ARCUS

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VOLUME I

DRAFT SCOPING REPORT

PROPOSED LOXTON WIND ENERGY FACILITY 3, NEAR LOXTON IN THE NORTHERN CAPE PROVINCE

On behalf of

LOXTON WIND FACILITY 3 (PTY) LTD

NOVEMBER 2022

DRAFT FOR PUBLIC COMMENT

Prepared By:

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PROJECT DETAILS

DFFE Reference	To be confirmed upon submission of application		
Arcus Reference	Loxton WEF Cluster and Associated Infrastructure		
Project Title	Scoping Report for the Proposed Loxton Wind Energy Facility 3, Northern Cape Province.		
EAP	Ashlin Bodasing	Arcus Consultancy Services South Africa (Pty) Ltd (ERM)	
Consultant	Aneesah Alwie	Arcus Consultancy Services South Africa (Pty) Ltd (ERM)	
Consultant	Tebogo Mapinga	Environmental Resources Management (ERM)	
Specialist Team	**Specialist**	**Specialist Study**	**Organisation**
	Soil, Land Use and Agricultural Potential	Johann Lanz	Independent Consultant
	Freshwater and Wetlands	Dr Brian Colloty	EnviroSci. Pty Ltd
	Terrestrial Ecology (Flora and Fauna)	Simon Todd	3 Foxes Biodiversity Solutions
	Avifauna	Jon Smallie	WildSkies Ecological Services
	Bats	Jonathan Aronson	Camissa Sustainability Consulting
	Visual / Landscape	Quinton Lawson and Bernard Oberholzer	Qarc and BOLA
	Heritage and Archaeology	Jayson Orton	ASHA Consulting
	Palaeontology	Dr John Almond	Natura Viva
	Noise	Morné de Jager	Enviro Acoustic Research
	Socio-Economic	Tony Barbour	Independent Consultant
	Traffic and Transportation	Athol Swartz	Independent Consultant
Project Applicant	Loxton Wind Facility 3 (Pty) Ltd		
Report Status	SCOPING REPORT – DRAFT FOR PUBLIC COMMENT		

PUBLIC PARTICIPATION DETAILS

The Draft Scoping Report, with the required application form, has been submitted to the Department of Forestry, Fisheries and the Environment (DFFE), acting as the Competent Authority (CA).

Members of the public, local communities, and stakeholders are invited to comment on the Draft Scoping Report available for public review and comment from the **14 November 2022 until the 14 December 2022 (both days inclusive)**, at the following locations.

Location	**Physical Address**
Hard Copy Location	
Loxton Public Library *Located within the Ubuntu Local Municipality Offices, Loxton*	Magrieta Prinsloo St, Loxton, 8405
CD copies will be made available upon request.	
Electronic Copy Locations	
Arcus Website	https://arcusconsulting.co.za/projects/
Electronic Transfer	I&APs can request for copies to be shared via a One Drive folder.
Comment Submission	
Company	Arcus Consultancy Services South Africa (Pty) Ltd
Via Email	LoxtonWEF@arcusconsulting.co.za
Online Portal	https://loxtonwef.aidaform.com/stakeholder-engagement
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ABBREVIATIONS, ACRONYMS AND UNITS

BAR	Basic Assessment Report
BESS	Battery Energy Storage System
CA	Competent Authority
CARA	Conservation of Agricultural Resources, 1983 (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
dB	Decibel
DFFE	Department of Forestry, Fisheries and the Environment (National)
DMRE	Department of Mineral Resources and Energy
DoE	Department of Energy
DHSWS	Department of Human Settlement, Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act, 1989 No. 73 of 1989)
EGI	Electricity Grid Infrastructure
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
ESA	Ecological Support Area
ESA	Early Stone Age
ESKOM	Eskom Holdings SOC Limited
EWT	Endangered Wildlife Trust
GNR	Government Notice Regulation
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
IRP	Integrated Resource Plan
kV	Kilovolt
kWh	Kilowatt Hours
LSA	Late Stone Age
MSA	Middle Stone Age
MW	Megawatt
NCR	Noise Control Regulations
NDP	National Development Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Area
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NPAES	National Protected Area Expansion Strategy
NSD	Noise-sensitive Development
NWA	National Water Act, 1998 (Act No. 36 of 1998)
OES	Ostrich Eggshell
PES	Present Ecological State
PGDS	Provincial Growth and Development Strategy
PPA	Power Purchase Agreement
PPP	Public Participation Process
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RMPPP	Risk Mitigation Power Procurement Programme
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SANS	South African National Standards
SAWS	South African Weather Service
SCADA	Supervisory Control and Data Acquisition
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SIA	Social Impact Assessment
SR	Scoping Report
SPV	Special Purpose Vehicle
WEF	Wind Energy Facility
WULA	Water Use License Application

EXECUTIVE SUMMARY

Loxton Wind Facility 3 (Pty) Ltd ('the Project Applicant') is applying for environmental authorisation to construct and operate the up to 240 MW Loxton Wind Energy Facility (WEF) 3 and its associated on-site substation and battery energy storage system ('the proposed development'). Arcus Consultancy Services South Africa (Pty) Ltd ('Arcus') has been appointed by Loxton Wind Facility 3 (Pty) Ltd to act as the independent environmental impact assessment practitioner (EAP) to undertake the Scoping and Environmental Impact Assessment (S&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.

SITE LOCATION AND PROPOSED DEVELOPMENT DESCRIPTION

The proposed Loxton WEF 3 is located approximately 15 km East of Loxton within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province.

The Loxton WEF 3 project site is proposed to accommodate the following infrastructure, which will enable the wind farm to supply a contracted capacity of up to 240 MW:

- Up to 41 wind turbines with a maximum hub height of up to 200 m and a rotor diameter of up to 200 m;
- A transformer at the base of each turbine;
- Concrete turbine foundations with a permanent footprint of approximately 6 ha;
- Each turbine will have a crane hardstand of 70 m x 45 m. The permanent footprint for turbine hardstands will be up to approximately 13 ha.
- Each turbine will have a temporary blade hardstand of 80 m x 45 m. The temporary footprint for blade hardstands will be up to approximately 15 ha.
- Temporary laydown areas (with a combined footprint of up to 25 ha) which will accommodate the boom erection, storage and assembly area;
- Battery Energy Storage System (with a footprint of up to approximately 5 ha);
- Cabling between the turbines, to be laid underground where practical;
- One on-site substations of up to 2 ha in extent to facilitate the connection between the wind farm and the electricity grid;
- Construction period laydown areas (temporary) up to 6 ha;
- Access roads to the site and between project components inclusive of stormwater infrastructure. A 12 m road corridor may be temporarily impacted upon during construction and rehabilitated to 6m wide after construction. The WEF will have a total road network of up to 50 km;
- A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha); and
- Operation and Maintenance buildings (with a combined footprint of up to 2 ha) including a gate house, security building, control centre, offices, warehouses, a workshop and visitor's centre.

The project is expected to have a 25-year life span, but with possible refurbishment this could be extended if deemed feasible at the time.

ENVIRONMENTAL LEGISLATIVE REQUIREMENTS

The EIA Regulations 2014 published in Government Notice (GN) No. R. 982 as amended provide for the control of certain Listed Activities. These activities are listed in GN No. R. 983 (Listing Notice 1 - Basic Assessment), R. 984 (Listing Notice 2 - Scoping & EIA Process) and R. 985 (Listing Notice 3 - Basic Assessment) of 4 December and are prohibited to proceed until environmental authorisation has been obtained from the competent authority, in this case, the Department of Environment, Forestry and Fisheries (DFFE).

On 7 April 2017 in Government Gazette 40772 the Minister of Environmental Affairs published amendments in Government Notice (GN) Number R. 326 to the Environmental Impact Assessment (EIA) Regulations of 2014 that provide for the control of certain Listed Activities. These activities are listed in Listing Notice 1 (GN R327), Listing Notice 2 (GN R325) and Listing Notice 3 (GN R324). Activities triggered within Listing Notice 1 and 3 require Basic Assessment; activities within Listing Notice 2 require a Scoping & EIA Process.

As the proposed Loxton WEF 3 and associated infrastructure triggers Activities in Listing Notices 1 - 3, and does not fall within a Renewable Energy Development Zone (REDZ), a full Scoping and EIA (S&EIA) process will be followed.

Listed Activities applicable to the proposed Loxton WEF 3 and associated infrastructure are presented in the table below. All potential impacts associated with these Listed Activities will be considered and assessed in this S&EIA process.

Applicable Listed Activities in terms of the NEMA, as amended

Listing Notice	Activities
LN 1 GN R327[1]	11(i); 12 (ii, a, c); 19 (i); 24 (ii); 28 (ii); 48 (a, c); and 56 (i)(ii).
LN 2 GN R325[2]	1; and 15.
LN 3 GN R324[3]	4 (g)(ii)(ee); 12(g)(ii); 14(ii, a, b, c)(g)(ii)(ff); 18(g)(ii) (bb)(ee); 23 (ii, a, c)(g)(ii)(ee)

Depending on the final design of the Loxton WEF 3 and associated infrastructure, there may be a requirement for the following additional permits / authorisations:

- Biodiversity Permits in terms of the National Environmental Management: Biodiversity Act (Act No 10 of 2004) (NEMBA);
- Waste Management License/s as required by the NEMA, Waste Act, 2008 (Act No. 59 of 2008);
- Water Use Licenses as required by the National Water Act, 1998 (Act No. 36 of 1998) (NWA); and
- Heritage License in term of the National Heritage Resources Act 25 of 1999.

Areas of Initial Investigation

A number of initial specialist investigations were completed for this Draft Scoping Report and their findings are included in this document.

Each of the specialist assessments will follow a systematic approach to the identification and 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.
- The individual assessment methodologies and baseline descriptions are set out in this report. The approaches are in line with the legal requirements and industry

[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 2 of the EIA Regulations, promulgated under Government Notice R984 of 4 December 2014, as amended by Government Notice R325 of 7 April 2017."
[3] "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."

best practice guidelines and makes use of the experience and expertise of the EAP and the specialists.

NEED AND DESIRABILITY

Spatial framework and strategic planning / policy documents that are the most relevant on a national, provincial, metropolitan and local level were reviewed as part of this study. Planning policies are discussed in Section 3 of the Draft Scoping Report (DSR) (this report – Volume I) and in detail in the Specialist Scoping Reports (Volume II).

It is established that policy supports the development of renewable energy at all levels of governance. The intent of local, provincial and national policies is to address energy supply issues and aim to promote economic growth in South Africa.

The EIA Regulations, 2014, as amended, state that the objective of the scoping process includes to, through a consultative process, motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location.

The Guideline for Need and Desirability released by the DFFE in 2017 was used to assess the need and desirability of the proposed Loxton WEF 3. According to the DFFE guideline[4]: "*Need and desirability is based on the principle of sustainability, set out in the Constitution and in NEMA, and provided for in various policies and plans, including the National Development Plan 2030 (NDP). Addressing the need and desirability of a development is a way of ensuring sustainable development – in other words, that a development is ecologically sustainable and socially and economically justifiable – and ensuring the simultaneous achievement of the triple bottom-line.*"

Section 7 of this report describes need and desirability for this development in detail, and provides an explanation as to why wind energy can be considered as an alternative to meeting the need for increased electricity demand over other sources of generation such as fossil fuels. Summarily, these reasons include:

- Positive impact on climate change;
- Overcoming the country's energy constraints;
- Diversification and decentralisation of supply;
- Reduced costs of energy; and
- Positive economic development including job creation.

It is the intention of the Project Developer to bid the Loxton WEF 3 in the seventh bidding window of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) with the aim of evacuating the generated power from the WEF into the National Eskom Grid. This will aid in the diversification and stabilisation of the country's electricity supply in line with the objectives of the Integrated Resource Plan (IRP).

ALTERNATIVES

The Applicant identified the Loxton Wind Facility 3 after conducting a series of pre-feasibility assessments by considering aspects such as potential wind speed, proximity to the grid connection point, available land, site access and very suitable topography. The proposed developable area (the proposed development site) was refined based on these initial feasibility assessments and taking into consideration preconstruction avifaunal and bat monitoring results.

[4] https://www.dffe.gov.za/sites/default/files/legislations/needanddesirabilityguideline2017_0.pdf

ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

The EIA process is a decision-making tool with the specific aim of selecting an option that will provide an appropriate balance between the benefits of a proposed development and the potential adverse environmental impacts. The EIA process is designed to identify activities which may have a detrimental effect on the environment, and proposed mitigation measures to minimise or eliminate these potential impacts. Should this balance be achieved, the competent authority will issue an environmental authorisation, with conditions, for the development to proceed.

Scoping Phase

The first phase of the EIA process is Scoping. The purpose of the scoping phase is to, through consultation with Interested and Affected Parties (I&APs), determine the extent of the impact assessment, including the potential impacts and issues that must be assessed during the EIA phase. The scoping phase also assesses each alternative (design, technology, location, etc.) of the development, against these potential impacts, to determine the best environmental option for the site to be further assessed during the EIA phase. The scoping phase also determines the methodology and terms of reference for specialist's studies to be undertaken for the proposed development.

This Draft Scoping Report (DSR) describes the proposed development and includes an assessment of its alternatives. The report documents legal, planning and policy context for the proposed development as a renewable energy development. The baseline environment is described, potential impacts are predicted (and initially assessed). It documents the Scoping Phase PPP, noting key stakeholders and it describes the EIA Phase assessment methodologies in the Plan of Study for EIA (PSEIA).

Environmental surveys, on site and desktop based assessments were initiated and where possible, this survey information is included in the DSR. The DSR will be made available for public comment for the prescribed statutory consultation period of 30 days. All comments received in response to the DSR will be tabled and responded to in a Comments and Responses Reports which will be addressed and submitted with the Final Scoping Report (FSR) and PSEIA to the DFFE, as the competent authority for approval to mark the end of the Scoping phase.

EIA Phase

Once the FSR is accepted by the DFFE, the EAP will compile the Draft EIA Report (DEIAr) and Environmental Management Programme (EMPr) which will be made available for public comment for a further period of 30 days. All comments will be considered and incorporated into the Final EIA Report (FEIAR).

The reports will document the assessment of all potential impacts of the proposed development on the existing baseline environment. This will include an assessment of cumulative impacts between the proposed development, and other developments in the area.

Once the FEIAR has been submitted to the DFFE, the DFFE will then issue a decision on whether to grant or refuse Environmental Authorisation.

SUMMARY OF FINDINGS

The Draft Scoping Report has captured the key and/or scoped issues and impacts for this proposed development by taking into account the findings of the public participation process as well as the specialists' study reports.

The specialist reports document anticipated environmental impacts that may be experienced within both the biophysical and social environments. The impacts have been

preliminarily assessed, as required by the NEMA 2014 EIA Regulations as amended. All specialist reports are included in Volume II of this report.

