features that some bats use for foraging and commuting (Verboom and Huitema 1997). The footprint of the grid connection route is small relative to the remaining habitat available in the surrounding area and as such the removal of vegetation is not likely to result in a significant impact. This impact can be reduced even further by limiting the removal of vegetation as far as possible.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	Yes						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: <ul style="list-style-type: none"> This impact must be reduced by limiting the removal of vegetation as far as possible. A site-specific Construction Environmental Management Plan (CEMP) must be implemented, which gives appropriate and detailed description of how construction activities must be conducted to reduce unnecessary destruction of habitat. All contractors are to adhere to the CEMP and should apply good environmental practice during construction. 							

<ul style="list-style-type: none"> • A bat specialist should conduct a site walkthrough, covering the final power line routes and the switching station and substation areas, to identify any roosts/activity of sensitive species, as well as any additional sensitive habitats. • During construction laydown areas and temporary access roads should be kept to a minimum in order to limit direct vegetation loss and habitat fragmentation, while designated no-go areas must be enforced i.e. no off-road driving. • Following construction, rehabilitation of all areas disturbed (e.g. temporary access tracks and laydown areas) must be undertaken and a habitat restoration plan must be developed by a specialist and included within the Construction Environmental Management Plan (CEMP). 	
Will this impact contribute to any cumulative impacts?	Cumulative impacts should be low because of the limited amount of vegetation that would be removed relative to the large area in the region that would not be developed. However, this will depend on the types of vegetation that are removed because the cumulative impact of removing endangered habitat will be greater than removing habitat that is not threatened.

Impact Phase: Operational Phase							
<p>Impact description: Bat mortality through collision with transmission lines</p> <p>Insectivorous bats are unlikely to collide with transmission lines due to their ability to echolocate. They are therefore able to detect and avoid obstacles in their path, such as electrical cabling. Fruit bats do not echolocate in the same manner and can collide and become electrocuted by transmission lines. There is no published evidence of this in South Africa but these events do occur globally.</p> <p>The geographic distribution of at least two species of fruit bat, the Egyptian rousette and Wahlberg's epauletted fruit bat, may overlap with the proposed grid connection route. The existence of suitable caves for roosting and fruit trees along or across this route may increase the likelihood that this species is present however these features are not present along the proposed grid connection routes.</p>							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	L	L	M
With Mitigation	L	M	L	Negative	L	L	M
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	Yes						
Can impact be avoided, managed or mitigated?	Yes						
<p>Mitigation measures:</p> <ul style="list-style-type: none"> • As this impact is unlikely to occur, no mitigation options are provided. 							
Will this impact contribute to any cumulative impacts?	The cumulative impacts will depend on the number of WEFs in the region, the species involved and the levels of bat mortality. Bats reproduce slowly (Barclay and Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.						

9.6 Noise

No potential noise-sensitive developments have been identified within the 300 m wide corridor of the potential South Grid Connection routes.

Any noise associated with the transmission lines is therefore considered to be of negligible impact.

9.7 Heritage

It is very likely that some archaeological materials will be directly impacted but, given the very small footprints of power line pylons, highly unlikely that resources of high cultural significance would be affected. Because of the expected generally low cultural significance the intensity of expected impacts is rated as being low. The nature of the archaeology seen on site suggests that the extent of any impacts would never extend much beyond the site level so this was rated as low. Impacts to archaeological resources are permanent which leads to a duration of high. Although no significant archaeological sites are located within the project footprint areas, it is probable that some resources will be found when the actual alignments are surveyed but the probability of them being impacted is rated as low because of the small disturbance footprints involved. The calculated Significance is low.

With mitigation impacts would still definitely occur. However, the probability of impacts to culturally significant sites remains low. The impact Significance also remains low.

Grid Alternative 1 and 2

Impact Phase: Construction Phase							
Impact description: Impacts on archaeological resources Archaeological resources may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	M	M	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?		No, once archaeological artefacts are disturbed/destroyed the site cannot be recreated.					
Will impact cause irreplaceable loss or resources?		Yes, heritage resources are regarded as unique.					
Can impact be avoided, managed or mitigated?		Yes, it is often easy to realign a section of road if needed but, if this is not possible then archaeological mitigation can be easily effected (there are no identified no-go areas within the present footprint).					
Mitigation measures:							
<ul style="list-style-type: none"> Commission an archaeological walk-through survey to identify sites within final footprint Carry out any archaeological mitigation for sites of cultural significance that cannot be avoided 							

Impact Phase: Construction Phase							
Impact description: Impacts on graves Graves may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Grid Alternative 1							
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	L	Negative	L	L	H
Grid Alternative 2							
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	L	Negative	M	L	H
Can the impact be reversed?		No, once graves are disturbed/destroyed they cannot be recreated.					

Will impact cause irreplaceable loss or resources?	Yes, every grave is unique.
Can impact be avoided, managed or mitigated?	Yes, it is often easy to realign a section of road if needed but, if this is not possible then exhumation can be effected (avoidance is strongly preferred).
Mitigation measures: <ul style="list-style-type: none"> • Commission an archaeological walk-through survey to identify graves within final footprint • Carry out exhumation of graves that cannot be avoided 	

Impact Phase: Construction / Operational and Decommissioning Phase							
Impact description: Impacts to the cultural landscape The cultural landscape would be altered through the addition of a new 'layer' comprising of large wind turbines and related infrastructure.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	M	L	Negative	M	H	H
Can the impact be reversed?	Yes, if the facility is decommissioned and the land rehabilitated then the impacts would cease.						
Will impact cause irreplaceable loss or resources?	No, because there are many other areas with very similar cultural landscape character.						
Can impact be avoided, managed or mitigated?	No, it is not possible to avoid the impacts. However, mitigation measures can very slightly reduce the severity of impacts.						
Mitigation measures: <ul style="list-style-type: none"> • Minimise cut and fill operations • Minimise unnecessary surface disturbance • Ensure effective rehabilitation of the development area after construction and again after decommissioning • Further measures would be as described by the visual assessment practitioner. 							

9.8 Palaeontology

For the South WEF Grid Connection application two alternative route alignments are being assessed. Given (1) the small scale of excavations for the powerline pylon footings, (2) the shortness of the lines, as well as (3) the low density of sensitive fossil sites recorded within the various grid connection corridors under consideration, the intensity of anticipated palaeontological impacts is rated as low even without mitigation.

For the South Grid Connection there is no preference on palaeontological grounds for one or other route alignment.

Grid Alternative 1 and 2

Impact Phase: Construction Phase							
Impact description: Palaeontological heritage resources Destruction, disturbance or damage of fossils preserved at or below the surface of the ground due to surface clearance and excavations during the construction phase (<i>e.g.</i> for pylon footings, access roads).							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	L	L	M
With Mitigation	L	H	L	Negative	L	L	M

Can the impact be reversed?	No, lost fossils cannot be re-created while disturbance leads to permanent loss of contextual scientific data.
Will impact cause irreplaceable loss or resources?	Possible, but unlikely. Most fossils are of widespread occurrence within the outcrop area of a given rock unit outside the project area. However, loss of unique, rare or exceptionally-preserved specimens cannot be discounted.
Can impact be avoided, managed or mitigated?	Yes
Mitigation measures: <ul style="list-style-type: none"> Monitoring of all substantial excavations (e.g. wind turbine foundations) by ECO for fossil material on an on-going basis during construction phase. Application of Chance Fossil Finds Procedure (See Appendix 2 of the Specialist Report in Volume II): safeguarding new fossil finds and reporting to ECPHRA by ECO for possible recording and sampling / collection by professional palaeontologist. 	

9.9 Visual

The South Grid Connection terminates near the R63 Route. The alternatives impacts are similar in nature and are therefore included in the same tables for the construction, operation and decommissioning phases.

Impact Phase: Construction Phase							
Impact description: Potential visual effect of construction activities, including cranes, construction traffic, dust and noise affecting the rural sense of place. <ul style="list-style-type: none"> The construction activities would be highly visible (within 500m) for a short section of the R63. The construction activities would be at the site scale. The construction activities would be of short term duration. 							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes, through site rehabilitation.						
Will impact cause irreplaceable loss or resources?	No, areas disturbed by construction activities can be rehabilitated.						
Can impact be avoided, managed or mitigated?	Yes, some visual mitigation is possible through careful siting and screening of the construction camps and stockpiles, and rehabilitation of disturbed areas.						
Mitigation measures: <ul style="list-style-type: none"> Location of the powerline off ridgelines and crests where possible to minimize skyline effects. Location of the construction camp, batching plant and related storage/stockpile areas in unobtrusive positions in the landscape, away from arterial or district roads, or alternatively screening measures utilized. Clear demarcation of construction camps, limited in size to only that which is essential. Employment of dust suppression and litter control measures. Formulation and adherence to an Environmental Management Programme (EMPr), monitored by an Environmental Control Officer (ECO). Existing roads used where possible for access / maintenance roads. Areas disturbed during construction to be rehabilitated to original state. 							

Impact Phase: Operational Phase	
Impact description: Potential visual intrusion of powerline pylons on the rural landscape. <ul style="list-style-type: none"> The powerlines would be highly visible (within 500m) for a short section of the R63. 	

<ul style="list-style-type: none"> The powerlines would be at the site scale. The visual intrusion of the powerlines would be of long term duration. 							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	H	M	Negative	M	H	H
Can the impact be reversed?	Yes, but only over the long term through decommissioning.						
Will impact cause irreplaceable loss or resources?	No, scenic resources would be restored after decommissioning in the long term.						
Can impact be avoided, managed or mitigated?	No, there is little or no potential for mitigation, except for micro-siting of pylons.						
Mitigation measures:							
<ul style="list-style-type: none"> Ridgelines and crests to be avoided in micro-siting of pylons. Monopoles to be used in preference to Lattice pylons where possible. 							

Impact Phase: Decommissioning Phase							
Impact description: Potential visual intrusion of pylons and access roads on the rural landscape.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Neutral	L	L	M
Can the impact be reversed?	Yes, through removal of pylons and rehabilitation of the site.						
Will impact cause irreplaceable loss or resources?	No, the landscape/scenic resources could be restored after rehabilitation in the long term.						
Can impact be avoided, managed or mitigated?	Yes, through removal of pylons and rehabilitation of the site.						
Mitigation measures:							
<ul style="list-style-type: none"> Pylons to be dismantled and removed from the site on decommissioning. Access roads that are no longer required to be ripped and regraded. Exposed or disturbed areas revegetated to grazing pasture or natural vegetation to blend with surroundings. 							

9.10 Social

The South WEF Grid Connection was assessed as part of the WEF, therefore the impacts shown below are combined for the WEF and the Grid Connection. The assumption here is that the individual impacts for the Grid Connection is expected to be lower than when combined with the WEF.

The key social issues associated with the construction phase include:

Potential positive impacts

- Creation of employment and business opportunities, and opportunity for skills development and on-site training.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities;

- Impacts related to the potential influx of job-seekers;
- Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site;
- Increased risk of grass fires associated with construction related activities;
- Noise, dust, waste and safety impacts of construction related activities and vehicles.

Impact Phase: Construction Phase							
Impact description: Creation of employment and business opportunities during the construction phase							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Positive	M	M	H
With Mitigation	H	L	H	Positive	M	H	H
Can the impact be reversed?		Yes, By not implementing the project					
Will impact cause irreplaceable loss or resources?		No					
Can impact be avoided, managed or mitigated?		Yes					
Mitigation measures:							
Employment							
<ul style="list-style-type: none"> • Where reasonable and practical the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area; • Where feasible, efforts should be made to employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria; • Before the construction phase commences the proponent should meet with representatives from the BCRLM and BCRLM to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase; • The local authorities, relevant community representatives and local farmers should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project; • Where feasible a training and skills development programmes for local workers should be initiated prior to the initiation of the construction phase; • The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. 							
Business							
<ul style="list-style-type: none"> • The proponent should liaise with the SBDM and BCRLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work; • Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information. • The SBDM and BCRLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project. 							
Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.							

Impact Phase: Construction Phase							
Impact description: Potential impacts on family structures and social networks associated with the presence of construction workers							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence

Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, By not implementing the project						
Will impact cause irreplaceable loss or resources?	Unlikely at a community level						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> Where possible the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories; The proponent should consider the need for establishing a Monitoring Forum (MF) in order to monitor the construction phase and the implementation of the recommended mitigation measures. The MF should be established before the construction phase commences, and should include key stakeholders, including representatives from the SBDM and BCRLM, farmers and the contractor(s). The MF should also be briefed on the potential risks to the local community and farm workers associated with construction workers; The proponent and the contractor(s) should, in consultation with representatives from the MF, develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be dismissed. All dismissals must comply with the South African labour legislation; The proponent and contractor (s) should implement an HIV/AIDS awareness programme for all construction workers at the outset of the construction phase; The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site; Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks; It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. 							

Impact Phase: Construction Phase							
Impact description: Potential impacts on family structures, social networks and community services associated with the influx of job seekers							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	L	Negative	L	L	M
With Mitigation	M	L	L	Negative	L	L	M
Can the impact be reversed?	Yes, By not implementing the project						
Will impact cause irreplaceable loss or resources?	Unlikely at a community level						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The proponent should implement a "locals first" policy, specifically with regard to unskilled and low skilled opportunities. 							

Impact Phase: Construction Phase							
Impact description: Potential risk to safety of farmers and farm workers, livestock and damage to farm infrastructure associated with the movement of construction workers on and to the site							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence

Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, repairing damage and compensating for stock losses etc.						
Will impact cause irreplaceable loss or resources?	Unlikely at a community level						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase proven to be associated with the construction activities for the WF will be compensated for. The agreement should be signed before the construction phase commences; Contractors appointed by the proponent should provide daily transport for workers to and from the site. This would reduce the potential risk of trespassing on the remainder of the farm and adjacent properties; The proponent should consider the option of establishing a MF (see above) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site; The proponent should hold contractors liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors and neighbouring landowners. The agreement should also cover losses and costs associated with fires caused by construction workers or construction related activities (see below); The Environmental Management Programme (EMP) should outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested; Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained on the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms. Contractors appointed by the proponent must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation; The housing of construction workers on the site should be limited to security personnel. 							

Impact Phase: Construction Phase							
Impact description: Potential loss of livestock, crops and houses, damage to farm infrastructure and threat to human life associated with increased incidence of grass fires							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, repairing damage and compensating for losses etc.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The proponent should enter into an agreement with the local farmers in the area whereby losses associated with fires that can be proven to be associated with the construction activities for the WF will be compensated for. The agreement should be signed before the construction phase commences; 							

- Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas;
- No smoking should be permitted on site, except in designated areas;
- Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months;
- Contractor to provide adequate firefighting equipment on-site;
- Contractor to provide fire-fighting training to selected construction staff;
- No construction staff, with the exception of security staff, to be accommodated on site over night;
- As per the conditions of the Code of Conduct, in the event of a fire proven to be caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the firefighting costs borne by farmers and local authorities.

Impact Phase: Construction Phase

Impact description: Potential dust and safety impacts and damage to road surfaces associated with movement of construction related traffic to and from the site

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H

Can the impact be reversed? Yes, by rehabilitating disturbed areas.

Will impact cause irreplaceable loss or resources? No

Can impact be avoided, managed or mitigated? Yes

Mitigation measures:

- As far as possible, the transport of components to the site along the N10 should be planned to avoid weekends and holiday periods;
- The contractor should inform local farmers and representatives from the SBDM and BCRLM Tourism of dates and times when abnormal loads will be undertaken;
- The contractor must ensure that damage caused by construction related traffic to the gravel public roads and local, internal farm roads is repaired on a regular basis throughout the construction phase. The costs associated with the repair must be borne by the contractor;
- Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis⁷, adhering to speed limits and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers;
- All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits;
- The Contractor should ensure that workers are informed that no waste can be thrown out of the windows while being transported to and from the site. Workers who throw waste out windows should be fined;
- The Contractor should be required to collect waste along access roads on a weekly basis;
- Waste generated during the construction phase should be transported to the local permitted landfill site.
- EMP measures (and penalties) should be implemented to ensure farm gates are closed at all times;
- EMP measures (and penalties) should be implemented to ensure speed limits are adhered to at all times.