DFFE: INFORMATION REQUIREMENTS FOR WEF APPLICATIONS

The Department of Forestry, Fisheries and Environment's requirements for information for all applications for Wind Energy Facilities (WEFs) are 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. Should the information not be available at this stage of the environmental authorisation process (Scoping phase), it is specified that it shall be documented during the EIA phase.

Table 0-1: Details of the Affected Farm Properties and SG 21 Codes

Farm Name	Portion Number	Farm Number	SG 21 Codes
Farm Erasmuskraal		273	C08000000000027300000
Farm Erasmuskraal	The Remaining Extent of Portion 0	269	C08000000000026900000
Farm Yzervarkspoort	Remaining Extent	139	C08000000000013900000
Farm Yzervarkspoort	1	139	C08000000000013900001
Farm 262	Remaining Extent	262	C08000000000026200000

Table 0-2: General Site Information

Component	Description/Dimensions
Copies of deeds of all affected farm portions	Submitted with the Application Form to the DFFE.
Location of the site	Approximately 15 km east of Loxton within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality.
Facility Area	Approximately 65 hectares. This is the permanent development footprint
Photos of areas that give a visual perspective of all parts of the site	Included in the Visual Scoping Report (Volume II)
Photographs from sensitive visual receptors (tourism routes, tourism facilities, etc.)	Included in the Visual Scoping Report (Volume II)

Table 0-2: WEF Technical Details

Component	Description/Dimensions
Maximum Generation Capacity	Up to 240 MW
Type of technology	Onshore Wind
Number of Turbines	Up to 41
WTG Hub Height from ground level	Up to 200 m
Blade Length	Up to 100 m
Rotor Diameter	Up to 200 m
Area occupied by both permanent and construction laydown areas	• Concrete turbine foundations with a permanent footprint 6 ha; • Each turbine will have a crane hardstand of 70 m x 45 m. The permanent footprint for turbine hardstands will be up to 13 ha. • Each turbine will have a temporary blade hardstand of 80 m x 45 m. The temporary footprint for blade hardstands will be up to 15 ha. • Temporary laydown areas (with a combined footprint of up to 25 ha) which will accommodate the boom erection, storage and assembly area; and

	• A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha).
Operations and maintenance buildings (O&M building) with parking area	Up to 2 ha including a gate house, security building, control centre, offices, warehouses, a workshop and visitor's centre.
Site Access	Access roads to the site and between project components inclusive of stormwater infrastructure. A 12 m road corridor may be temporarily impacted upon during construction and rehabilitated to 6 m wide after construction. The WEF will have a total road network of up to 50 km.
Area occupied by inverter transformer stations/substations	Up to 2 ha
Capacity of on-site substation	132 kV
Battery Energy Storage System footprint	Footprint of up to 5 ha
BESS MWh	The BESS will comprise of a selection of electrochemical batteries together with chargers, inverters, and related equipment. The BESS will have a maximum height of 8 m (as recommended) and have a capacity of 1000 MWh.
Length of internal roads	Up to 50 km
Width of internal roads	6 - 12 m including road reserve.
Proximity to grid connection	~ 50 – 100 km, depending on the preferred alternative route.
Internal Cabling	Electrical cabling between the turbines, to be laid underground where practical
Height of fencing	Up to 3.5 m
Type of fencing	Galvanized Palisade fencing or similar
Facility Area	Approximately 65 hectares. This is the permanent development footprint

Table 0-3: 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: Site Geographical Co-ordinates Map
The exact site of the application must be indicated (the areas that will be occupied by the application).	Figure 2: Site Locality Map
A *status quo* map/layer must be provided that includes the following: Current use of land on the site including:	
Buildings and other structures	To be produced during EIA phase
Agricultural fields	To be produced during EIA phase
Grazing areas	To be produced during EIA phase
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	Figure 6: Preliminary Environmental Constraints Map
Critically endangered and endangered vegetation areas that occur on the site	Figure 6: Preliminary Environmental Constraints Map
Bare areas which may be susceptible to soil erosion	To be produced during EIA phase
Cultural historical sites and elements	To be produced during EIA phase
Rivers, streams and water courses	Figure 6: Preliminary Environmental Constraints Map
Ridgelines and 20 m continuous contours with height references in the GIS database	To be produced during EIA phase
Fountains, boreholes, dams (in-stream as well as off-stream) and reservoirs	To be produced during EIA phase

High potential agricultural areas as defined by the Department of Agriculture, Forestry and Fisheries	No high potential agricultural areas have been identified by the specialist.
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 6: Preliminary Environmental Constraints Map
Indicate isolated residential, tourism facilities on or within 1 km of the site	To be produced during EIA phase
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)	To be produced during EIA phase
A map/layer that indicate locations of birds and bats including roosting and foraging areas	Figure 6: Preliminary Environmental Constraints Map
A site development proposal map(s)/layer(s) that indicate: • Turbine positions • Foundation footprint • Permanent laydown area footprint • Construction period laydown footprint • 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).	Figure 3: Site Development Plan
River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used.	To be produced during EIA phase
Substation(s) and/or transformer(s) sites including their entire footprint.	Figure 3: Site Development Plan
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).	To be produced during EIA phase
Cut and fill areas at turbine sites along roads and at substation/transformer sites indicating the expected volume of each cut and fill	To be produced during EIA phase
Borrow pits	To be produced during EIA phase
Spoil heaps (temporary for topsoil and subsoil and permanently for excess material) Buildings including accommodation	To be produced during EIA phase

Table 0-5: Development Area Geographic Coordinates- Loxton WEF 3

Proposed Loxton WEF 3 Site Boundary and Associated Infrastructure		
Aspect	Latitude	Longitude
North West Corner	31° 25'54.62" S	022° 27'44.40" E
South West Corner	31° 30'45.17" S	022° 26'11.79" E
South East Corner	31° 29'36.20" S	022° 34'32.29" E
North East Corner	31° 25'29.94" S	022° 33'45.83" E
Substation (Alternative 1)		

Centre Point	31°27'5.06"S	22°31'28.36"E
Construction Camp (Alternative 2)		
Centre Point	31°27'56.35"S	22°30'55.15"E
Laydown Area (Alternative 1)		
Centre Point	31°30'5.11"S	22°28'0.42"E
Laydown Area (Alternative 2)		
Centre Point	31°25'21.30"S	22°30'14.53"E

Please refer to Figure 1 - 3 for the proposed location and the preliminary site development plan.

Specialist Investigation

Studies including soil, land and agricultural potential, aquatic / freshwater, terrestrial ecology (flora and fauna), avifauna, bats, visual / landscape, heritage and archaeology, palaeontology, noise, socio-economic and traffic and transportation have been completed and / or is underway to quantify possible impacts and magnitude of impacts.

Summary of Findings

The Draft Scoping Report has captured the key and/or scoped issues and impacts for this proposed development by taking into account the findings of the specialists' scoping reports. The specialist reports document anticipated environmental impacts that may be experienced within both the biophysical and social environments.

It is the opinion of the EAP based on the assessments undertaken thus far that the application can proceed to the EIA phase and the scoping report can be accepted by the DFFE.

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1 INTRODUCTION

1.1 Project Overview

Loxton Wind Facility 3 (Pty) Ltd is applying for environmental authorisation to construct and operate the up to 240 MW Loxton Wind Energy Facility (WEF) 3 and its associated on-site substation and battery energy storage system. Hereafter the proposed Loxton WEF 3 and its associated infrastructure will be referred to as the 'proposed development'.

The proposed development is located approximately 15 km east of the town of Loxton within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province (Figure 2 – Site Locality Map).

In terms of Chapter 5 of the National Environmental Management Act, 1998 (Act 107 of 1998 – NEMA), and the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended), the Project Applicant appointed Arcus Consultancy Services South Africa (Pty) Ltd (Arcus), to act as the project manager and to undertake the Scoping and Environmental Impact Assessment (S&EIA) process for Environmental Authorisation.

1.2 Purpose and aim of the Scoping Report

This Draft Scoping Report aims to present and assess the baseline environmental as well as the initial proposed site development plan. While a preliminary turbine layout has been provided, the precise location of each wind turbine, and associated infrastructure has not been finalised and will be determined by the findings of the various specialists application process as well as other technical and financial constraints for this proposed development site. The site development plan and the proposed layout is determined through an iterative process.

2 TERMS OF REFERENCE

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

In terms of legal requirements, the NEMA EIA Regulations 2014, as amended, regulate and prescribe the content of the Scoping Report and specify the type of supporting information that must accompany the submission of the report to the authorities. Table 2.1 shows how and where the legal requirements are addressed in this Scoping Report. Section 9 of this SR provides a summary of the Public Participation Process (PPP) and the final SR will contain the Public Participation undertaken to date. As comments are received on the SR these will be collated and included in the final SR.

As per the EIA Regulations 2014, as amended, "the objective of the scoping process is to, through a consultative process-

a) *Identify the relevant policies and legislation relevant to the activity;*

b) *Motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;*

c) *identify and confirm the preferred activity and technology alternative through an identification of impacts and risks and ranking process of such impacts and risks;*

d) *identify and confirm the preferred site, through a detailed site selection process, which includes an identification of impacts and risks inclusive of identification of*

identification of cumulative impacts and a ranking process of all the identified alternatives on the geographical, physical, biological, social, economic, and cultural aspects of the environment;

e) identify the key issues to be addressed in the assessment phase;

f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required, as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration, and probability of the impacts to inform the location of the development footprint within the preferred site; and

g) identify suitable measures to avoid, manage or mitigate identified impacts to determine the extent of the residual risks 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 application (in this case, the DFFE);
- I&APs, provincial and local governments, 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 and any required long term avifaunal and bat on-site monitoring.

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

Table 2-1: Legislative Requirements for Scope of Assessment and Content of the Scoping Report

	Appendix 2 Requirements NEMA, 1998 (Act No. 107 of 1998)	***Location in SR***
2 (1)	*A scoping report must information that is necessary for a proper understanding of the process, informing all preferred alternatives, including location alternatives, the scope of the assessment, and the consultation process to be undertaken through the environmental impact assessment process, and must include-*	
(a)	*details of-* i. *the EAP who prepared the report; and* ii. *the expertise of the EAP, including a curriculum vitae;*	Section 2.2 and Appendix A
(b)	*the location of the activity, including -* i. *the 21 digit Surveyor General code of each cadastral land parcel;* ii. *where available, the physical address and farm name;* iii. *where the required information in items (i) and (ii) is not available, the co-ordinates of the boundary of the property or properties;*	Executive Summary
(c)	*a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is -* i. *a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or* ii. *on land where the property has not been defined, the coordinates within which the activity is to be undertaken;*	Figure 2 – Site Locality Map
(d)	*a description of the scope of the proposed activity, including -* i. *all listed and specified activities triggered;*	Table 3.1 Section 7

	ii. *a description of the activities to be undertaken, including associated structures and infrastructure;*	
(e)	*a description of the policy and legislative context within which the development is proposed, including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;*	Section 3
(f)	*a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;*	Section 8
(g)	*a full description of the process followed to reach the proposed preferred activity, site and location of the development footprint within the site, including -* i. *details of the alternatives considered;*	Section 6 - 8
	ii. *details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;*	Section 9
	iii. *a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;*	Section 9
	iv. *the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;*	Section 5
	v. *the impacts and risks which have informed the identification of each alternative, including the nature, significance, consequence, extent, duration and probability of such identified impacts, including the degree to which these impacts -* *(aa) can be reversed;* *(bb) may cause irreplaceable loss of resources; and* *(cc) can be avoided, managed or mitigated;*	Section 10 - 11
	vi. *the methodology used in identifying and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;*	Section 4
	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;*	Section 10 - 11
	viii. *the possible mitigation measures that could be applied and level of residual risk;*	Section 10 - 11
	ix. *the outcome of the site selection matrix;*	Section 5 – 11
	x. *if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and*	Section 6
	xi. *a concluding statement indicating the preferred alternatives, including preferred location of the activity;*	Section 12
(h)	*a plan of study for undertaking the environmental impact assessment process to be undertaken, including -* i. *a description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity;* ii. *aspects to be assessed by specialists;* iii. *a description of the proposed method of assessing the environmental aspects, including a description of the proposed method of assessing the environmental aspects including aspects to be assessed by specialists;* iv. *a description of the proposed method of assessing duration and significance;* v. *an indication of the stages at which the competent authority will be consulted;*	Section 13

	vi. *particulars of the public participation process that will be conducted during the environmental impact assessment process; and* vii. *a description of the tasks that will be undertaken as part of the environmental impact assessment process;* viii. *identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.*	
(i)	*an undertaking under oath or affirmation by the EAP in relation to -* i. *the correctness of the information provided in the report;* ii. *the inclusion of comments and inputs from stakeholders and interested and affected parties; and* iii. *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;*	Appendix A
(j)	*an undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;*	Appendix A
(k)	*where applicable, any specific information required by the competent authority; and*	n/a
(l)	*any other matters required in terms of section 24(4)(a) and (b) of the Act.*	n/a
2 (2)	*Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a scoping report, the requirements as indicated in such notice will apply.*	Section 4

2.1 Structure of the Scoping Report

The application for environmental authorisation and assessment of impacts is ultimately a decision-making process with the specific aim of selecting an option that is technically feasible, practical, and will cause the least impact to the environment. The Scoping Report contains the following information:

- Nature of the activity;
- Need and desirability of the proposed development;
- Description of the receiving environment;
- Identification of potential feasible alternatives;
- Identification of potential positive and negative impacts;
- Identification of knowledge gaps; and
- A Plan of Study for the EIA phase.

The Scoping Report also contains the Plan of Study for the EIA Phase. This plan sets out the proposed approach to the EIA Phase study including the:

- Tasks that will be undertaken, including specialist reports and the manner in which such tasks will be completed;
- Stages at which the competent authority will be consulted; and
- Description of the methods of assessment and the details of the public participation process.

The Scoping Report is set out in two volumes:

Volume I: Scoping Report

Volume II: Specialist Scoping Reports

The independent environmental assessment practitioner (EAP) and specific specialists identified potential negative and positive impacts that could arise as a result of the proposed development and mitigation measures were proposed which could allow for the avoidance or reduction of negative impacts or which may enhance positive impacts. The

appointment of specialists was made based on the list of specialists identified by the Screening Report (see Volume II) generated for the proposed development on the DFFE Screening Tool Portal. The structure of the report is provided in Table 2.2 below.

Table 2-2: Structure of this Scoping Report

Section	Title	Containing
Volume I: Scoping Report		**Assessment of the Proposed Development**
-	Executive Summary	Summary of the Project Specifications, Listed Activities, Specialist Investigations and Findings.
1	Introduction	Project Introduction, and Purpose and Aim of the Report.
2	Terms of Reference	Structure of the Scoping Report, Project Team Details, and Assumptions and Limitations of the Study.
3	Environmental Legal Framework	National Environmental Legislation, Applicable Acts, International Conventions and Treaties, Policies and Guidelines.
4	Scope of Work and Scoping Phase Methodology	Environmental Screening Tool Results, Specialists Studies Methodology, Assessment Techniques for the S&EIA.
5	Description of the Baseline Environment	A Description of the Receiving Environment.
6	Assessment of Alternatives	No-Go, Site Selection, Design Evolution and Technology Alternatives.
7	The Preferred Alternative	Description of the Preferred Proposed Development, including a description of the location, technical specifications and components.
8	Need and Desirability	Brief description of the Need and Desirability of the Proposed Development.
9	Public Participation Process	Initial and Scoping Phase - Public Participation Process, Summary of Issues.
10	Assessment of Potential Impacts	An Assessment of the Potential Impacts during the Construction, Operational and Decommissioning Phases.
11	Assessment of Cumulative Impacts	An Assessment of the Potential Cumulative Impacts.
12	Summary of Findings	A Summary of the Findings.
13	Plan of Study for EIA	Documents aspects requiring further assessment and the assessment methods proposed for the EIA Phase.
Appendix A	EAP Declaration of Independence and CV	EAP Commissioner of Oaths Declaration of Independence and CV.
Volume II: Specialist Scoping Reports		**Respective Specialist Scoping Reports.**

2.2 Project Team Details

The Applicant, Loxton Wind Facility 3 (Pty) Ltd, appointed Arcus, with the lead EAP being Ashlin Bodasing to co-ordinate and manage the S&EIA application process. The appointed specialist team was based on the results of the DFFE Screening Tool Report generated.

Table 2-3: Details of the Applicant

Name of the Applicant	Loxton Wind Facility 3 (Pty) Ltd		
Name of contact person for applicant (if other)	Unai Urtasun		
Company Registration Number	2022 / 294641 / 07		
BBBEE status	n/a		
Physical address	Unit 1501, 15th Floor, Portside Building 4 Bree Street, Cape Town, Western Cape		
Postal address	PO Box 1730, Welgemoed, Cape Town, Western Cape		
Postal code	8001	Cell:	
Telephone	-	Fax:	-
E-mail	unai.bravo.urtasun@acciona.com		

Table 2-4: Details of the Environmental Assessment Practitioner

Name of the EAP organisation	Arcus Consultancy Services South Africa (Pty) Ltd		
Details of the organisation	Arcus is a specialist environmental consultancy providing environmental services to the renewable energy market. Arcus has advised on over 250 renewable energy projects, including in the United Kingdom and South Africa, with environmental management and in-house specialist services. Since 2020, Arcus has been acquired and part of the Environmental Resource Management (ERM) group of companies. Being part of the ERM group has been a benefit to both organisations in sharing expertise and providing effective advisory and consultancy services.		
Environmental Assessment Practitioner	Ashlin Bodasing		
Consultant	Aneesah Alwie		
Postal address	240 Main Road, Great Westerford Building, 1st Floor, Rondebosch, Cape Town		
Telephone	+27105963502	Postal Code:	7700
Cellular	+27 (0)76 340 8914	Fax:	(-) -
E-mail	Ashlin.Bodasing@arcusconsulting.co.za / LoxtonWEF@arcusconsulting.co.za		
EAP Qualifications	Bachelor of Social Science: Geography and Environmental Management Registered EAP (EAPASA 2020/780)		
Details of EAP Expertise	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 18 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, Basic 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.

Refer to Appendix A for the EAP's Declaration of Interest and Curriculum Vitae

Table 2-5: S&EIA Project Team

Discipline	Specialist	Specialist Organisation
Aneesah Alwie	Arcus	Consultant
Soil, Land Use and Agricultural Potential	Johann Lanz	Independent Consultant
Freshwater and Wetlands	Dr Brian Colloty	EnviroSci. Pty Ltd
Terrestrial Ecology (Flora and Fauna)	Simon Todd	3Foxes Biodiversity Solutions
Avifauna	Jon Smallie	WildSkies Ecological Services
Bats	Jonathan Aronson	Camissa Sustainability
Visual / Landscape	Quinton Lawson and Bernard Oberholzer	Qarc and BOLA
Heritage and Archaeology	Jayson Orton	ASHA Consulting
Palaeontology	Dr John Almond	Natura Viva
Noise	Morné de Jager	Enviro Acoustic Research
Socio-Economic	Tony Barbour	Independent Consultant
Traffic and Transportation	Athol Swartz	Independent Consultant

2.3 Assumptions and Limitations

The following assumptions and limitations are applicable:

- 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 is assumed that the information contained in the Screening Tool Reports generated are accurate and correct and valid at the time of preparing this report.
- The project description information provided is preliminary and will require further detailed investigation, which will form part of the subsequent stages of this EIA process. Statements or indicators of significance in this report must be considered in light of the uncertainty regarding the exact extent and significance of resources on the site at this stage of the process.

- The general location of the proposed wind turbines, maximum extent of access roads, and the connection of routings have been indicated. The actual position of each wind turbine will be determined by the outcome of the EIA process, as will the exact location of the proposed operations and maintenance buildings.
- With respect to specialist assessments, most have assumed that the issues identified are likely to be similar to other proposed WEF projects in the area, and desktop surveys and site visits have been carried out for the Scoping Phase of this EIA. Specialist site visits, and modelling has been undertaken and should further visits be required these will inform the EIA phase of the application process.
- The assumptions and limitations, presented in each specialist report, Volume II of this report, are noted.
- The developments to be included in the cumulative assessment is based on available public information, the most current DFFE database of renewable applications (at the time of writing the report, REEA_OR_2022_Q2.shp[5]), and if the applicant has submitted an application for environmental authorisation.
- It is assumed that the Plan of Study for the EIA phase will be accepted and approved.

3 ENVIRONMENTAL LEGAL FRAMEWORK

The proposed development requires environmental authorisation prior to being constructed and operated. This section of the report highlights the important environmental legal considerations taken while undertaking this S&EIA process.

3.1 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 developments that may significantly affect the environment. Included amongst the key principles is the principle that all developments must be socially, economically and environmentally sustainable, and 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, as amended, also provides for the participation of potential and registered I&APs and it stipulates that decisions must take the interests, needs and values of all I&APs into account.

Chapter 5 of NEMA, as amended, 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.

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.

3.2 Environmental Impact Assessment (EIA) Regulations, 2014 as amended

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

[5] South African Renewable Energy EIA Application Database (http://egis.environment.gov.za/frontpage.aspx?m=27).

environmental authorisation has been obtained from the competent authority, in this case, the Department of Forestry and Fisheries (DFFE).

The DFFE is the competent authority for all renewable energy proposals which will be bid into the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), as NEMA, as amended, 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"

It is the intention of the Project Applicant to bid the Loxton WEF 3 in the seventh bidding window of the REIPPPP with the aim of evacuating the generated power from the WEF into the National Eskom Grid.

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 DFFE 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 3.1 below. All potential impacts associated with these Listed Activities will be considered and adequately assessed in this authorisation process.

Table 3-1: NEMA Listed Activities in Relation to the Proposed Development

Listing Notices 1, 2 and 3 **07 April 2017**	**Listed Activity**	**Description of project activity that triggers listed activity**
Listing Notice 1 **GN R 327** Activity 11	*The development of facilities or infrastructure for the transmission and distribution of electricity—* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.*	The proposed Loxton WEF 3 will entail the construction of a 33 kV / 132 kV on-site substation hubs incorporating the facility substation, switchyard and collector infrastructure with a footprint of up to 2ha. All internal cabling will be 33kV The proposed Loxton WEF 3 will be constructed across various farm portions located approximately 15 km east of Loxton within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province.
Listing Notice 1 **GN R 327** Activity 12	*The development of-* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs* *(a) within a watercourse;* *(c) if no development setback exists within 32 m of a watercourse, measured from the edge of a watercourse.*	The proposed Loxton WEF 3 will entail the construction of built infrastructure and structures (such as wind turbines, hardstands, offices, workshops, Operations and Maintenance (O&M) buildings, ablution facilities, onsite substations, laydown areas and security enclosures etc.). The infrastructure and structures are expected to exceed a footprint of 100 m^2 and could occur within small drainage features and 32 m of the watercourses.

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
Listing Notice 1 **GN R 327** Activity 19	*The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;*	The proposed Loxton WEF 3 will entail the excavation, removal and moving of more than 10 m^3 of soil, sand, pebbles, or rock from nearby watercourses on site, mainly for the purpose of constructing access roads. As a result, the proposed Loxton WEF 3 could potentially entail the infilling of more than 10 m^3 of material into the nearby watercourses. Details of the infilling of and excavations from the affected watercourses/drainage features will be confirmed during the detailed engineering design phase.
Listing Notice 1 **GN R 327** Activity 24	*The development of a road-* *(ii) with a reserve wider than 13.5 meters, or where no reserve exists where the road is wider than 8 meters*	A temporary road corridor of up to 12 m will be impacted during the construction phase. This will be rehabilitated after the completion of construction activities to allow for a permanent 6 m wide road surface, with side drains on one or both sides where necessary.
Listing Notice 1 **GN R 327** Activity 28	*Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.*	The proposed Loxton WEF 3 will take place outside of an urban area and across several adjoining farm portions, and is considered as a commercial/industrial development, which will have an estimated total development footprint of more than 20 ha. The proposed Loxton WEF 3 will also entail the construction of an onsite substations, as well as a battery energy storage system, and various associated structures and infrastructure. This will constitute infrastructure with a total physical footprint of more than 1 ha.
Listing Notice 1 **GN R 327** Activity 48	*The expansion of-* *Infrastructure or structures where the physical footprint is expanded by 100 square metres or more; where such expansion occurs-* *(a) within a watercourse;* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*	The proposed Loxton WEF 3 will require the upgrading of existing roads within the development area, as well as watercourse crossing upgrades, where such upgrades may take place within watercourses and within 32 m from the edge of these watercourses. The total footprint of the upgrades to be undertaken on the existing roads would be in excess of 100 m^2 within a watercourse, or within 32 m of a watercourse.
Listing Notice 1 **GN R 327** Activity 56	*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre-*	Existing farm access roads will be widened or lengthened. These roads would currently have no road reserve and will be wider than 8 meters in some

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
	(i) where the existing reserve is wider than 13.5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.	areas during construction phase of the development.
Listing Notice 2 **GN R 325** Activity 1	*The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.*	The proposed Loxton WEF 3 will comprise a maximum generation capacity of up to 240 MW (i.e., facility for the generation of electricity from a renewable resource).
Listing Notice 2 **GN R 325** Activity 15	*The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-* *(i) the undertaking of a linear activity*	The construction of the proposed development will require clearance of more than 20 hectares of indigenous vegetation. The total project development footprint is up to 65 ha.
Listing Notice 3 **GN R 324** Activity 4	*The development of a road wider than 4 metres with a reserve less than 13,5 metres* *(g) Northern Cape* *(ii) Outside urban areas:* *(ee) Critical Biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	A 12 m road corridor will be temporarily impacted upon during construction and rehabilitated to 6 m wide after construction. The Loxton WEF 3 will have a total road network of up to 50 km. The site falls outside of an urban area and parts of the site fall within a NPAESF area and Critical Biodiversity Area (CBA) 1 and CBA 2 in the Northern Cape.
Listing Notice 3 **GN R 324** Activity 12	*The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* *(g) Northern Cape* *(ii) Within critical biodiversity areas identified in bioregional plans;*	The proposed development will require the clearance of natural vegetation in excess of 300 m^2 in areas of natural vegetation. A portion of the WEF is located within a CBA 1 and 2 in the Northern Cape.
Listing Notice 3 **GN R 324** Activity 14	*The development of—* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs—* *within a watercourse;* *in front of a development setback;* *if no development setback has been adopted, within 32 metres of a*	The proposed development will entail the development of infrastructure with physical footprints of $10m^2$ or more within a watercourse / surface water feature or within 32m from the edge of a watercourse / surface water feature. Although the layout of the proposed development will be designed to avoid the identified surface water features / watercourse as far as possible, some of

Listing Notices 1, 2 and 3 07 April 2017	Listed Activity	Description of project activity that triggers listed activity
	watercourse, measured from the edge of a watercourse; *excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.* *(g) Northern Cape* *(ii) Outside urban areas:* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	the infrastructure / structures will likely need to traverse the identified surface water features / watercourses. The construction of the infrastructure (MV cabling and roads) for the development will occur within Critical Biodiversity Areas (CBAs) located outside of urban areas.
Listing Notice 3 **GN R 324** Activity 18	*The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* *(g) Northern Cape* *(ii) Outside urban areas* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	Internal access roads will be required to access the wind turbines as well as the respective substations. Existing roads will be used wherever possible. Internal access roads will thus likely be widened by more than 4 m or lengthened by more than 1 km. These roads will occur within the Northern Cape Province, outside urban areas. The respective proposed development sites contain indigenous vegetation. In addition, the widening of the roads will occur within CBAs and or within 100 m from the edge of a watercourse or wetland.
Listing Notice 3 **GN R 324** Activity 23	*The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such expansion occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *(g) Northern Cape* *(ee) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;*	The respective proposed development will entail the development and expansion of roads by $10m^2$ or more within a surface water feature / watercourse or within 32m from the edge of a surface water feature / watercourse. Although the layout of the proposed development will be designed to avoid the identified surface water features / watercourses as far as possible, some of the existing internal and access roads may likely need to traverse some of the identified surface water features / watercourses. The proposed developments occur within CBAs, and are located outside urban areas.

3.3 The National Heritage Resources Act, 1999 (Act No 25 Of 1999 - NHRA)

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, 1999, 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, 1999, 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, Act 107 of 1998) or any other applicable legislation. The decision-making authority must ensure that the heritage evaluation fulfils the requirements of the NHRA, 1999, and take into account any comments and recommendations made by the relevant heritage resources authority.

The Heritage Impact Assessment, which forms part of this Basic Assessment process was submitted to the Northern Cape South African Heritage Resources Authority (SAHRA) for comment.

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, 1999, also protects intangible heritage such as traditional activities, oral histories and places where significant events happened. 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.

The heritage impact assessment reports will be submitted to the SAHRA for comment.

3.4 National Department of Agriculture, Land Reform and Rural Development (DALRRD)

A renewable energy facility requires approval from the National Department of Agriculture, Land Reform and Rural Development (DALRRD) if the facility is on agriculturally zoned land. A *No Objection Letter* for the change in land use is required. This letter is one of the requirements for receiving municipal rezoning. This application requires a motivation backed by good evidence that the development is acceptable in terms of its impact on the agricultural production potential of the development site.