Impact Phase: Construction Phase

Impact description: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the WEFs and power lines will damage farmlands and result in a loss of farmlands for grazing.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
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⁷ Treated effluent (non-potable) water should be used for wetting of roads and construction areas

Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by rehabilitating disturbed areas.						
Will impact cause irreplaceable loss or resources?	No, however, disturbed areas will need to be rehabilitated						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The location of wind turbines, access roads, laydown areas etc. should be informed by the findings of the soil and vegetation study. In this regard areas of high potential agricultural and sensitive vegetation soils should be avoided; The developer should consult with affected property owners in order to enable them to factor construction activities into their farming schedules; The location of wind turbines, access roads, laydown areas etc. should be discussed with the locally affected landowner in the finalisation process and inputs provided should be implemented in the layout as best as possible; The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible; An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase; All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input from the soil scientist and discussed with the local farmer; The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed; The implementation of the Rehabilitation Programme should be monitored by the ECO; All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas; EMP measures (and penalties) should be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed to drive into the veld; Disturbance footprints should be reduced to the minimum. Compensation should be paid by the developer to farmers that suffer a permanent loss of land due to the establishment of the WEF. Compensation should be based on accepted land values for the area. 							

Impact Phase: Construction Phase							
Impact description: The activities associated with the construction phase, such as establishment of access roads and the construction camp, movement of heavy vehicles and preparation of foundations for the WEFs and power lines will damage farmlands and result in a loss of farmlands for grazing.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by rehabilitating disturbed areas.						
Will impact cause irreplaceable loss or resources?	No, however, disturbed areas will need to be rehabilitated						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The location of wind turbines, access roads, laydown areas etc. should be informed by the findings of the soil and vegetation study. In this regard areas of high potential agricultural and sensitive vegetation soils should be avoided; 							

- The developer should consult with affected property owners in order to enable them to factor construction activities into their farming schedules;
- The location of wind turbines, access roads, laydown areas etc. should be discussed with the locally affected landowner in the finalisation process and inputs provided should be implemented in the layout as best as possible;
- The footprint areas for the establishment of individual wind turbines should be clearly demarcated prior to commencement of construction activities. All construction related activities should be confined to the demarcated area and minimised where possible;
- An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase;
- All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase. The rehabilitation plan should be informed by input from the soil scientist and discussed with the local farmer;
- The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed;
- The implementation of the Rehabilitation Programme should be monitored by the ECO;
- All workers should receive training/ briefing on the reasons for and importance of not driving in undesignated areas;
- EMP measures (and penalties) should be implemented to strictly limit all vehicle traffic to designated roads and construction areas. Under no circumstances should vehicles be allowed to drive into the veld;
- Disturbance footprints should be reduced to the minimum.
- Compensation should be paid by the developer to farmers that suffer a permanent loss of land due to the establishment of the WEF. Compensation should be based on accepted land values for the area.

Impact Phase: Operational Phase

Impact description: Development of infrastructure to generate clean, renewable energy

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Positive	M	M	H
With Mitigation	M	H	M	Positive	H	H	H
Can the impact be reversed?	Yes, by removing infrastructure.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> • Implement a skills development and training programme aimed at maximizing the number of employment opportunities for local community members; • Maximise opportunities for local content, procurement and community shareholding; • Establish a visitor centre. As indicated in the literature review, visitor centers in Scotland have attracted large numbers of visitors to wind farms. 							

Impact Phase: Operational Phase

Impact description: Creation of employment and business opportunities associated with the operational phase

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	L	Positive	M	M	H
With Mitigation	M	M	M	Positive	H	H	H
Can the impact be reversed?	Yes, by removing project.						
Will impact cause irreplaceable loss or resources?	No						

Can impact be avoided, managed or mitigated?	Yes
<p>Mitigation measures:</p> <p>Employment</p> <ul style="list-style-type: none"> Where reasonable and practical the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. Due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area; Where feasible, efforts should be made to employ local contractors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria; Before the construction phase commences the proponent should meet with representatives from the BCRLM and BCRLM to establish the existence of a skills database for the area. If such a database exists it should be made available to the contractors appointed for the construction phase; The local authorities, relevant community representatives and local farmers should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project; Where feasible a training and skills development programmes for local workers should be initiated prior to the initiation of the construction phase; The recruitment selection process should seek to promote gender equality and the employment of women wherever possible. <p>Business</p> <ul style="list-style-type: none"> The proponent should liaise with the SBDM and BCRLM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g. construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction contractors. These companies should be notified of the tender process and invited to bid for project-related work; Where possible, the proponent should assist local BBBEE companies to complete and submit the required tender forms and associated information. The SBDM and BCRLM, in conjunction with the local business sector and representatives from the local hospitality industry, should identify strategies aimed at maximising the potential benefits associated with the project. The proponent should implement a training and skills development programme for locals during the first 5 years of the operational phase. The aim of the programme should be to maximise the number of South African's and locals employed during the operational phase of the project; The proponent, in consultation with the SBDM and BCRLM, should investigate the options for the establishment of a Community Development Trust. 	

Impact Phase: Operational Phase							
Impact description: Establishment of a community trust funded by revenue generated from the sale of energy. The revenue can be used to fund local community development							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	H	M	Positive	M	L	H
With Mitigation	M	H	H	Positive	H	H	H
Can the impact be reversed?	Yes, by not implementing the project.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
<p>Mitigation measures:</p> <ul style="list-style-type: none"> The SBDM and BCRLM should be consulted as to the structure and identification of potential trustees to sit on the Trust. The key departments in the SBDM and BCRLM that should be consulted include the Municipal Managers Office, IDP Manager and LED Manager; Clear criteria for identifying and funding community projects and initiatives in the area should be identified. The criteria should be aimed at maximising the benefits for the community as a whole and not individuals within the community; 							

- Strict financial management controls, including annual audits, should be instituted to manage the funds generated for the Community Trust from the WEF.

Impact Phase: Operational Phase

Impact description: The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for sheep and farming inputs, such as feed etc.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	L	Positive	L	L	H
With Mitigation	M	M	M	Positive	M	H	H

Can the impact be reversed? Yes, by not implementing agreements.

Will impact cause irreplaceable loss or resources? No

Can impact be avoided, managed or mitigated? Yes

Mitigation measures:

- Implement agreements with affected landowners.

Impact Phase: Operational Phase

Impact description: Visual impact associated with the proposed WEF and the potential impact on the areas rural sense of place.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M – H	M	M
With Mitigation	M	M	M	Negative	M – H	M	M

Can the impact be reversed? Yes, by removing turbines.

Will impact cause irreplaceable loss or resources? No

Can impact be avoided, managed or mitigated? Yes

Mitigation measures:

- The recommendations contained in the VIA should be implemented;
- Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.

Impact Phase: Operational Phase

Impact description: Visual impact (based on comments from stakeholders who did not identify major concerns) associated with the proposed WEF and the potential impact on the areas rural sense of place.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	L	Negative	L	M	M
With Mitigation	M	M	L	Negative	L	M	M

Can the impact be reversed? Yes, by removing turbines.

Will impact cause irreplaceable loss or resources? No

Can impact be avoided, managed or mitigated?	Yes
Mitigation measures:	
<ul style="list-style-type: none"> The recommendations contained in the VIA should be implemented; Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact. 	

Impact Phase: Operational Phase

Impact description: Potential impact on property values and current operations linked to the visual impact associated with the proposed WF and the potential impact on the areas rural sense of place.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With Mitigation	M	M	M	Negative	M	M	M

Can the impact be reversed? Yes, by removing turbines.