3.5 Subdivision of Agricultural Land Act, 1970 (Act No. 70 of 1970 - SALA)

In terms of the Subdivision of Agricultural Land Act, 1970, any application for change of land use must be approved by the Minister of Agriculture. This is a consent for long-term lease in terms of the SALA. If DALRRD approval for the development has already been obtained in the form of the No Objection letter, then SALA approval should not present any difficulties. Note that SALA approval is not required if the lease is over the entire farm portion. SALA approval (if required) can only be applied for once the Municipal Rezoning Certificate and Environmental Authorisation has been obtained.

1.3 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 salinization 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.

Rehabilitation after disturbance to agricultural land is managed by the CARA. A consent in terms of CARA is required for the cultivation of virgin land. Cultivation is defined in CARA as "any act by means of which the topsoil is disturbed mechanically". The purpose of this consent for the cultivation of virgin land is to ensure that only land that is suitable as arable land is cultivated. Therefore, despite the above definition of cultivation, disturbance to the topsoil that results from the construction of a renewable energy facility and its associated infrastructure does not constitute cultivation as it is understood in CARA. This has been corroborated by Anneliza Collett (Acting Scientific Manager: Natural Resources Inventories and Assessments in the Directorate: Land and Soil Management of the Department of Agriculture, Land Reform and Rural Development (DALRRD)). The construction and operation of the facility will therefore not require consent from the Department of Agriculture, Land Reform and Rural Development in terms of this provision of CARA.

1.4 National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998)

The purpose of the National Veld and Forest Fire Act, as amended by the National Fire Laws Amendment Act (Act 12 of 2001), is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. It also specifies the responsibilities of landowners. The term 'owners' includes lessees, people in control of land, the executive body of a community, the manager of State land, and the chief executive officer of any local authority. The requirements include, but are not limited to, the maintenance of firebreaks and availability of firefighting equipment to reasonably prevent the spread of fires to neighbouring properties.

1.5 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 Forestry, Fisheries and the Environment") 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.

1.6 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 this proposed development.

1.6.1 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

1.7 National Water Act, 1998 (Act No. 36 of 1998 - NWA)

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 WEF which will require access roads over watercourses and drainage channels and boreholes for construction water, in terms of Section 21 of the Act include but are not limited to the following:

Section 21 (a): Abstraction of water from boreholes and rivers or dams;
Section 21 (b): Storage of water (dams or reservoirs);
Section 21 (c): Impeding or diverting the flow of water in a watercourse;
Section 21 (i): Altering the bed, banks, course or characteristics of a watercourse; and
Section 21 (g): Storage of domestic waste in conservancy tanks.
GN 1199 of 18 December 2009 grants general authorisation (GA) 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.

1.7.1 Permit Requirements

A Water Use License Application (WULA) or a General Application (GA) may be required. This will be determined by the Department of Human Settlement, Water and Sanitation (DHSWS) during the WULA pre-application process.

This process will run separate to this environmental authorisation application process.

1.8 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004 - NEMBA)

1.8.1 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 flora and fauna that occur on the site may be threatened or protected.

1.8.2 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.

1.9 The Nature and Environmental Conservation Ordinance No. 19 of 1974; and Northern Cape Nature Conservation Act, 2009 (Act No. 9 of 2009)

These were developed to protect both animal and plant species within the various provinces of the country 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.

1.10 National Forests Act, 1998 (Act No. 84 of 1998 - NFA)

This act lists protected tree species and prohibits certain activities. The prohibitions provide that "*no person may cut, damage, disturb, destroy or remove any protected tree, or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister".*

1.11 Astronomy Geographic Advantage Act, 2007 (Act. 21 of 2007)

The Act provides for the preservation and protection of areas within the Republic that are uniquely suited for optical and radio astronomy. The Square Kilometer Array radio telescope is located in the declared Karoo Central Advantage Array and as such it is protected against harmful interference from wireless communication and electromagnetic emissions from electrical equipment.

1.12 National Road Traffic Act, 1996 (Act No. 93 of 1996) (NRTA)

The technical recommendations for highways (TRH 11): *"Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads"* outline the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed.

Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges, and culverts.

The general conditions, limitations, and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution, and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the National Road Traffic Act and the relevant Regulations.

The South African National Roads Authority (SANRAL) and the Provincial Department of Transport would act as a Competent/Commenting Authority.

1.13 Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA)

The Civil Aviation Act, 2009 (Act No. 13 of 2009) (CAA), governs civil aviation in the Republic. The Act provides for the establishment of a stand-alone authority mandated with the controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by the South African Civil Aviation Authority (SACAA), an agency of the Department of Transport (DoT).

The SACAA achieves the objectives of the Act by complying with the Standard and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations (SA CARs). All proposed developments or activities in South Africa that potentially could affect civil aviation must be assessed by SACCAA in terms of the CARs and the South African Civil Aviation Technical Standards (SA CATs), in order to ensure civil aviation safety.

The SACAA and Air Traffic Navigation Services (ATNS) is included as a stakeholder and will be provided with an opportunity to comment on the application during the public participation process.

1.14 Promotion of Access to Information Act, 2000 (Act No. 2 of 2002) (PAIA)

The PAIA gives effect to the constitutional right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.

1.15 National Environmental Management Act: National Appeals Regulations, 2014

The purpose of these regulations is to regulate the procedure contemplated in section 43(4) of the National environmental management act relating to the submission, processing and consideration of a decision on an appeal. This Act is used to help guide and understand the appeal process and the procedures may follow.

1.16 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 S&EIA 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 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;*
- *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);*
- *Screening Report referred to in Regulation 16(1)(v) of the Environmental Impact Assessment Regulations 2014, as amended;*

1.17 Conventions and Treaties

1.17.1 The Paris Agreement (2016)

South Africa is one of 195 countries that are signatory to The Paris Agreement. The Paris Agreement is a legally binding instrument within the United Nations Framework Convention on Climate Change (UNFCCC) that provides guidance for action on climate change, focusing on sustainable development and poverty eradication. It sets the goal of preventing increase in global average temperature to below 2 degrees Celsius and pursuing efforts to limit global temperature increase to 1.5 degrees Celsius. Previous Minister of the DFFE, Ms Edna Molewa, signed the Paris Agreement on Climate Change on behalf of South Africa on 22 April 2016.[6]

The proposed WEF fits the emission reduction targets of the Paris Agreement and its aim of sustainable development.

1.17.2 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. South Africa became a signatory to the CBD in 1993, which was ratified in 1995.

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.

1.17.3 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

[6] https://www.environment.gov.za/mediarelease/southafrica_ratifies_parisagreement (accessed on 24 January 2019).

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.

1.17.4 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*".

1.17.5 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.

1.18 Policies and Guidelines

1.18.1 Environmental Impact Assessment Guidelines

Relevant guidelines and policies as applicable to the management of the S&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).*

1.18.2 The Equator Principles (EPs) III, 2013

The principles applicable to the project are likely to include:

- *Principle 2: Environmental and Social Assessment;*
- *Principle 3: Applicable Environmental and Social Standards;*
- *Principle 4: Environmental and Social Management System and Equator Principles Action Plan;*
- *Principle 5: Stakeholder Engagement;*
- *Principle 6: Grievance Mechanism;*
- *Principle 7: Independent Review;*
- *Principle 8: Covenants;*
- *Principle 9: Independent Monitoring and Reporting; and*
- *Principle 10: Reporting and Transparency.*

These principles, among various requirements, include a requirement for an assessment process and an Environmental and Social Management Plan (ESMP) to be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards, and the appointment of an independent environmental expert to verify monitoring information.

1.18.3 South African Wind Energy Facility Guidelines

The following guidelines are relevant to the proposed WEF and the potential impacts they may have on bats/avifauna and habitat that support bats/avifauna:

- South African Best Practice Guidelines for Pre-Construction Monitoring of Bats at Wind Energy Facilities. 5th Edition. 2020;
- South African Best Practice Guidelines for Operational Monitoring of Bats at Wind Energy Facilities. 5th Edition. 2020;
- South African Bat Fatality Threshold Guidelines. Edition 2. 2018;
- The Species Environmental Assessment Guideline (SANBI, 2020);
- Best-Practice Guidelines for assessing and monitoring the impact of wind-energy facilities on birds in southern Africa. Third Edition, 2015;
- Best Practice Guidelines for Verreaux's Eagle and Wind Energy (BirdLife South Africa, 2017), and the more recent draft update of these: Verreaux's Eagles and Wind Farms (BirdLife South Africa, 2021);
- The Southern African Bird Atlas Project 2 data, available at the pentad level (http://sabap2.adu.org.za/v1/index.php) (accessed at www.mybirdpatch.adu.org.za);
- IUCN 2021. The IUCN List of Threatened Species. 2021 - 3. http://www.iucnredlist.org/;
- Wind Energy Impacts on Birds in South Africa: A Preliminary review of the results of operational monitoring at the first wind farms of the Renewable Energy Independent Power Producer Procurement Programme in South Africa. BLSA. Occasional Report Series: 2;
- On a collision course: the large diversity of birds killed by wind farms in South Africa (Perold et al. 2020);
- Birds & Renewable Energy. Update for 2019. BirdLife South Africa. Birds and Renewable Energy Forum, 10 October 2019; and
- Avian Wind Farm Sensitivity Map. Birdlife South Africa. http://www.birdlife.org.za/conservation/birds-and-wind-energy/windmap.

1.18.4 International Finance Corporation (IFC) Performance Standards

The IFC's Performance Standards on Social and Environmental Sustainability (Referred to as Performance Standards hereinafter) is an environmental and social risk management tool provided by the IFC for its investment and financing clients, and is also one of the major applicable standards of the Equator Principles. As the global influence of the Equator Principles has continued to rise, more and more Equator Principles Financial Institutions (EPFI) have been applying the Performance Standards in their assessments of

environmental and social impacts. Under this backdrop, the Performance Standards have become the world's leading system and tool for environmental and social risk management.

The IFC Performance Standards encompass eight topics as described in Table 3-2 below. Given that South Africa has a complex and well-balance environmental regulatory system, the IFC Performance Standards are wholly addressed in the NEMA, 1998, as amended, framework.

For reference purposes the Project Applicant, will be referred to as the 'Borrower' in Table 3-2.

The project will not have adverse impacts on PS5: Land Acquisition and Involuntary Resettlement and PS7: Indigenous Peoples as there is no displacement or resettlement, and none such indigenous people are found in the proposed development area of influence.

Table 3-2: Description of the IFC Performance Standards

PS Description	Project Applicability
Performance Standard 1: Assessment and Management of Environmental and Social (E&S) Risks and Impacts **Objective:** Underscores the importance of identifying E&S risks and impacts and managing E&S performance throughout the life of a project.	
Borrowers are required to manage the environmental and social performance of their business activity, which should also involve communication between the Borrower/Investee, its workers and the local communities directly affected by the business activity. This requires the development of a good management system, appropriate to the size and nature of the business activity, to promote sound and sustainable environmental and social performance as well as lead to improved financial outcomes.	Section 2 of Chapter 1 of the NEMA, as amended, provides details of the environmental management principles that should be adhered to during the entire project life. Chapter 6 of the NEMA EIA Regulations, 2014 (as amended) outlines the requirements for Public Participation in respect of a project. This document represents the S&EIA process (equitable to an ESIA) undertaken for the proposed development, and comprehensively assesses the key environmental and social impacts and complies with the requirements of the NEMA EIA Regulations, 2014 (as amended). The proposed development will be managed in terms of environmental and social impacts through an approved Environmental Management Programme (EMPr) which is drafted as part of the EIA process. The following have been included as part of this Assessment: • Description of relevant Policy; • Identification of Risks and Impacts; • EMPr (included in the EIA phase); • Requirements for Monitoring and Review; • Stakeholder Engagement as part of PPP; • External Communication and Grievance Mechanism; and • Recommendation for ongoing Reporting to Affected Communities.
Performance Standard 2: Labour and Working Conditions **Objective:** Recognizes that the pursuit of economic growth through employment creation and income generation should be balanced with protection of basic rights for workers.	
For any business, its workforce is a valuable asset and a sound worker-management relationship is a key component of the overall success of the enterprise. By protecting the basic rights of workers, treating workers fairly and providing them with safe and healthy working conditions, Borrowers can enhance the efficiency and productivity of their operations and strengthen worker commitment and retention.	Whilst PS 2 is applicable to the proposed development, it will not be addressed in detail in this report as Labour and Working conditions are typically addressed prior to construction, once EA has been awarded. Recommendations are provided concerning development of a detailed Human Resources (HR) and Occupational Health and Safety (OHS) system by the Applicant. In terms of the proposed development, construction will require the appointment of an EPC contractor (and others) for completion.

PS Description	Project Applicability
	Appointment of contactors and employees will be 'fair and equal', and workers will be provided with a safe, healthy and inclusive work environment. The EMPr will incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors.
Performance Standard 3: Resource Efficiency and Pollution Prevention **Objective:** Recognizes that increased industrial activity and urbanization often generate higher levels of air, water and land pollution, and that there are efficiency opportunities.	
Increased industrial activity and urbanization often generate increased levels of pollution to air, water and land that may threaten people and the environment at the local, regional and global level. Borrowers are required to integrate pollution prevention and control technologies and practices (as technically and financially feasible as well as cost-effective) into their business activities.	The Project is not likely to have many large-scale and long-term impacts related to pollution. Measures to address air, water and land pollution will be contained in the EMPr. There are no material resource efficiency issues associated with the proposed development and the EMPr will include general resource efficiency measures. The project is not greenhouse gas (GHG) emissions intensive and the detailed assessment and reporting of emissions is not required. This project, however, seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. The project will not release industrial effluents and waste generation will be managed according to the EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. Land contamination of the site from previous land use is not a concern as the project area is mostly an agricultural area where low intensity agriculture / grazing is practiced.
Performance Standard 4: Community Health, Safety, and Security **Objective:** Recognizes that projects can bring benefits to communities but can also increase potential exposure to risks and impacts from incidents, structural failures, and hazardous materials.	
Business activities can increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures and releases of hazardous materials as well as impacts on a community's natural resources, exposure to diseases and the use of security personnel. Borrowers are responsible for avoiding or minimizing the risks and impacts to community health, safety and security that may arise from their business activities.	The requirements for PS 4 have been addressed in this report and will be managed in accordance with the EMPr. It is understood that the project infrastructure and equipment will be designed to good industry standards to minimise risks to communities, however a community health and safety plan should be compiled by the Applicant prior to construction to meet the requirements of IFC Performance Standard 4 (Community Health, Safety and Security). To ensure compliance with PS 4, Applicant will need to evaluate the risks and impacts to the health and safety of the affected community during the design, construction and operation of the proposed development and establish preventive measures to address them in a manner commensurate with the identified risks and impacts as contained in this report. Such measures need to adhere to the precautionary principle for the prevention or avoidance of risks and impacts over minimization and reduction.
Performance Standard 5: Land Acquisition and Involuntary Resettlement **Objective:** Applies to physical or economic displacement resulting from land transactions such as expropriation or negotiated settlements.	
Land acquisition due to the business activities of a Borrowers may result in the physical displacement (relocation	Not Applicable

PS Description	Project Applicability
or loss of shelter) and economic displacement (loss of access to resources necessary for income generation or as means of livelihood) of individuals or communities. Involuntary resettlement occurs when affected individuals or communities do not have the right to refuse land acquisition and are displaced, which may result in long-term hardship and impoverishment as well as environmental damage and social stress. Borrowers are required to avoid physical or economic displacement or minimize impacts on displaced individuals or communities through appropriate measures such as fair compensation and improving livelihoods and living conditions.	
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources **Objective**: Promotes the protection of biodiversity and the sustainable management and use of natural resources.	
Protecting and conserving biodiversity (including genetic, species and ecosystem diversity) and its ability to change and evolve, is fundamental to sustainable development. Borrowers are required to avoid or mitigate threats to biodiversity arising from their business activities and to promote the use of renewable natural resources in their operations.	In terms of protecting and conserving biodiversity, specialists have assessed the impacts of the proposed development within the area of influence and will recommend further measures to prevent/avoid/mitigate these potential impacts during the EIA phase. Specialist methods include a combination of literature review, stakeholder engagement and consultation, and in-field surveys. This substantively complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa.
Performance Standard 7: Indigenous Peoples **Objective:** Aims to ensure that the development process fosters full respect for Indigenous Peoples.	
Indigenous Peoples are recognized as social groups with identities that are distinct from other groups in national societies and are often among the marginalized and vulnerable. Their economic, social and legal status may limit their capacity to defend their interests and rights to lands and natural and cultural resources. Borrowers are required to ensure that their business activities respect the identity, culture and natural resource-based livelihoods of Indigenous Peoples and reduce exposure to impoverishment and disease.	Not Applicable. As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area. The Project does not involve displacement.
Performance Standard 8: Cultural Heritage **Objective:** Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.	

PS Description	Project Applicability
Aims to protect cultural heritage from adverse impacts of project activities and support its preservation.	A cultural heritage impact assessment and paleontological impact assessment has been undertaken for the proposed development. Consultation will also take with the SAHRA.

2 SCOPE OF WORK AND SCOPING PHASE METHODOLOGY

The EIA process formally commences with notifying the competent authority (in this case the Department of Forestry, Fisheries and Environment (DFFE) of the proposed development through the submission of an application form. The EAP, along with a team of technical specialists, commence the Scoping Phase, in order to inform decision regarding the appropriate "scope" of the EIA phase.

The existing environmental baseline of the site proposed for development is established during this phase through a desktop assessment and site visits. The type of development is considered and its anticipated impacts on the existing environment informs the specialists' studies to be undertaken. The methodology of how these impacts should be assessed within the EIA phase is also determined.

A Draft Scoping Report (DSR – this document) is compiled which is made available for public and stakeholder review and comment for a legislated period of 30 days. All comments received in response to the DSR will be considered, responded to in the Comments and Responses Trail and incorporated, where applicable, into the Final Scoping Report (FSR) and Plan of Study for EIA.

Should the FSR be approved by the DFFE, the EIA Phase is initiated, which includes further detailed specialist assessments. A Draft EIA Report is compiled and incorporates these findings. The Draft EIA Report is made available for stakeholder and public review for a period of 30 days. Comments are again considered and responded to in a Final EIA Report.

I&APs are then notified of the submission of the Final EIA Report to DFFE.

Once a Final EIA Report has been submitted, the competent authority (the DFFE) will make a decision within 107 days on whether to grant or refuse Environmental Authorisation for the application.

2.1 DFFE Environmental Screening Tool

In terms of GN R960 (promulgated on 5 July 2019) and Regulation 16 (1)(b)(v) of the EIA Regulations, 2014 (as amended), the submission of a Screening Report generated from the national web based environmental screening tool is compulsory for the submission of BA and EIA applications in terms of Regulation 19 and 21 of EIA Regulations, 2014 (as amended). The Screening Report generated for the proposed development is included in Volume II of this Report.

The screening report was generated based on the selected classification, i.e., Utilities Infrastructure / Electricity / Generation / Renewable / Wind. The screening report generated did not identify any Wind or Solar PV / CSP Developments which received environmental authorisation within a 30 km radius of the wind farm[7], furthermore, no intersections with Environmental Management Frameworks (EMF) or with any development zones were found.

Based on the selected classification to produce the screening tool report, and the environmental sensitivities of the development footprint, the screening report generates a list of specialist assessments identified for inclusion in the assessment report. It is the

[7] The EAP / specialists will assess in full the cumulative impacts on the developments identified within a 30 km radius of the development during the EIA Phase.

responsibility of the EAP to confirm this list and to motivate in the assessment report, the reason for not including any of the identified specialist study.

Table 4.1 provides a summary of the specialist assessments identified by the screening tool reports, and the response to each assessment in terms of the proposed development, based on site verification visits.

Specialist assessments undertaken (Volume II) have considered the results of the DFFE Screening Tool in their terms of reference.

Table 3-3: Specialist assessments identified in terms of the national web-based screening tool for the proposed Loxton WEF 3

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	**By Specialist / EAP**
Agriculture Theme	Protocol for the Specialist Assessment and Minimum Report Content Requirements of Environmental Impacts on Agricultural Resources by Onshore Wind and/or Solar Photovoltaic Energy Generation Facilities where the Electricity Output is 20 MW or more, gazetted on 20 March 2020. This protocol replaces the requirements of Appendix 6 of the Environmental Impact Assessment Regulations.	**Medium Sensitivity**	**Low Sensitivity**
	Comment: The agricultural sensitivity of the site, as identified by the screening tool, varies from low to very high across different parts of the site. The criteria for agricultural sensitivity in the screening tool are straightforward and are clearly defined in terms of cultivation status and land capability. The classified land capability of the site is predominantly 5, but ranges from 2 to 6. The confirmed medium sensitivity agricultural areas are highly likely to be avoided by the proposed facility infrastructure, regardless of agricultural impact, because they are low-lying and near watercourses and farmsteads. The specialist assessment **dispute** the medium sensitivity as given by the screening tool, and considers the site to be of low sensitivity. The motivation for confirming the sensitivity is predominantly that the climate data (low rainfall of approximately 199 to 221 mm per annum and high evaporation of approximately 1,371 to 1,412 mm per annum) (Schulze, 2009) proves the area to be arid, and therefore of limited land capability. Moisture availability is totally insufficient for crop production without irrigation. In addition, the land type data shows the dominant soils to be shallow soils on underlying rock. A low agricultural sensitivity is entirely appropriate for this land, which is totally unsuitable for crop production. It is important to note that despite the medium sensitivity, the agricultural impact is low (see Sections 10 - 12).		
Landscape / Visual Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Very High Sensitivity**	**Medium Sensitivity**
	Comment: The sensitivity mapping on which the screening tool is based is regional in scale and is therefore **disputed** based on the more detailed visual sensitivity mapping prepared by the visual specialists at the local project scale.		
Archaeological and Cultural Heritage Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Very High Sensitivity**	**Medium Sensitivity**
	Comment: The screening tool report shows the archaeological and heritage sensitivity to be very high throughout the study area. The site visit confirms that in fact the majority of the site is of low sensitivity with only small pockets (where heritage resources occur) considered to be of higher sensitivity. The main concerns are the farm complexes (inhabited and abandoned) since these have high densities of heritage resources and		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	are considered locally significant cultural landscapes. These tend to be in river valleys, while the ridges targeted for development have almost no traces of heritage. A photographic record and description of the relevant heritage resource is contained within the impact assessment report. The heritage specialist thus **disputes** the uniform low sensitivity, noting that several pockets of medium to high sensitivity are also present in the area.		
Palaeontology Impact Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Very High Sensitivity**	**Low Sensitivity**
	Comment: It is concluded that the palaeosensitivity of the project area is, in practice, low. The provisional palaeosensitivity mapping by the DFFE Screening Tool is accordingly **disputed** by the specialist.		
Terrestrial Biodiversity Impact Assessment	Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Terrestrial Biodiversity, gazetted on 20 March 2020.	**Very High Sensitivity**	**High Sensitivity**
	Comment: The facility falls almost entirely within areas classified as High sensitivity under the Terrestrial Biodiversity Theme due to the presence of CBAs, ESAs, FEPA Subcatchments and Protected Area Expansion Strategy Focus Areas. The specialist **disputes** the very high sensitivity but confirms high sensitivity for this theme.		
Aquatic Biodiversity Impact Assessment	Protocol for the Specialist Assessment and minimum report content requirements for Environmental Impacts on Aquatic Biodiversity, gazetted on 20 March 2020.	**Very High Sensitivity**	**Very High Sensitivity**
	Comment: The aquatic sensitivity of the site, as identified by the screening tool, varies from very high to high and a small portion is low. across different parts of the site. The specialist assessment **confirms** the sensitivity as given by the screening tool due to the presence of National Freshwater Priority Ecosystem Areas (NFEPAs) and rivers as well as several CBAs. Structures such as turbines, O&M buildings, substations and BESS, should be placed outside of the High Sensitivity habitats, while remaining structures (roads and transmission lines) could cross or span the Moderate / Low Sensitivity areas. Noting that Low Sensitivity can also equal Moderate areas but with existing impacts e.g., current roads, farm tracks of previously disturbed areas but these must be confirmed during the remainder of the assessment phases for areas such as roads or grid access routes. Any activities within the watercourses and pans, the buffers, or 500 m from the wetland boundary will require a Water Use license under Section 21 c and i of the National Water Act (Act 36 of 1998).		
	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Avifaunal Species by Onshore	**Low Sensitivity**	**High Sensitivity**

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
Avian Impact Assessment	Wind Energy Generation Facilities where the electricity output is 20 MW or more, gazetted 20 March 2020.		
	Comment: The Avian Wind Farm Sensitivity map for South Africa (Retief et al. 2011) and the Important Bird and Biodiversity Areas programme data (IBA - Marnewick et al. 2015) were consulted to determine the sensitivity of the project in national terms. The site falls mostly within the lowest two categories of sensitivities in terms of avifauna, is not located in or close to any IBAs (Marnewick et al. 2015), nor does it fall in a Renewable Energy Development Zone (REDZ/2). Overall, it is the specialist opinion that the proposed site falls in an area of Low sensitivity on a national scale. This statement serves to provide holistic context on the suitability of the location of the development on the basis of these consulted databases and does not consider individual species. Additionally, the specialist **disputes** the Screening Tool finding for the Avian Theme which designates the site as Low sensitivity. The habitat is transformed, but the combination of irrigated and dryland pastures, grassland with shrub, dams and wetlands which have replaced the original Fynbos vegetation is highly suitable for a number of wind farm sensitive priority species, including some Red Listed species.		
Civil Aviation Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Civil Aviation Installations, gazetted on 20 March 2020.	**Low Sensitivity**	**Low Sensitivity**
	Comment: Site verification **confirms** the low sensitivity. During the public consultation, the South African Civil Aviation Authority (SACAA) will be consulted by the EAP / Project Applicant to confirm that there will be no impact to the airspace of the development area and immediate surrounds. A site sensitivity verification report has been produced by the EAP for inclusion as part of the scoping process.		
Defence Assessment	Protocol for the specialist assessment and minimum report content requirements for Environmental Impacts on Defence Installations, gazetted on 20 March 2020.	**Low Sensitivity**	**Low Sensitivity**
	Comment: Site verification **confirms** the low sensitivity. During the public consultation, the South African National Defence Force (SANDF) will be consulted by the EAP / Project Applicant to confirm that there will be no impact on the defence installation of the development area and immediate surrounds. A site sensitivity verification report has been produced by the EAP for inclusion as part of the scoping process.		
RFI Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Very High Sensitivity**	**Not determined**
	Comment:		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	The screening tool described the study area as very high Radio Frequency Interference Theme (RFI) sensitivity due to the cluster falling within the Square Kilometre Array (SKA) Karoo Central Radio Astronomy Advantage Area 1 buffer. A high-level path loss study has been commissioned to understand if there is any impact to SKA receptors and if so, what mitigation is required. Regardless, the SARAO will be included as a registered I&AP as part of the EIA process.		
Noise Impact Assessment	Protocol for specialist assessment and minimum report content requirements for Noise Impacts, gazetted on 20 March 2020.	**Very High Sensitivity**	**Medium Sensitivity**
	Comment: The output from the Screening tool indicates a number of areas within, and up to 2,000 m from the project boundary is considered to be of a "very high" sensitivity to noise. The site sensitivity by the specialist was confirmed using available aerial images (Google Earth®) and assuming that these structures are residential as the statuses of the structures are unknown at this stage. The assessment highlighted that there are no noise-sensitive receptors located in areas identified to have a "very high" sensitivity to noise by the online screening tool. Due to the number of potential noise-sensitive locations in the area, it is recommended that the potential significance of the noise impact be assessed on the verified receptors in a noise specialist study. Based on the site sensitivity verification by the specialist, the site was determined to be of medium sensitivity and **disputes** the Very High Sensitivity rated of the screening tool.		
Flicker Assessment	Site Sensitivity Verification requirements where a specialist assessment is required but no Specific Assessment Protocol has been prescribed, gazetted 20 March 2020.	**Very High Sensitivity**	**Not Determined**
	Comment: Although noise and flicker are two separate themes within the DFFE Screening Tool, the sensitive features (dwellings / receptors) are the same for both themes. In Arcus' experience, the noise sensitivities and buffers also provide sufficient setback to ensure shadow flicker effects will not be significant. Shadow flicker constraints are thus catered for to some degree by the noise related spatial constraints and buffers. No flicker assessment has been / will be undertaken for the scoping phase. The outcome of the noise assessment /visual study will assist the EAP in the flicker assessment during the EIA phase of the development.		
Traffic Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Not Determined**	**Low Sensitivity**
	Comment: Traffic assessment was identified as a required specialist assessment but no environmental sensitivity was determined by the screening report. A desk-based traffic assessment was undertaken for the proposed development. A site visit will be undertaken for the EIA phase.		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
Geotechnical Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Not Determined**	**Not Determined**
	Comment: Geotechnical assessment was identified as a required specialist assessment but no environmental sensitivity was determined by the screening report. The EAP is of the opinion that a Geotechnical Assessment for the development can and will only be undertaken once the final development design is confirmed, prior to the commencement of the construction phase. **The EAP has not included this assessment as part of the application process.**		
Socio-Economic Assessment	Site Sensitivity Verification Requirements where a Specialist Assessment is required but no specific assessment protocol has been prescribed, gazetted on 20 March 2020.	**Not Determined**	**Low Sensitivity**
	Comment: Socio-economic assessment was identified as a required specialist assessment but no environmental sensitivity was determined by the screening report. Following the scoping assessment and verification, the socio-economic theme is deemed low by the specialist. A full impact assessment will be undertaken by the specialist for the EIA phase of the development.		
Plant Species Assessment	Protocol for specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Plant Species, gazetted on 20 March 2020.	**Low Sensitivity**	**Low Sensitivity**
	Comment: There are no known species of conservation concern that are likely to occur in the area. This **confirms** the results of the site verification which found no plant SCC within the site. The broader area does not appear to have many plant species of concern present and no such species have been identified on any of the other five wind energy facilities that the consultant has worked on in the area to date. As such, the low sensitivity rating of the site can be confirmed and unless some plant SCC are found within either site before the EIA phase commences, a Plant Species Compliance Statement would be the appropriate level of study for the sites in this regard.		
Animal Species Assessment	Protocol for specialist assessment and minimum report content requirements for Environmental Impacts on Terrestrial Animal Species, gazetted on 20 March 2020.	**Meduim Sensitivity**	**High Sensitivity**
	Comment: The Avian Wind Farm Sensitivity map for South Africa (Retief et al. 2011) and the Important Bird and Biodiversity Areas programme data (IBA - Marnewick et al. 2015) were consulted to determine the sensitivity of the project in national terms. The site falls mostly within the lowest two categories of sensitivities in terms of avifauna, is not located in or close to any IBAs (Marnewick et al. 2015), nor does it fall in a Renewable		