Will impact cause irreplaceable loss or resources? No

Can impact be avoided, managed or mitigated? Yes

Mitigation measures:

- The recommendations contained in the VIA should be implemented;
- Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact;
- The option of compensation for impact on property values and current operations should be considered.

Impact Phase: Operational Phase

Impact description: Potential impact of the WF on local tourism

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	L	Negative	L	L	H
With Mitigation	M	M	L	Negative	L	L	H

Can the impact be reversed? Yes, by removing turbines.

Will impact cause irreplaceable loss or resources? No

Can impact be avoided, managed or mitigated? Yes

Mitigation measures:

- The recommendations contained in the VIA should be implemented;
- Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact.

Impact Phase: Operational Phase

Impact description: Potential impact of the WF on adjacent tourism operations associated with game farming and hunting

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	M
With	M	M	M	Negative	M	M	M

Mitigation							
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The recommendations contained in the VIA should be implemented; Recommended that the applicants meet with the affected landowners to discuss the possibility relocating wind turbines that have the highest potential visual impact. 							

Impact Phase: Decommissioning Phase							
Impact description: Social impacts associated with the decommissioning phase are linked to the loss of jobs and associated income							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	M	H
With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by removing turbines.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The proponent should ensure that retrenchment packages are provided for all staff retrenched when the WEF is decommissioned. All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning; The proponent should investigate the option of establishing an Environmental Rehabilitation Trust Fund to cover the costs of decommissioning and rehabilitation of disturbed areas. The Trust Fund should be funded by a percentage of the revenue generated from the sale of energy to the national grid over the 20 year operational life of the facility. The rationale for the establishment of a Rehabilitation Trust Fund is linked to the experiences with the mining sector in South Africa and failure of many mining companies to allocate sufficient funds during the operational phase to cover the costs of rehabilitation and closure. Alternatively, the funds from the sale of the WEF as scrap metal should be allocated to the rehabilitation of the site. 							

9.11 Traffic

Impact Phase: Construction Phase							
Impact description: Vehicle Conflict on-project site							
Where either laying cables underground or installing pylons and overhead lines, there is risk of vehicles crashing into people in the work zone where the WEF construction activities overlap with the GRID construction activities on-site.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	L	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes						

Will impact cause irreplaceable loss or resources?	No
Can impact be avoided, managed or mitigated?	Managed
Mitigation measures:	
<ul style="list-style-type: none"> Co-ordinate WEF and GRID build to avoid unnecessary overlapping of construction activities. 	

Impact Phase: Construction Phase							
Impact description: Deterioration of gravel Minor Roads. Additional heavy traffic on Minor roads could degrade the existing road pavement.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures:							
Carry out regular maintenance of the road to ensure that its condition is maintained or improved:							
<ul style="list-style-type: none"> Document condition of gravel roads prior to construction. Upgrade gravel roads to suitable condition for proposed construction vehicles. Ensure that the minor road is left in a better condition post-construction. 							

Impact Phase: Construction Phase							
Impact description: Additional traffic on gravel Minor Roads will result in more dust that reduces visibility and increases potential for crashes on the Minor Roads.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures:							
Reduce travel speed on gravel road to reduce dust:							
<ul style="list-style-type: none"> Post speed restriction signage for construction vehicles on minor roads. 							

Impact Phase: Construction Phase							
Impact description: Additional traffic at the Minor Road M00412 intersection with the R63 increases chances of vehicle crashes.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	M

With Mitigation	L	L	H	Negative	M	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures:							
Alert motorists to construction traffic at the access:							
<ul style="list-style-type: none"> Place warning construction vehicle signage on the R63 on each approach to Minor Road M00412. Ensure that all construction vehicles are roadworthy Ensure that all construction vehicles have appropriate drivers licence. 							

Impact Phase: Operational Phase							
Impact description: Negligible Impacts							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	n/a	n/a	n/a	Negative	n/a	n/a	n/a
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	No impacts						
Mitigation measures:							
<ul style="list-style-type: none"> There are no impacts requiring mitigation 							

Impact Phase: Decommissioning Phase							
Impact description: Deterioration of gravel Minor Roads. Additional heavy traffic on Minor roads could degrade the existing road pavement.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	M	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes, impacts can be managed and mitigated.						
Mitigation measures:							
Carry out regular maintenance of the road to ensure that its condition is maintained or improved:							
<ul style="list-style-type: none"> Document condition of gravel roads prior to construction. Upgrade gravel roads to suitable condition for proposed construction vehicles. Ensure that the minor road is left in a better condition post-construction. 							

Impact Phase: Decommissioning Phase
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Impact description: Additional traffic on gravel Minor Roads will result in more dust that reduces visibility and increases potential for crashes on the Minor Roads.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	M
With Mitigation	L	L	L	Negative	L	L	M
Can the impact be reversed?		Yes					
Will impact cause irreplaceable loss or resources?		No					
Can impact be avoided, managed or mitigated?		Yes, impacts can be managed and mitigated.					
Mitigation measures: Reduce travel speed on gravel road to reduce dust: <ul style="list-style-type: none"> Post speed restriction signage for construction vehicles on minor roads. 							

10 CUMULATIVE IMPACTS

10.1 Geology, Soils and Agriculture

Because of the even lower (negligible) agricultural impacts of power lines compared to wind farms, the agricultural environment can accommodate far more electricity grid infrastructure than currently exists, or is currently proposed, before acceptable levels of change are exceeded. Acceptable levels of change in terms of other types of impact, for example visual impact, would be exceeded long before the levels for agricultural impact became an issue. For the above reasons, the cumulative agricultural impact of the electrical grid connection components can confidently be assessed as negligible and a more formal assessment is irrelevant.

Impact Phase: Cumulative Phase							
Impact description: Regional loss of agricultural land use Agricultural grazing land directly occupied by the development infrastructure, which includes roads and hardstands, will become unavailable for agricultural use. However, only a very small proportion of the total land surface is impacted in this way.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	L	L	H
With Mitigation	L	M	L	Negative	L	L	H
Can the impact be reversed?		Yes, once the wind farm is decommissioned, the footprint of the infrastructure can again be utilised as grazing land.					
Will impact cause irreplaceable loss or resources?		No, because only a very small amount of grazing land is lost and such land is not a scarce resource.					
Can impact be avoided, managed or mitigated?		Yes, to some extent.					
Mitigation measures: <ul style="list-style-type: none"> The only possible mitigation measure is the avoidance of high sensitivity areas by the design layout, and this has already been implemented during the design phase. 							

10.2 Flora and Terrestrial Fauna

According to a map of DEA-registered projects as at July 2018, there are no other renewable energy applications in the immediate vicinity of the site, with the nearest facilities being the Golden Valley, Amakhala Emoyeni and Middleton Wind Energy projects near to Cookhouse. Apart from these wind energy projects, there are also some solar energy developments around Pearston west of the project site. The solar projects are however on the plains and do not affect the same environment as the Highlands project. Given the distance and extent of these different developments, it is clear that the current level of cumulative impact around the Highlands site is relatively low. From a terrestrial ecology point of view, there are also few linkages between the different facilities and as such the potential disruption of ecological processes is unlikely. The major broad-scale ecological corridors that are likely to be operating in the area include an east-west corridor along the great escarpment to the north of the site as well as a north-south and east-west corridor associated with the bands of thicket vegetation that occur on the western slopes of the site going through to Jansenville in west and south towards Kirkwood. As the development footprint in these areas remains very low, it is highly unlikely that these would be impacted to a significant degree by renewable energy development. Given the location and extent of current developments in the area, the Highlands WEF would generate habitat loss equivalent to approximately 200 ha and while this would contribute to habitat loss at the local scale, broader implications for cumulative impacts would remain low.