Identified Specialist Assessment	Assessment Protocol	Identified Sensitivity	
		By DFFE Screening Report	By Specialist / EAP
	Energy Development Zone (REDZ/2). Overall, it is the specialist opinion that the proposed site falls in an area of Low sensitivity on a national scale. This statement serves to provide holistic context on the suitability of the location of the development on the basis of these consulted databases and does not consider individual species. Additionally, the avian specialist **confirms** the High sensitivity assessment for the presence of Verreaux's Eagle and Ludwig's Bustard and the Jackal Buzzards. The faunal specialist **confirms** the high sensitivity as majority of the site consists of high sensitivity areas due to the potential presence of several bird species of concern and the Black-footed Cat with underlying medium sensitivity due to the possible presence of the Riverine Rabbit and Karoo Dwarf Tortoise. The field assessment confirms that site contains suitable habitat for the Riverine Rabbit as well as the Karoo Dwarf Tortoise. The Black-footed Cat is less likely to be present and based on extensive searching and camera trapping by the major landowner within the site Niel Viljoen, the Black-footed Cat has not been detected within the site and is considered absent from the project area. The Karoo Dwarf Tortoise is associated with rocky slopes and is confirmed present in the wider area and can be assumed to be present within Loxton Wind Energy Facility 3 site. The Riverine Rabbit is associated with the silty floodplains of the ephemeral rivers of the Upper Karoo and is common within suitable habitat in the wider Loxton area. Although there is some suitable habitat within the Loxton Wind Energy Facility 3 site along the Soutpoort River, the camera trapping did not pick up any Riverine Rabbit within the site despite numerous cameras located within the areas considered suitable for this species. However, given the high conservation status of the Riverine Rabbit, this species is assumed present for the purposes of the current study. Apart from the species listed above by the screening tool, there are several additional fauna species of concern that are either confirmed present in the area such as the Mountain Reedbuck, or potentially present in the general area including the Grey Rhebok *Pelea capreolus* (NT) and Brown Hyena *Hyaena brunnea* (NT).		
Bats (Wind) Assessment	**Not Determined.**	**High Sensitivity**	**Medium Sensitivity**
	Comment: Based on current taxonomic information and field data, no threatened species were recorded or expected to occur on site. The acoustic monitoring results show that the median number of bat passes/hour per night at height (50 m and 100 m) would classify the study area as high sensitivity for Egyptian free-tailed bat (except during winter) and moderate to low sensitivity for Cape serotine and Roberts's flat-headed bat depending on season. The outcome of the SSV is that the overall sensitivity of the site varies by bat species and season, linked to their relative activity levels. However, the two sensitivities are based on different data types. The Screening Tool is based on broad scale habitat data whereas the SSV is based on bat collision risk with wind turbines derived from activity data collected within the project boundary and is therefore a better approximation of the project sensitivity because collision is the primary impact. As such the SSV **disputes** the current environmental sensitivity of the proposed project area, arguing that the sensitivity should be reduced to low for Cape serotine, low-medium for Roberts's flat-headed bat and high for Egyptian free-tailed bat.		

2.2 Specialist Scoping Methodology

To evaluate the potential preliminary environmental impacts and verify the sensitivity of the screening report, information relating to the existing environmental conditions was collected through field and desktop research, this is known as the baseline.

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

- Description of existing environment/baseline conditions;
- Site Sensitivity Verification;
- Prediction and Assessment of likely potential impacts, including cumulative impacts (both positive and negative), where relevant;
- Identification of appropriate mitigation measures;
- Predication and Assessment of residual (potential) environmental impacts;
- Plan of Study for the EIA Phase, and
- Summary of findings and recommendations.

The methodology each specialist used to collate their report is summarised below and is available in each Specialist Report attached to this Report as Volume II.

2.2.1 Soils, Land Use and Agricultural Potential

The specialist undertook a desk-based assessment of existing soil and agricultural data for the site. Soil data was sourced from the land type data set provided by the DAFF (Department of Agriculture, Forestry and Fisheries). Satellite imagery of the site was sourced from Google Earth. Land capability data, field crop boundaries and rainfall and evaporation data were all sourced from various data applications and data sets.

A site investigation was not considered necessary for this assessment, including for the site sensitivity verification as the land capability limitation is predominantly a function of climate, which cannot be usefully informed by a site assessment.

Based on the specialists' verification of the site as 'less than high' sensitivity, the level of agricultural assessment followed by the specialist was an Agricultural Compliance Statement.

2.2.2 Freshwater and Wetlands (Aquatics)

The study followed the approaches of several national guidelines regarded for aquatic assessments. These were then modified by the specialist, to provide a relevant mechanism of assessing the present state of the study systems applicable to the specific environment, and in a clear and objective manner, assess the potential impacts associated with the proposed development site. The methodology also included the considerations of the Macfarlene & Bredin (2017) buffer models and revisions to the SANBI National Wetland Inventory.

The assessment made use of the National Wetland Classification System (NWCS) approach and included delineating any natural waterbodies, and assessing the potential consequences of the proposed development on the surrounding watercourses.

2.2.3 Terrestrial Ecology (Flora and Fauna)

Several site visits as well as a desktop review of the available ecological information for the area was conducted to identify and characterise the ecological features of the site.

During the site visits, the wind farm site was extensively investigated. Potentially sensitive features within the site were investigated, validated and characterised in the field including any pans, rocky outcrops and major drainage features that were observed in the field or

from satellite imagery of the site. Particular attention was paid to the integrity of habitats present as well as the broader ecological context in terms of connectivity and broad-scale ecological processes likely to be operating at the site.

In terms of the actual sampling approaches that were used, the vegetation of the site was characterised through walk-through surveys distributed across the site, in which plant species lists for the different habitats observed were compiled. Specific attention was paid to the presence of species of conservation concern (SCC) as well as other species which are considered to be of ecological significance.

In terms of fauna, active searches were conducted for reptiles and amphibians across the site, within habitats where such species are likely to be encountered. In addition, all reptiles and amphibians encountered while doing other field work were recorded. As the Riverine Rabbit is a species of particular concern in the area, camera trapping was conducted across the site within areas observed to be potentially favourable for this species. Camera traps were placed in the field from 16 - 18 June 2022, checked 10 - 11 August 2022 and retrieved on 07 September 2022. This gives rise to over 10 weeks of continuous camera trap sampling. There are six camera trap locations that fall within the Loxton WEF3 boundary and another four that are within 1 km of the boundary and considered to be of significance for the Loxton WEF 3.

This information was used to derive an ecological sensitivity map that presents the ecological constraints for the development and which should be used to inform the layout of the development. Although the current study was a scoping study, a preliminary assessment was provided in which impacts are assessed for the pre-construction, construction, operation, and decommissioning phases of the development.

2.2.4 Avifauna

As part of the feasibility investigations towards the suitability for the development of a wind farm, an Avifaunal Screening Assessment for the site was conducted and the developable area was refined on the basis of identified avifaunal constraints. This included running the Verreaux's Eagle Risk Assessment (VERA) model, to identify high and medium risk areas around known Verreaux's Eagle nests. Following the initial feasibility assessment, the specialist conducted the necessary 12 months' pre-construction bird monitoring which was initiated on site in July 2021 and completed in May 2022. Each seasonal Site Visit consisted of approximately 14 consecutive days by a team of four skilled observers, to record data on bird species and abundance on and near site. These seasonal site visits covered: summer (when summer migrants are present); winter (when raptors breed and Blue Cranes flock); spring (when summer migrants are arriving on site and many species start to breed; and autumn (when summer migrants are leaving and many raptors are preparing to breed).

Following the 12-month monitoring programme for the developable area the Avifaunal Impact Assessment Report was produced. The report and monitoring programme followed the "Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Avifaunal Species by Onshore Wind Energy Generation Facilities where the Electricity Output is 20 Megawatts or More" (Government Gazette 43110, GN 320, 20 March 2020).

The 12-month monitoring programme included the following and is represented in Plate 4.1 below:

Sample counts of small terrestrial species - Transects were counted by two observers walking along a line recording all birds seen and heard within 200 m either side,

Counts of large terrestrial species and raptors - Transects were counted by driving slowly (40-50km/hr) along the transect scanning for birds. Every two kilometres or at suitable vantage points observers got out of the vehicle to stand and scan with binoculars.

Focal site surveys and monitoring - Focal Sites were surveyed at least once on each site visit and comprised at least 15 - 20 minutes of observation for breeding activity around the nest of interest, or a count of the birds using a dam site. Four Verreaux's Eagle nests identified during screening (FS 1, 2, 3 and 5) were designated as Focal Sites. As monitoring progressed, four of the larger dams on site were identified as important for waterfowl counts (FS 6, 12, 13 and 16). Other raptor nests, a Hamerkop nest and arable land were also included as Focal Sites, and Ludwig's Bustard lekking activity was noted at what became FS 14 and 15.

Incidental observations - This monitoring programme comprised a significant amount of field time on site by the observers, much of it spent driving between the above activities. As such, it is important to record any other relevant information whilst on site. All other incidental sightings of priority species (and particularly those suggestive of breeding or important feeding or roosting sites or flight paths) within the broader study area were recorded. As far as possible, field teams attempted to avoid recording resident species in the same location on consecutive days, however some replication is highly probable, particularly between site visits.

Direct observation of bird flight on site - The aim of direct observation is to record bird flight activity on site. An understanding of this flight behaviour will help explain any future interactions between birds and the wind farm. Spatial patterns in bird flight movement may also be detected, which will allow for input into turbine placement. Direct observation was conducted through counts at a number of fixed Vantage Points (VPs) in the study area. These VPs provided coverage of a reasonable and representative proportion of the entire study area. VP's were identified using GIS (Geographic Information Systems), and then fine-tuned during the project setup, based on access and other factors such as viewsheds and a representation of habitats. Since these VPs aim at capturing both usage and behavioural data, they were positioned mostly on high ground to maximise visibility. The survey radius for VP counts is 2 kilometres (although large birds are sometimes detected further). Vantage Point counts were conducted by two observers and birds were recorded 360° around observers. Data should be collected during representative conditions, so the sessions were spread throughout the day, with each VP being counted over 'early to mid-morning', 'mid-morning to early afternoon', and 'mid-afternoon to evening'. Each VP session was 4 hours long, which is believed to be towards the upper limit of observer concentration span, whilst also maximising duration of data capture relative to the travel time to the Vantage Points. A maximum of two VP sessions were conducted per day, to avoid observer fatigue compromising data quality. At least 48 hours of Vantage Point observation was collected per Vantage Point, with certain VPs receiving a total of 72 hours of observation in compliance with the Verreaux's Eagle guidelines and VERA model identified areas (BirdLife South Africa 2017, 2021).

One of the most important attributes of any bird flight event is its height above ground, since this will determine its risk of collision with turbine blades. Since it is possible that the turbine model (and hence the exact height of the rotor swept zone) could still change on this project, actual flight height was estimated rather than assigning flight height to broad bands (such as proposed by Jenkins *et al.* 2015). This 'raw' data will allow flexibility in assigning to classes later on depending on final turbine specifications.

Control site - At this site, two Vantage Points (12 hours per VP, per Site Visit), one Driven Transect and three Walked Transects were monitored in addition to the main site. The findings from the control site are not presented in this Scoping Report but are available for comparison post-construction where necessary.

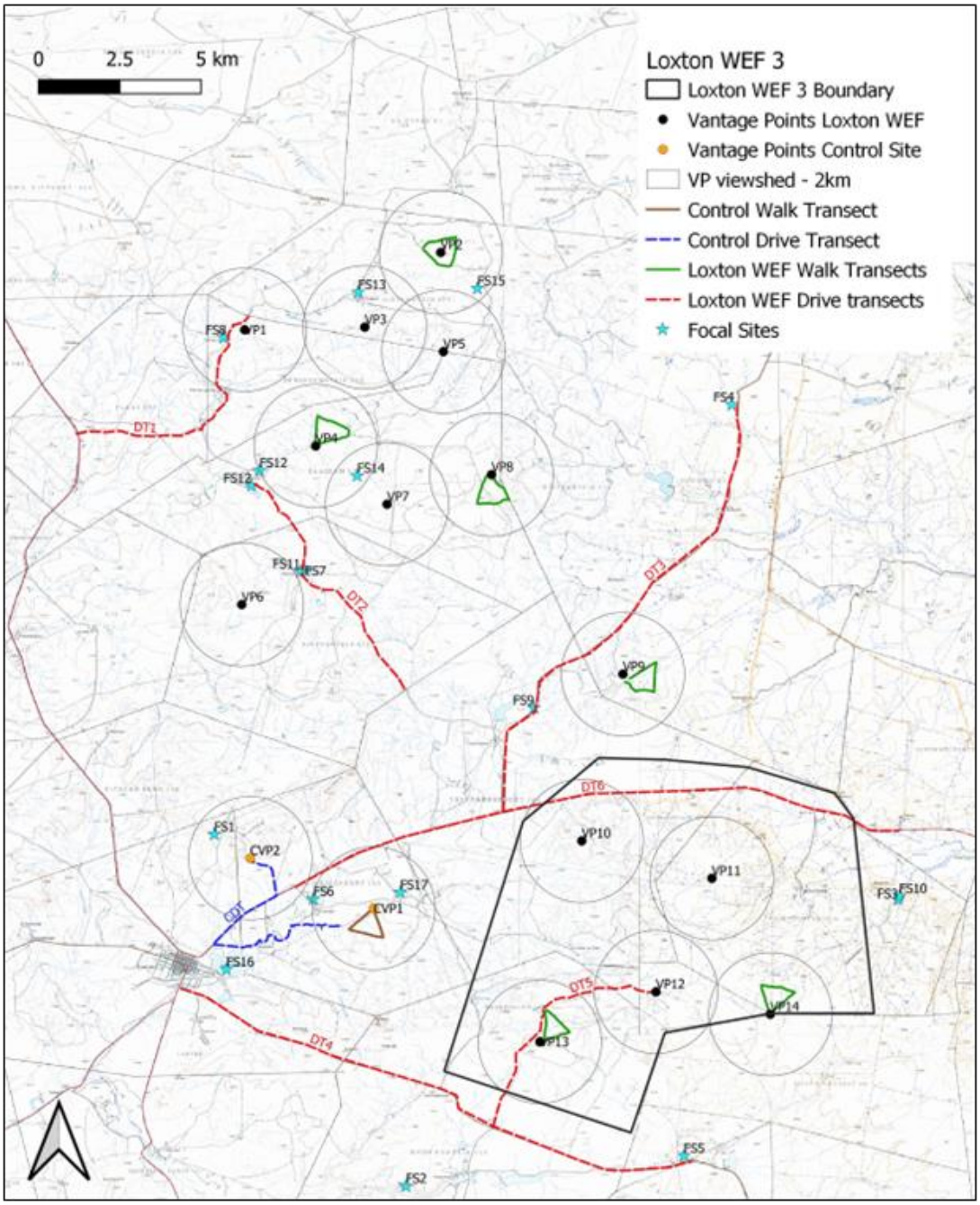


Plate 3-1: Pre-construction bird sampling methods at the proposed development site.

2.2.5 Bats

The specialist undertook a desktop study assessment plus a 10 km buffer given that bats are volant mammals (Scottish Natural Heritage 2019). This area was studied at a desktop level to determine which bat species (i.e., impact receptors) are likely to occur at the project, to provide information on their natural history and conservation status, and to contextualise the project site within the larger social-ecological environment with respect to bats. Bats were also studied through eight months of field surveys which began on 6

November 2021 and will be completed in November 2022 based on best practise in South Africa (MacEwan et al. 2020). The field data, as well as the desktop information was used to assess impacts. The final EIA will be based on the full 12 months of data from the pre-construction bat monitoring.

During the field surveys, bat activity was sampled at 10 locations with Wildlife Acoustics, Inc. SM4 bat detectors. Since a preliminary turbine layout was available, the study design was focused on surveying areas within the project boundary where turbines were likely to be installed. In addition, the study design prioritised collecting bat activity at height because seven meteorological towers are present on site. At three locations, SMM-U2 microphones were positioned at the top of a 10 m aluminium mast. At seven locations, microphones were positioned on a meteorological tower at 50 m and 100 m respectively. Sampling took place nightly from sunset to sunrise.

The scoping assessment was based on 237 nights of bat monitoring data. The sampling period included winter (30 nights), spring (25 nights), summer (90 nights) and autumn (92 nights). Most data available for the specialist scoping report were from autumn and summer. Since bat activity is typically higher in these seasons in the study area, the dataset is suitable to provide an approximation of risk to bats posed by the project. The limited spring and winter data is not a major limitation for assessing risk. Additional data from spring and winter will be included and assessed in the final EIA report.

Roost surveys were undertaken which entailed discussions with landowners to locate any known roosts or potential roosts with evidence of bats. In addition, buildings at farmsteads, as well as accessible rocky outcrops/crevices, were systematically surveyed during field visits in April 2022 (autumn), May 2022 (autumn), and September 2022 (spring). The surveys aimed to directly observe roosting bats, locate evidence of roosting bats (e.g., culled insect remains, fur-oil-stained exit and entry points, guano/droppings), and assess the likelihood for each potential roost to support bats.

Acoustic data retrieved from each bat detector were processed using Kaleidoscope® Pro (Version 5.4.2, Wildlife Acoustics, Inc.). Bats were automatically identified using the embedded "Bats of South Africa Version 5.4.0" reference library and verified by inspecting echolocation files. The number of acoustic files recorded was used as a measure to quantify bat activity.

2.2.6 Noise

This assessment was based on a desktop study and was assessed in terms of the Noise Sensitivity Theme using the National Web-based Environmental Screening Tool. Basic predictive models were also used to identify potential issues of concern. Wind turbines do emit noises at sufficient levels to propagate over large distances and the assessment indicates the potential noise impact on the closest receptors.

Furthermore, ambient sound levels were measured previously in areas with a similar developmental character. The data indicate ambient sound levels are generally low, with faunal and other natural sounds as the main source of noise in the area. Wind-induced noises influence ambient sound levels during periods with increased winds, with the ambient sound levels determined by numerous factors (vegetation type and density, faunal species in the area, etc.). The low ambient sound level was confirmed during a site visit conducted from the 3 to 5 June 2022 during periods with low winds, with data to be processed and included in the recommended Noise Impact Assessment Report for the EIA Phase. The ambient sound levels were measured in terms of Government Notice Regulation 320 of March 2020.

2.2.7 Heritage and Archaeology

A survey of available literature was carried out to assess the general heritage context into which the development would be set. Data was also collected via a field survey by two archaeologists subjected to a detailed foot survey on 25 June 2022.

2.2.8 Palaeontology

The study included desktop and field-based palaeontological heritage study based on information resources and the specialist expertise. Minimum standards for the palaeontological component of heritage impact assessment reports (PIAs) have recently been published by SAHRA (2013) and Heritage Western Cape (2021) and has been considered for the development of the study.

2.2.9 Visual / Landscape

The visual assessment methodology included the following steps:

- A 3D digital terrain model of the study area was prepared in order to determine the viewshed of the project, based on the preliminary layout.
- Potential sensitive receptors, such as farmsteads along the route, were identified using the viewshed map, Google Earth and a site visit.
- Landscape features and sensitive receptors were mapped together with recommended buffers for wind turbines, buildings, roads and powerlines.
- Field work was used to verify the existence and significance of landscape features and receptors in order to refine the visual mapping layers.
- A photographic record was made with the emphasis on views from potential sensitive receptors (mainly surrounding farmsteads and guest farms) at varying distances.
- The panoramic photographs, which included their GPS positions, were used to create the photomontages.
- Potential visual impacts relating to the proposed WEF for construction, operational and decommissioning phases of the project were assessed along with their relative significance.
- Mitigation measures to avoid or minimise potential negative visual impacts were formulated.
- Cumulative visual impacts in relation to other existing and proposed wind energy facilities and grids in the area were assessed.
- Impact significance ratings were determined based on the methodology provided by Arcus.
- A site visit was carried out from 19 to 21 September 2022. The season was not a consideration for the visual assessment, but clear visibility was required for the photographic survey.

2.2.10 Socio-Economic

The approach to the Scoping Level SIA study is desktop level and based on the Western Cape Department of Environmental Affairs and Development Planning Guidelines for Social Impact Assessment (February 2007). These guidelines are based on international best practice. A site visit will be undertaken during the Assessment Phase of the SIA and will include interviews with interested and affected parties.

2.2.11 Traffic and Transportation

The South African Traffic Impact and Site Traffic Assessment Standards (2014), and the Manual for Traffic Impact Studies (1995), form the basis for this traffic impact assessment. A Traffic Impact Assessment was compiled in line with guidelines for technical appraisal of the traffic impact of the proposed developments on the existing road network within a

study area, during the construction, operation and decommissioning phases of the Loxton WEF. A site visit is to be conducted once the position of the WTG has been finalised.

Traffic generation estimates used in the traffic assessment was based on the experience of similar projects. Due to the location of the proposed development, there are more than one route to transport material and equipment to the proposed development from various commercial centres in South Africa. Thus, for analysis purposes the estimated traffic volume for a specific activity is applied to all possible routes to the proposed development, resulting in a worst-case scenario. The most significant hourly increase in traffic volumes on the roads within the study area stems from the transportation of material and equipment to and from the proposed development. The maximum projected cumulative hourly increase in traffic volume is in the order of 62 vehicles per hour, which is greater than the threshold, of 50 vehicles per hour, stipulated in the South African Traffic Impact and Site Traffic Assessment Manual (2012), thus necessitating the requirement for a Traffic Impact Assessment.

2.3 Prediction of Potential Impacts

The prediction 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. For example, during the construction phase, traffic volumes are far greater than during the operational life of a WEF.

The project team has experience from environmental studies for other projects in the locality of the proposed development. The team is, therefore, able to identify potential impacts based on their experience and knowledge of the type of development proposed and the local area. Their inputs inform the scope for the S&EIA process.

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, which will also inform the PSEIA.

2.3.1 Assessment of Potential Impacts

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity or importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (or 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).

A 7-step approach for the determination of significance of potential impacts was developed by Arcus to align with the requirements of Appendix 3 of the EIA Regulations, 2014 (as amended). This 7-step approach was adapted from standard ranking metrics such as the Hacking Method, Crawford Method etc. and complies with the method provided in the EIA

guideline document (GN 654 of 2010) and considers international EIA Regulatory reporting standards such as the newly amended European Environmental Impact Assessment (EIA) Directive (2014/52/EU).

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

The approach is both objective and scientific based to allow appointed specialists and EAPs to retain independence throughout the assessment process.

The 7-Step approach for determining the significance of impacts pre, and post mitigation, is described below:

Step 1: Predict potential impacts by means of an appraisal of:

- Site Surveys,
- Project-related components and infrastructure,
- Activities related with the project life-cycle,
- The nature and profile of the receiving environment and potential sensitive environmental features and attributes,
- Input received during public participation from all stakeholders, and
- The relevant legal framework applicable to the proposed development

Step 2: Determination of whether the potential impacts identified in **Step 1** will be *direct* (caused by construction, operation, decommissioning or maintenance activities on the proposed development site or immediate surroundings of the site), *indirect* (not immediately observable or do not occur on the proposed development site or immediate surroundings of the site), *residual* (those impacts which remain after post mitigation) and *cumulative* (the combined impact of the project when considered in conjunction with similar projects in proximity).

Step 3: Description and determination of the significance of the predicted impacts in terms of the criteria below to ensure a consistent and systematic basis for the decision-making process. Significance is numerically quantified on the basis score of the following impact parameters:

1. ***Extent*** **(E)** of the impact: The geographical extent of the impact on a given environmental receptor.
2. ***Duration*** **(D)** of the impact: The length of permanence of the impact on the environmental receptor.
3. ***Reversibility*** **(R) of the impact**: The ability of the environmental receptor to rehabilitate or restore after the activity has caused environmental change
4. ***Magnitude*** **(M)** of the impact: The degree of alteration of the affected environmental receptor.
5. ***Probability*** **(P)** of the impact: The likelihood of the impact actually occurring.

A widely accepted numerical quantification of significance is the formula:

$$\underline{\mathbf{S=(E+D+R+M)*P}}$$

Where: *Significance=(Extent+Duration+Reversibility+Magnitude)*Probability*

The following has also been considered when determining the significance of a potential impact.

6. **Nature (N)** of the impact: A description of what causes the effect, what will be affected, and how it will be affected.
7. **Status (S)** of the impact: described as either positive, negative or neutral
8. **Cumulative impacts**.
9. Inclusion of **Public comment.**

The significance of environmental impacts is determined and ranked by considering the criteria presented in **Table 4.2** below. All criteria are rank according to 'Very Low', 'Low', 'Moderate', 'High' and 'Very High' and are assigned scores of 1 to 5 respectively.

Table 3-4: Defining the significant in terms of the impact criteria.

Impact Criteria	Definition	Score	Criteria Description
Extent (E)	Site	1	Impact is on the site only
	Local	2	Impact is localized inside the activity area
	Regional	3	Impact is localized outside the activity area
	National	4	Widespread impact beyond site boundary. May be defined in various ways, e.g. cadastral, catchment, topographic
	International	5	Impact widespread far beyond site boundary. Nationally or beyond
Duration (D)	Immediate	1	On impact only
	Short term	2	Quickly reversible, less than project life. Usually up to 5 years.
	Medium term	3	Reversible over time. Usually between 5 and 15 years.
	Long term	4	Longer than 10 years. Usually for the project life.
	Permanent	5	Indefinite
Magnitude (M)	Very Low	1	No impact on processes
	Low	2	Qualitative: Minor deterioration, nuisance or irritation, minor change in species/habitat/diversity or resource, no or very little quality deterioration. Quantitative: No measurable change; Recommended level will never be exceeded.
	Moderate	3	Qualitative: Moderate deterioration, discomfort, Partial loss of habitat /biodiversity /resource or slight or alteration. Quantitative: Measurable deterioration; Recommended level will occasionally be exceeded.
	High	4	Qualitative: Substantial deterioration death, illness or injury, loss of habitat /diversity or resource, severe alteration or disturbance of important processes. Quantitative: Measurable deterioration; Recommended level will often be exceeded(e.g. pollution)
	Very High	5	Permanent cessation of processes
Reversibility (R)	Reversible	1	Recovery which does not require rehabilitation and/or mitigation.
	Recoverable	3	Recovery which does require rehabilitation and/or mitigation.
	Irreversible	5	Not possible, despite action. The impact will still persist, and no mitigation will remedy or reverse the impact.
Probability (P)	Improbable	1	Not likely at all. No known risk or vulnerability to natural or induced hazards
	Low Probability	2	Unlikely; low likelihood; Seldom; low risk or vulnerability to natural or induced hazards

Impact Criteria	Definition	Score	Criteria Description
	Probable	3	Possible, distinct possibility, frequent; medium risk or vulnerability to natural or induced hazards.
	Highly Probable	4	Highly likely that there will be a continuous impact. High risk or vulnerability to natural or induced hazards
	Definite	5	Definite, regardless of prevention measures.

The *significance* (s) of potential impacts identified according to the criteria above has been colour coded for the purpose of comparison. This colour coding will be used in impact tables.

Significance is deemed Negative (-)			Significance is deemed Positive (+)		
0 - 30	31 - 60	61 - 100	0 - 30	31 - 60	61 - 100
Low	Moderate	High	Low	Moderate	High

Step 4: Determination of practical and reasonable mitigation measures based on specialists' inputs and field observations following the mitigation hierarchy (avoid, minimise, manage, mitigate, or rehabilitate).

Step 5: Evaluation of predicted residual impacts after implementation of mitigation measures.

Step 6: Determination of the significance of the impact taking into consideration the predicted residual impacts after implementation of mitigation measures.

Step 7: Based on an acceptable significance of the impact, determination of the need and desirability of the proposed development and an opinion as to whether the development should proceed or not.

The Assessment of the significance of potential impacts is then populated in an Impact Summary Table, see Section 10 of this Report for the specialists' potential impact assessments.

2.3.2 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 are defined and will be 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. Therefore, all potential projects are included, even though it is unknown how many of these will actually be constructed.

Renewable energy sites included for cumulative impact assessment are based on the knowledge and status of the surrounding areas at the time of the specialists compiling their assessments, these will be updated as applicable through the EIA process.