10.3 Freshwater and Wetlands

In the assessment of this project, the surrounding projects within a 35km radius of the site were assessed. From an aquatic environment standpoint, Highlands does not share any of the same direct subquaternary catchment and thus the other projects are too far removed. It would also not share any of the new roads, as it has been shown in the past that the access roads have always had some form of impact on aquatic systems, while internal structures (hard stands and turbines) to a lesser degree. Presently, no significant cumulative impacts were identified as these are also located outside of the delineated aquatic systems and their buffers for the proposed site.

In the assessment of this project, the surrounding projects within a 35 km radius of the site were assessed, including a number of Solar projects. The author has also reviewed the outcomes of the remaining projects as part of this EIA or other EIA / WUL applications in the region. All of the projects have indicated that aquatic impact avoidance as part of their layouts design process coupled mitigation, i.e. selecting the best possible routes to minimise the local and regional impacts while improving the drainage or hydrological conditions within these rivers has been included to result in a cumulative impact that would be negligible. However, the worse-case scenario has been assessed below, i.e. only the minimum of mitigation is implemented by the other projects, noting only a small number of projects ever reach the construction phase and that flows within these systems are sporadic.

Impact Phase: Cumulative Phase							
Impact description: Overall cumulative impact during the construction and operational phases							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	M	L	Negative	M	H	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?			Yes				

Will impact cause irreplaceable loss or resources?	Yes
Can impact be avoided, managed or mitigated?	Yes
Mitigation measures:	
<ul style="list-style-type: none"> 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. 	
Residual Impact	Residual impacts will be negligible after appropriate mitigation.

10.4 Avifauna

Details regarding the routes and lengths of the grid connection power lines for all the projects considered were not all available, and therefore a precautionary approach has been adopted and the cumulative impact of power line collisions (particularly involving Blue Crane and Ludwig's Bustard) is rated as high.

If all operational facilities implement appropriate and effective mitigation as outlined by their respective specialists, and if all mitigation measures outlined in this report are implemented for the proposed Highlands development, the cumulative impact after mitigation is likely to have moderate Significance.

Impact Phase: Cumulative Phase							
Impact description: Cumulative impact of all impacts on avifauna.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	H	M	H	Negative	H	M	M
With Mitigation	H	M	M	Negative	M	L	M
Can the impact be reversed?	Partially						
Will impact cause irreplaceable loss or resources?	Possibly						
Can impact be avoided, managed or mitigated?	Partially						
Mitigation measures:							
<ul style="list-style-type: none"> All mitigation measures listed above and recommended for other projects listed above must be adhered to. 							

10.5 Bats

The cumulative assessment is combined with the WEF. The potential cumulative impact to bats from the Highlands South Grid connection is expected to be of low significance.

Impact Phase: Cumulative Phase
Impact description: Cumulative Impacts
Cumulative indirect impacts to bats, such as those relating to changes to the physical environment (e.g. roost and habitat destruction) are likely to be low across the cumulative impact regions. Cumulative direct impacts to bats, specifically those related to bat mortality, are likely to be higher.
For non-migratory species cumulative direct impacts could have a medium or high significance before mitigation but could reduce to medium or low with appropriate turbine siting and operational mitigation if determined as being necessary based on operational monitoring. Direct impacts on migratory species (i.e. the Natal long-fingered bat) may be high before mitigation but could also reduce to medium with appropriate

turbine siting and operational mitigation. However, these ratings would be dependent on all other surrounding wind energy facilities also adopting similar mitigation strategies to reduce impacts to bats.

Limited data are available on the actual impacts to bats at the nine operational facilities in the cumulative impact region. In addition, pre-construction monitoring data of bat activity are not a good predictor of the impacts that may be expected at operational wind farms (Hein et al. 2013), limiting their use in understanding and predicting cumulative impacts. Data from one operational wind farm in the cumulative impact region (approximately 130 km south of the proposed Highlands WEFs) which we were able to access suggested that impacts to bats are high. No current information is available to suggest that operational mitigation strategies are being applied at this specific facility. The addition of wind farms in the cumulative impact region may therefore have negative consequences particularly for the north-eastern subpopulation of the migratory Natal long-fingered bat. However, because of a lack of published data on the impact of wind energy facilities on bats in South Africa, and limited baseline data on bat population size and demographics, the confidence in this assessment is low.

	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	H	M	H	Negative	H	M	L
With Mitigation	H	M	L	Negative	M	M	M
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	Yes						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> As this impact is unlikely to occur, no mitigation options are provided. 							
Will this impact contribute to any cumulative impacts?	The cumulative impacts will depend on the number of WEFs in the region, the species involved and the levels of bat mortality. Bats reproduce slowly (Barclay and Harder 2003) and their populations can take long periods of time to recover from disturbances so the cumulative impacts can be high if appropriate management and mitigation is not implemented.						

10.6 Noise

The cumulative impact assessment considers the cumulative effects of the proposed development, and other renewable energy projects within 35 km of the proposed development. Two such other projects have been identified:

- Middleton Wind Energy farm; and
- Pearston Solar Farm.

Each of the above are located more than 20 km from the proposed Development. As such, there is no possibility of cumulative impacts. The cumulative assessment therefore only considers the cumulative effects of the six components of the proposed development.

Impact Phase: Construction Phase							
Impact description: Construction of Tracks and Hardstanding							
2 no. Tracked Excavators							
1 no. Articulated Dump Truck							
1 no. Bulldozer							
1 no. Vibratory Roller							
6 no. Haulage Trucks per hour							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	H

With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> Acoustic enclosures/screens should be used to contain noise-generating/equipment; Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible; Plant and equipment covers and hatches should be properly; Silenced equipment should be used where possible; Plant should be turned off when not in use; Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms; The use of vehicle horns should be limited to emergency use only; Good public relations should be maintained with local residents that may be affected by noise from site operations. 							

Impact Phase: Construction Phase							
Impact description: Excavation and Concreting of Turbine Foundations							
1 no. Tracked Excavator							
1 no. Concrete Mixer Truck with pump and boom arm							
2 no. Poker Vibrators							
1 no. Dump Truck (tipping fill)							
1 no. Roller (rolling fill)							
1 no. concrete Batching Plant							
1 no. Lorry							
6 no. Haulage Trucks per hour							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> Acoustic enclosures/screens should be used to contain noise-generating/equipment; Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible; Plant and equipment covers and hatches should be properly; Silenced equipment should be used where possible; Plant should be turned off when not in use; Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms; The use of vehicle horns should be limited to emergency use only; Good public relations should be maintained with local residents that may be affected by noise from site operations. 							

Impact Phase: Construction Phase
Impact description: Turbine Erection

1 no. Wheeled Mobile Crane 1 no. Mobile Telescopic Crane 1 no. Diesel Generator 2 no. Torque guns 5 no. Haulage Trucks per hour (Turbine Delivery)							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	H	Negative	M	M	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: <ul style="list-style-type: none"> Acoustic enclosures/screens should be used to contain noise-generating/equipment; Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible; Plant and equipment covers and hatches should be properly; Silenced equipment should be used where possible; Plant should be turned off when not in use; Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms; The use of vehicle horns should be limited to emergency use only; Good public relations should be maintained with local residents that may be affected by noise from site operations. 							

Impact Phase: Construction Phase							
Impact description: Generator (Night-time Use)							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	M	Negative	L	L	H
With Mitigation	L	L	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures: <ul style="list-style-type: none"> Acoustic enclosures/screens should be used to contain noise-generating/equipment; Noise-generating plant should be located as far away from the noise sensitive receptors as is feasible; Plant and equipment covers and hatches should be properly; Silenced equipment should be used where possible; Plant should be turned off when not in use; Where practicable, mobile plant should be fitted with broadband, rather than tonal reversing alarms; The use of vehicle horns should be limited to emergency use only; Good public relations should be maintained with local residents that may be affected by noise from site operations. 							

Impact Phase: Operational Phase							
Impact description: Operation – Day							

Wind Turbines, Wind Turbine Auxiliary Plant, Transmission Line and Substation							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	L	Negative	L	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> None required 							

Impact Phase: Operational Phase							
Impact description: Operation – Night							
Wind Turbines, Wind Turbine Auxiliary Plant, Transmission Line and Substation							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	M	Negative	M	M	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> Installation of turbines with lower noise emission than those assumed within this report; and Shutdown of selected turbines at night under relevant wind directions; or Removal of selected turbines from the proposed Development. The removal of Turbines 16 and 17 will reduce impact at receptor 6. 							

10.7 Heritage, Archaeology and Palaeontology

In general heritage information from the area is very limited and the cumulative assessment below is thus based partly on the author's specialist knowledge of the landscape and the likely distribution of heritage resources within it. Only four other projects from within a 35 km radius are known. These are the proposed Middleton Wind Energy Project and three proposed Solar PV projects near Pearston.

It is concluded that the cumulative impact significance of the proposed South WEF is Low. It can be argued that, following effective mitigation, our scientific understanding of the palaeontology of this region of the Eastern Cape could be markedly improved – a positive cumulative impact outcome that would partially offset the inevitable loss of fossils during WEF construction. The confidence for this cumulative impact assessment is *medium*.

Impact Phase: Cumulative Phase							
Impact description: Impacts on archaeological resources							
Archaeological resources may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence

Without Mitigation	L	H	L	Negative	M	M	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No, once archaeological artefacts are disturbed/destroyed the site cannot be recreated.						
Will impact cause irreplaceable loss or resources?	Yes, heritage resources are regarded as unique.						
Can impact be avoided, managed or mitigated?	Yes, it is often easy to realign a section of road if needed but, if this is not possible then archaeological mitigation can be easily effected (there are no identified no-go areas within the present footprint).						
Mitigation measures:							
<ul style="list-style-type: none"> Commission an archaeological walk-through survey to identify sites within final footprint Carry out any archaeological mitigation for sites of cultural significance that cannot be avoided 							

Impact Phase: Cumulative Phase							
Impact description: Impacts on graves Graves may be damaged or destroyed during clearing of the ground or excavation of foundations.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	H	H	Negative	M	L	H
With Mitigation	L	H	L	Negative	L	L	H
Can the impact be reversed?	No, once graves are disturbed/destroyed they cannot be recreated.						
Will impact cause irreplaceable loss or resources?	Yes, every grave is unique.						
Can impact be avoided, managed or mitigated?	Yes, it is often easy to realign a section of road if needed but, if this is not possible then exhumation can be effected (avoidance is strongly preferred).						
Mitigation measures:							
<ul style="list-style-type: none"> Commission an archaeological walk-through survey to identify graves within final footprint Carry out exhumation of graves that cannot be avoided 							

Impact Phase: Cumulative Phase							
Impact description: Impacts to the cultural landscape The cultural landscape would be altered through the addition of a new 'layer' comprising of large wind turbines and related infrastructure.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	M	Negative	M	H	H
With Mitigation	M	M	M	Negative	M	H	H
Can the impact be reversed?	Yes, if the facility is decommissioned and the land rehabilitated then the impacts would cease.						
Will impact cause irreplaceable loss or resources?	No, because there are many other areas with very similar cultural landscape character.						
Can impact be avoided, managed or mitigated?	No, it is not possible to avoid the impacts. However, mitigation measures can very slightly reduce the severity of impacts.						
Mitigation measures:							

- Minimise cut and fill operations
- Minimise unnecessary surface disturbance
- Ensure effective rehabilitation of the development area after construction and again after decommissioning
- Further measures would be as described by the visual assessment practitioner.

10.8 Visual

The development of the proposed Highlands WEFs, when seen together with the existing wind farms and power lines in the vicinity, would result in cumulative visual impacts resulting in further change to the largely rural character to the area.

Besides the proposed Highlands WEFs, there are existing Eskom powerlines parallel with the R63 Route, an approved solar PV farm near Pearston and a proposed Middleton wind farm south of Cookhouse on the N10 National Route, both within 35 kilometres of the Highlands site.

The Environmental Impact Report (EIR) for the Solar PV Farm near Pearston indicated that the visual impact would be moderate both before and after mitigation, (CEN, 2012). No specialist visual assessment was included in the EIR and no negative cumulative impacts were identified. Except for the brief Scoping Report, no further information could be found on the proposed Middleton Wind Energy Facility, including specialist visual studies.

The fact that the proposed Highlands WEFs fall within the gazetted Cookhouse REDZ means that it would form part of a renewable energy node.

Given that the renewable energy projects mentioned above are not within viewing distance of each other and that they form part of REDZ, the cumulative visual impact significance is considered to be low in the local context.

10.9 Social

Impact Phase: Operational Phase							
Impact description: Cumulative visual impact associated with the establishment of a WEF on the areas rural sense of place and character of the landscape							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	M	L	Negative	L	M	M
With Mitigation	M	M	L	Negative	L	M	M
Can the impact be reversed?		Yes, by removing turbines.					
Will impact cause irreplaceable loss or resources?		No					
Can impact be avoided, managed or mitigated?		Yes					
Mitigation measures:							
<ul style="list-style-type: none"> • The recommendations contained in the VIA should be implemented. 							

Impact Phase: Operational Phase							
Impact description: Cumulative impact associated with the establishment of a number of renewable energy facilities that has the potential to place pressure on local services, specifically medical, education and accommodation							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	L	L	Negative	L	L	H

With Mitigation	M	L	L	Negative	L	L	H
Can the impact be reversed?	Yes, by implementing effective mitigation.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The Eastern Cape Provincial Government, in consultation with the SBDM and BCRLM and the proponents involved in the development renewable energy projects in the SBDM and BCRLM area should consider establishing a Development Forum to co-ordinate and manage the development and operation of renewable energy projects in the area, with the specific aim of mitigating potential negative impacts and enhancing opportunities. This would include identifying key needs, including capacity of existing services, accommodation and housing and the implementation of an accredited training and skills development programmes aimed at maximising the opportunities for local workers to be employed during the construction and operational phases of the various proposed projects. These issues should be addressed in the Integrated Development Planning process undertaken by the SBDM and BCRLM. 							

Impact Phase: Operational Phase							
Impact description: Cumulative impact associated with the establishment of a number of renewable energy facilities in the region that will create employment, skills development and training opportunities, creation of downstream business opportunities.							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	M	H	M	Positive	M	L	H
With Mitigation	M	H	M	Positive	H	M	H
Can the impact be reversed?	Yes, by not implementing the project.						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	Yes						
Mitigation measures:							
<ul style="list-style-type: none"> The proposed establishment of suitably sited renewable energy facilities within the SBDM and BCRLM should be supported. 							

10.10 Traffic and Transportation

The 140 MW power project in Middleton (approximately 35 km from Highlands WEF) is still in process and possibly that construction could coincide with the Highlands South WEF Grid Connection construction.

It is estimated that the Middleton (wind energy) project would generate on average around 41 trips to site per day assuming the project is built in just under a year. It is estimated that this would include 3 to 4 abnormal vehicle trips (from Ngqura Port) to site per day for 87 days. Apart from a few ISO truck container deliveries, other vehicle trips are more local in nature.

The 5 solar PV applications in Pearston area, totalling 230 MW, are expected to generate some 10 heavy vehicle trips to site per day (from Port Elizabeth or Koega) and some 6 buses and some 80 light vehicle trips (mostly staff and workes arriving in the AM and departing in the PM, from nearby towns such as Pearston and Somerset East).

As a worst case scenario it is assumed that all these developments could coincide with the Highlands South WEF Grid Connection trips to site, along the N2 and N10.

Impact Phase: Cumulative Phase							
Impact description: Negligible Impacts							
	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Without Mitigation	L	L	L	Negative	L	L	M
With Mitigation	n/a	n/a	n/a	Negative	n/a	n/a	n/a
Can the impact be reversed?	Yes						
Will impact cause irreplaceable loss or resources?	No						
Can impact be avoided, managed or mitigated?	No						
Mitigation measures:							
<ul style="list-style-type: none"> Cumulative Impacts are negligible. No mitigation measures are required. 							

11 SUMMARY OF FINDINGS

This BAR has provided a description of the proposed Highlands South Wind Energy Facility Grid Connection. It has also discussed the need and desirability of the proposed project. The environmental legislation and planning contexts for the proposed Grid Connection has been documented, including the proposed site's baseline environment. Specialist investigations and detailed assessments have been conducted for the following areas of study:

- Geology, soils and agriculture;
- Freshwater and wetlands;
- Flora and terrestrial fauna;
- Avifauna;
- Bats;
- Noise;
- Cultural Heritage, Archaeology and Palaeontology;
- Visual.
- Social; and
- Traffic and Transport;

The above studies assessed the potential impacts of the proposed development. A summary of the potential impacts is included in the table below.

Table 11.1 Summary of Grid Connection Alternatives Impacts

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Geology, Soils and Agricultural Potential Impact							
Grid Alternative 1 and 2							
Construction and Decommissioning Phase							
Soil degradation	L	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Cumulative Phase							

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Regional loss of agricultural land use	L	M	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Wetlands and freshwater							
Grid Alternative 1 and 2							
Increase in sedimentation and erosion	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Impact on localized surface water quality	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Cumulative Phase							
Cumulative Impact	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Terrestrial Ecological Impacts							
Grid Alternative 1 and 2							
Construction Phase							
Vegetation and listed plant species	L	H	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Faunal Impacts	L	L	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Operational Phase							
Soil Erosion	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Alien plant invasion	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Decommissioning Phase							

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Faunal impacts	L	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Soil erosion	L	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Alien plant invasion	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Avifauna							
Grid Alternative 1 and 2							
Construction Phase							
Destruction of habitat used by birds (Alternative 1)	M	M	M	Negative	M	H	M
<i>With Mitigation (Alternative 1)</i>	<i>L</i>	<i>L</i>	<i>M</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Disturbance / Displacement	M	M	M	Negative	M	H	M
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Operational Phase							
Bird mortality from power line collision	H	M	H	Negative	H	H	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>H</i>	<i>Negative</i>	<i>M</i>	<i>M</i>	<i>M</i>
Bird mortality from electrocution	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Disturbance / Displacement	M	M	M	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Decommissioning Phase							
Disturbance / Displacement	M	M	M	Negative	M	H	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Cumulative Phase							
Cumulative impact	H	M	H	Negative	H	M	M
<i>With Mitigation</i>	<i>H</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	<i>M</i>	<i>L</i>	<i>M</i>
Bats							
Grid Alternative 1 and 2							
Construction Phase							
Roost disturbance	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Roost destruction	L	H	L	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Habitat Modification	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Operational Phase							
Collision with transmission lines	L	M	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>VERY L</i>	<i>L</i>	<i>M</i>
Cumulative Phase							
Cumulative impact	H	M	H	Negative	H	M	L
<i>With Mitigation</i>	H	M	L	<i>Negative</i>	M	M	M
Heritage and Archaeology							
Grid Alternative 1 and 2							
Impacts on archaeological resources	L	H	L	Negative	L	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Impacts on graves (Alternative 1)	L	H	H	Negative	M	L	H
<i>With Mitigation (Alternative 1)</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Impacts on graves (Alternative 2)	L	H	H	Negative	M	L	H
<i>With Mitigation (Alternative 2)</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	<i>M</i>	<i>L</i>	<i>H</i>
Impacts to the cultural landscape	L	M	L	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	<i>M</i>	<i>H</i>	<i>H</i>
Cumulative Phase							
Impacts on archaeological resources	L	H	L	Negative	M	M	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Impacts on graves	L	H	H	Negative	M	L	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>H</i>
Impacts to the cultural landscape	M	M	M	Negative	M	H	H
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>Negative</i>	<i>M</i>	<i>H</i>	<i>H</i>
Palaeontology							
Grid Alternative 1 and 2							
Impacts to palaeontological resources	L	H	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Visual							
Grid Alternative 1 and 2							
Rural sense of place.- Construction	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Rural sense of place.- Operational	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>Negative</i>	<i>M</i>	<i>H</i>	<i>H</i>

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Rural sense of place.- Decommission	L	H	M	Negative	M	H	H
With Mitigation	L	L	L	Neutral	L	L	M
Social							
Grid Alternative 1 and 2							
Construction Phase							
Employment and business opportunities	M	L	M	Positive	M	M	H
<i>With Mitigation</i>	<i>H</i>	<i>L</i>	<i>H</i>	<i>Positive</i>	M	<i>H</i>	<i>H</i>
Presence of construction workers	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Influx of job-seekers	M	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Risks to livestock and farming infrastructure	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Risk of grass fires	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Noise, dust, waste and safety impacts	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Establishment of access roads and the construction camp	M	L	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Operational Phase							

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Employment and business opportunities	M	M	L	Positive	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>Positive</i>	M	<i>H</i>	<i>H</i>
Powerline pylons on the rural landscape	L	H	M	Negative	M	H	H
<i>With Mitigation</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>Negative</i>	M	<i>H</i>	<i>H</i>
Decommissioning Phase							
Loss of jobs and associated income	M	M	M	Negative	M	M	H
<i>With Mitigation</i>	<i>M</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>H</i>
Cumulative Phase							
Visual Impact	M	M	L	Negative	L	M	M
<i>With Mitigation</i>	<i>M</i>	<i>M</i>	<i>L</i>	<i>Negative</i>	L	<i>M</i>	<i>M</i>
Employment opportunities	M	H	M	Positive	M	L	H
<i>With Mitigation</i>	<i>M</i>	<i>H</i>	<i>M</i>	<i>Positive</i>	H	<i>M</i>	<i>H</i>
Traffic							
Grid Alternative 1 and 2							
Construction Phase							
Vehicle Worker Crashes	L	L	H	Negative	M	L	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Minor road degradation	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Minor road dust	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	L	<i>L</i>	<i>M</i>
Intersection safety	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>H</i>	<i>Negative</i>	M	<i>L</i>	<i>M</i>

All Phases	Extent	Duration	Intensity	Status	Significance	Probability	Confidence
Operational Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>Negative</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
Decommissioning Phase							
Minor road degradation	L	L	M	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Minor road dust	L	L	H	Negative	M	M	M
<i>With Mitigation</i>	<i>L</i>	<i>L</i>	<i>L</i>	<i>Negative</i>	<i>L</i>	<i>L</i>	<i>M</i>
Cumulative Phase							
Negligible Impacts	L	L	L	Negative	L	L	M
<i>With Mitigation</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>Negative</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>

12 IMPACT STATEMENT

All specialist studies have indicated that either of the alternatives proposed for the development grid connection from the proposed Highlands South WEF to the existing Eskom Transmission line would be acceptable from an environmental perspective (Figure 12.1).

The location of the project site lies within the Cookhouse Renewable Energy Development Zone (REDZ), which are areas which the Council of Scientific and Industrial Research (CSIR) has identified as geographical areas best suited for the roll-out of wind energy projects in South Africa. The identified areas are part of the strategic environmental assessment (SEA) that the CSIR conducted for wind and solar energy, on behalf of the national Department of Environmental Affairs (DEA). No environmental fatal flaws have been identified, and should all the recommended mitigation measures be implemented by the applicant, it is anticipated that, overall, impacts would be of low negative significance (biophysical impacts) or of medium positive significance (social upliftment). With reference to the information provided at this stage of the project cycle, the confidence in the assessment is regarded as acceptable.

Consideration must be given to the fact that this proposal is dependent on the approval and construction of the proposed Highlands South WEF (separate application), and should the latter not be approved, the likelihood of this proposal for the Highlands South Grid Connection being implemented is low. The reason for the separation of the project components in terms of the application process rests with the fact that the Environmental Authorisation for the proposed grid connection may become the property of Eskom, and operation and maintenance thereof would not be controlled by the applicant.

Taking into consideration the findings of the BA process for the proposed project and the fact that recommended mitigation measures have been used to inform the project layout design, it is the opinion of the Environmental Assessment Practitioner (EAP) that the

majority of negative impacts associated with the implementation of the proposed project have been mitigated to acceptable levels. While the residual impacts of the project will have an impact on the local environment the extent of the benefits associated with the implementation of the projects will benefit a much larger group of people, in terms of renewable energy supply and positive local and regional economic impact.

Overall, it is recommended that the Highlands South Grid Connection be supported, subject to the implementation of the recommended mitigation measures and management actions contained in the specialist reports.

12.1 Conditions to be included in the EA

All recommendations and proposed mitigation measures detailed in the specialists report (Volume II) and EMPr (Appendix C) must be implemented and adhered to.

12.1.1 Agriculture and Soils

No additional conditions.

12.1.2 Ecology

No additional conditions.

12.1.3 Freshwater and Wetlands

Vegetation clearing should occur in a phased manner in accordance with the construction programme to minimise erosion and/or run-off.

All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be more than 32 m from any demarcated water courses, unless agreed otherwise with the Environmental Control Officer (ECO).

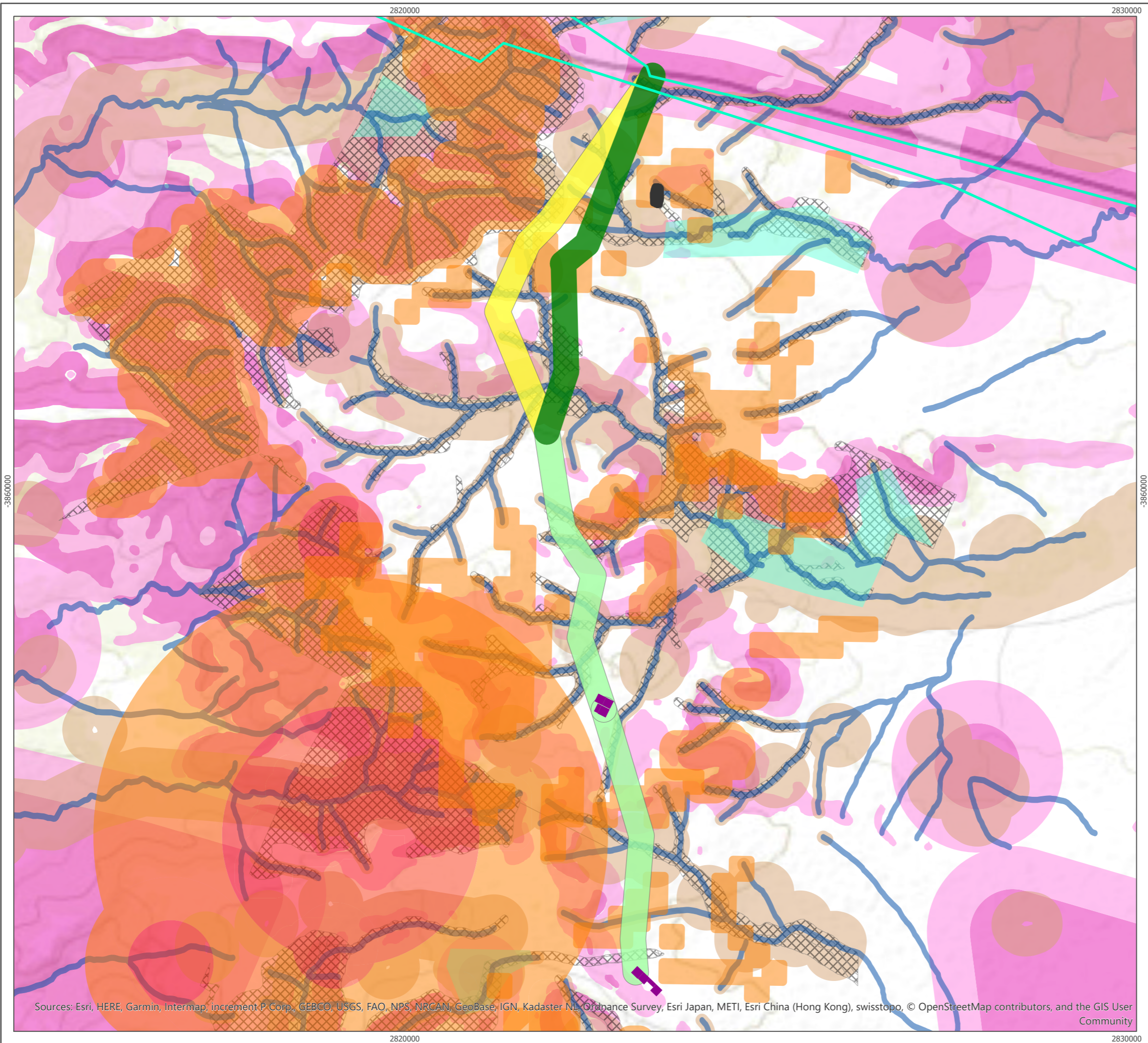
An ECO, with a good understanding of the local flora must be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas, using selected species detailed in this report.

All alien plant re-growth must be monitored, and should it occur these plants should be eradicated.

It is further recommended that a comprehensive rehabilitation plan be implemented from the project onset within areas of disturbance (inclusion of buffers) to ensure a net benefit to the aquatic environment. This should form part of the suggested walk down as part of the final EMPr preparation. The walkdown is required as the final cut/fill and embankments for roads and other structures could not be provided at this point, thus it would be important to evaluate in terms of the aquatic environment and evaluate the need for a Water Use License / GA for these areas.

12.1.4 Avifauna

Prior to construction, the avifaunal specialist should conduct a site walkthrough covering the final road and power line routes to identify any nests/breeding activity of sensitive species, as well as any additional sensitive habitats within which construction activities may need to be excluded (or timed to be outside of an applicable breeding season).



- Existing Eskom High Voltage Transmission Line
- Substation C1&C2, O&M Buildings and Laydown Areas
- South Grid Alternative 1
- South Grid Alternative 2
- South Grid Alternative 1&2
- Palaeontology Buffer
- Highlands Watercourse crossings 32m buffer
- High Heritage Sensitivity
- High Ecological Sensitivity
- High Bat Sensitivity (No turbines, other infrastructure is permitted)
- Visual No-Go area
- Visual High Sensitivity
- Avifaunal Sensitivity**
- No Go Nest Buffer
- High Sensitivity (No Turbines, but other infrastructure is permitted)



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Environmental Sensitivity
Figure 12.1

Highlands South Grid
Basic Assessment Report

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

During the site walkthrough the specialist must determine the power line spans of the grid connection route that will require marking devices [Bird Flight Diverters (BFDs)] to increase visibility.

Install bird flight diverters as per the instructions of the specialist which may include the need for modified BFDs fitted with solar powered LED lights on certain spans.

12.1.5 Bats

No additional conditions.

12.1.6 Noise

No additional conditions.

12.1.7 Visual

Ensure that visual management measures are included as part of the EMP, monitored by an Environmental Control Officer (ECO), including siting of the construction camp and stockpiles, dust suppression and litter control measures, as well as rehabilitation of borrow pits and haul roads, with monthly reporting to an environmental management team.

Ensure that visual mitigation measures are monitored by management on an on-going basis, including the maintenance of rehabilitated areas, control of signage, lighting and wastes on the site, with interim inspections by the ECO.

12.1.8 Heritage, Archaeology and Palaeontology

- A final walk-down survey of the authorised footprints should be carried out at least 6 months before the start of construction in order for any archaeological mitigation requirements to be determined and carried out;
- If any archaeological material or human burials are uncovered during the course of development then work in the immediate area should be halted. The find would need to be reported to the heritage authorities and may require inspection by an archaeologist. Such heritage is the property of the state and may require excavation and curation in an approved institution.

12.1.9 Social

No additional conditions.

12.1.10 Traffic and Transportation

No additional conditions.

APPENDIX A: EAP CV & DECLARATION OF INDEPENDENCE

APPENDIX B: ENVIRONMENTAL MANAGEMENT PROGRAMME