A preliminary assessment of cumulative impacts has been made in the Scoping Phase and will be assessed further in the EIA Phase.

3 DESCRIPTION OF THE BASELINE ENVIRONMENT

In order to evaluate the potential environmental impacts, information relating to the existing environmental conditions or baseline environment is collected through field and desktop research. The baseline environment also extends into the future, although predictions of any changes can involve a high number of variables and may be subject to potentially large uncertainties. As a result, in most cases, the baseline is assumed to remain unchanged throughout the operation of the development. Where this is not the case, this is stated.

The baseline environment has been used to identify any potential sensitive receptors on and near the site, and it is used to assess what changes may take place during the construction, operation and decommissioning phases of the development and the effects, if any, that these changes may have on these receptors.

Within each technical assessment, the methods of data collection are discussed with the relevant specialists. Data is also collected from public records and other archive sources and where appropriate, extensive field surveys are carried out. The timing/seasonality of the work within the study area is also outlined within each assessment where applicable.

3.1 Regional and Local Context

The project development site is located approximately 15 km East of Loxton within the Ubuntu Local Municipality (ULM) which falls within the jurisdiction of the Pixley Ka Seme District Municipality (PKSDM) in the Northern Cape Province.

The PKSDM is made up of eight category B local municipalities which include Emthanjeni, Kareeberg, Thembelihle, Siyathemba, Renosterberg, Ubuntu, Siyancuma and Umsobomvu municipalities, see Plate 5.1 below. The town of Victoria West is the administrative seat of the ULM. The project area is located in Ward 3 of the ULM. The district municipal area is however well located in a central position in terms of its regional context with three major transport routes dissecting the municipal area. These routes include the N1 between Cape Town and Johannesburg, the N9 route from Colesberg joining the N10, which links Namibia with the Eastern Cape and the N12 route from Johannesburg via Kimberly to Cape Town.

One of South Africa's largest rivers, the Orange River also flows through the heart of the municipal area providing water for irrigation, farming, drinking and recreational uses along the banks of the river. The Gariep Dam, Vanderkloof Dam and the Boegoeberg Dam area three major dams all located within the district municipal area. The abundance of water is however only limited to the areas around the river, with the largest part of the district municipal area identified as a water scare area, which adversely influence the economy of these areas.

The population of the ULM in 2016 was 19 471 (Community Household Survey 2016). Of this total, 38.6% were under the age of 18, 55.9% were between 18 and 64, and the remaining 5.5% were 65 and older. The population of Ward 3 in 2011 was 4 715. Of this total, 37% were under the age of 18, 58% were between 18 and 64, and the remaining 5% were 65 and older. The ULM and Ward 3 therefore have a high percentage of the population that fall within the economically active group of 18-65. The figures are similar to the figures for the PKSDM and Northern Cape (58.5% and 57.7% respectively).

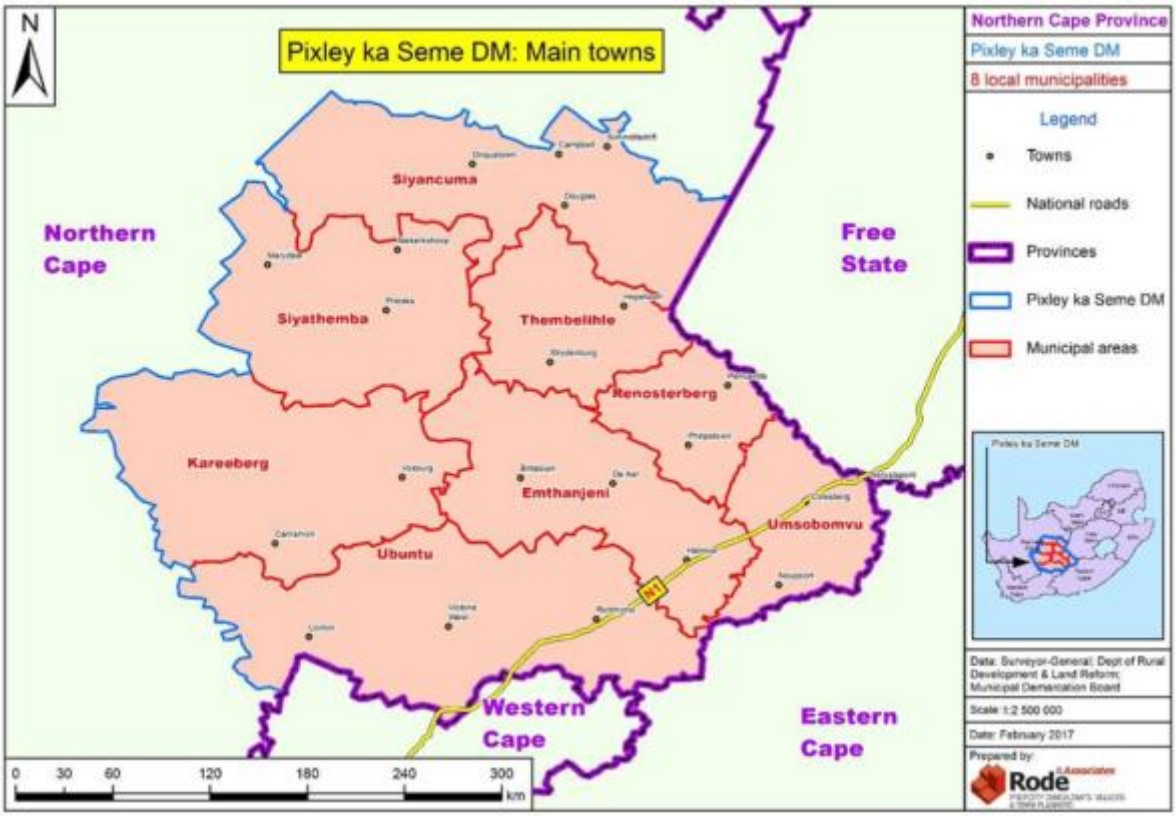


Plate 3-1: Location of Ubuntu Local Municipality within the Pixley Ka Seme District Municipality

3.2 Biophysical Characteristics of the Study Area

3.2.1 Topography and Terrain

The topography of the region is one of its main assets with vast open spaces and unspoilt panoramic visual vistas stretching over great distances. The topography is related to the geology and relief with altitudes ranging between 1000m to 1800m above sea level. Land reforms associated with plains, hills and lowlands cover approximately 80% of the region. Plains have slopes of less than 5° (8%) and result in a gradual change of climatic conditions. Ridges have slopes of more than 5° and therefore have more variable climatic conditions.

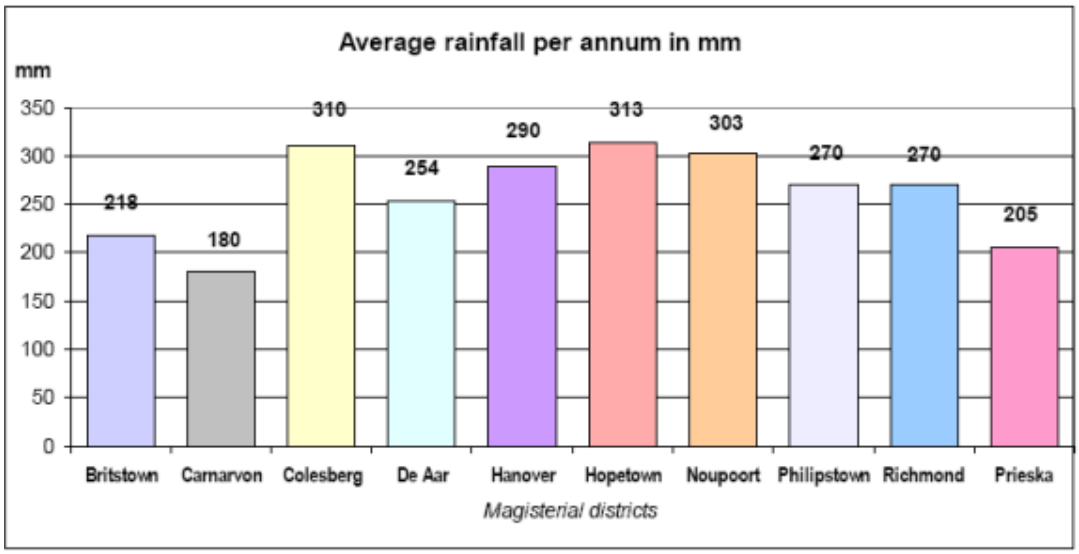
The farm is located in a sheep farming agricultural region. Grazing is the dominant agricultural land use on the site and surrounds. Grazing capacity of the site is low at 26 hectares per large stock unit.

3.2.2 Climate conditions

The PKSD lies in the upper regions of the Karoo and experiences moderate to hot summers and cold dry winters. Being a very hot area, the average annual maximum temperature is around 40°C, while the average annual minimum temperature is -10°C. The winters are cold and dry with moderate frost occurring during the night. The coldest months are during June and July. The area is located in a summer rainfall region with very little rainfall. This region is very dry and most of the region receives less than 300mm of rain per annum with the areas in the east receiving generally more rain than the dryer areas in the west. Rain occurs predominantly in the form of summer thunderstorms and 60% of the average annual rainfall occurs between October and April. The mean annual rainfall ranges from 130mm - 300mm per year. Average annual evaporation ranges between 1600mm in the east and 2400mm in the west. The PKSD

is situated in part of the Orange and the Gamtoos River catchment areas. The Orange and Vaal Rivers are the two perennial rivers in the region.

The district is known for severe droughts and often experiences heavy rainfalls which leads to



flooding and erosion. Due to the dry climate the area also experiences a lot of dust pollution that can be exacerbated by overgrazing and poor farming management systems.

Plate 3-2: Average rainfall per magisterial district in Pixley Ka Seme District

3.2.3 Geology

The geology in the PKSDM area is dominated by horizons of dolerite rocks. Dolerite covers approximately 36% of the area, followed by Tillite (12%) and the rock types of Sand, Andesite, and Quartzite covering between 7% and 5% of the area. The remainder of the rock types cover less than 4%. (Pixley Ka Seme District SDF 2007).

3.2.4 Soils, Land Use and Agricultural Potential

The arid climate (low rainfall of approximately 199 to 221 mm per annum and high evaporation of approximately 1,371 to 1,412 mm per annum) (Schulze, 2009) is the limiting factor for land capability, regardless of the soil capability and terrain. Moisture availability is very limiting to any kind of agricultural production, including grazing. Because climate is the limiting factor that controls production potential, it is the only aspect of the agro-ecosystem description that is required for assessing the agricultural impact of this development. All other agricultural potential parameters become irrelevant under the dominant limitation of aridity.

The farm is located in a sheep farming agricultural region. Grazing is the dominant agricultural land use on the site and surrounds. Grazing capacity of the site is low at 26 hectares per large stock unit.

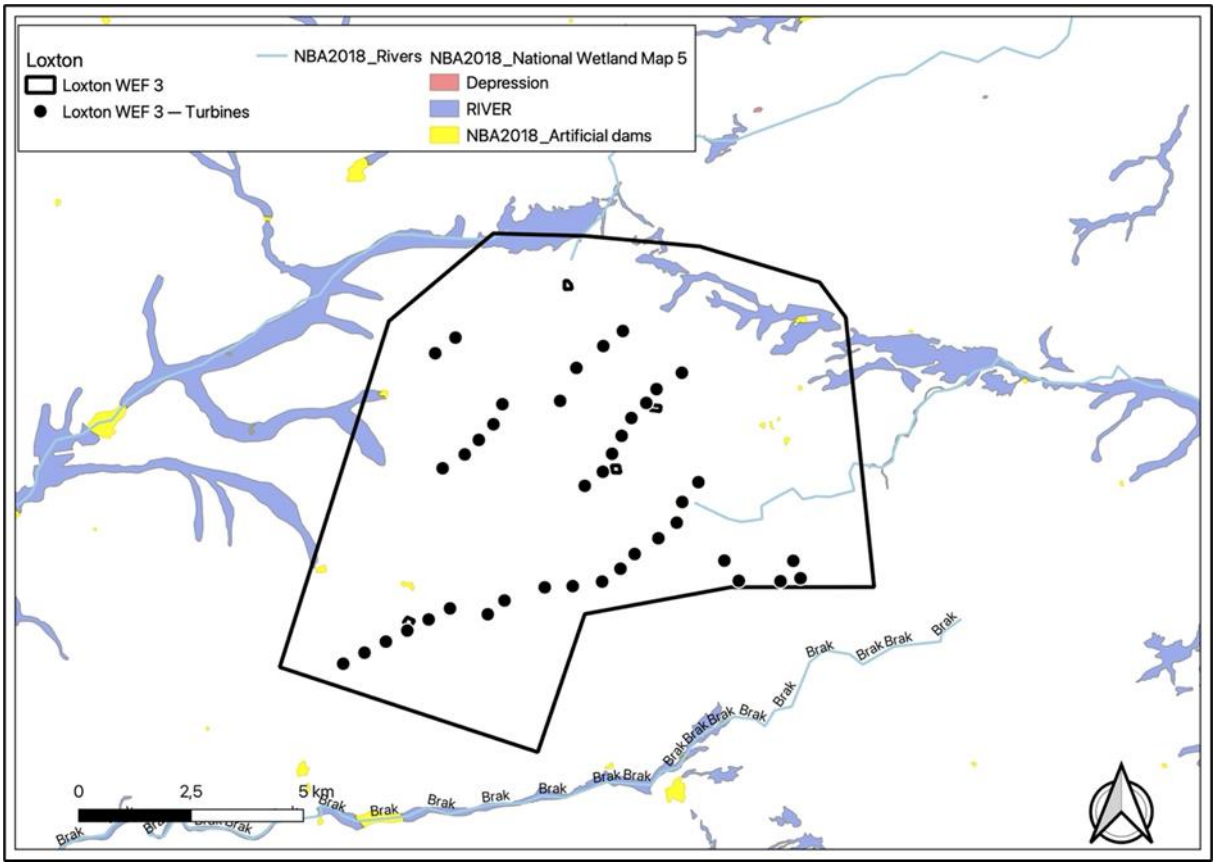
3.2.5 Freshwater and Wetlands (Aquatics)

The study area is dominated by three major types of natural aquatic features and a small number of artificial barriers associated with catchments and rivers, characterised as follows:

- Ephemeral watercourses - alluvial systems with or without riparian vegetation. These range from narrow channels to broad flood plain areas;
- Depressions
- Minor watercourses; and
- Dams and weirs / berms with no wetland or aquatic features.

The site is mostly located within the D55D (Soutpoort River), with small portions in the D5G (Gansvlei River) and the D61J (Groen River) Quinary Catchments of the Nama Karoo Ecoregion in the Orange River Water Management Area (Kimberley Regional Office). The DFFE screening reports high sensitivity rating was based on the presence of these rivers, and the report also contain National Freshwater Priority Ecosystem Areas (NFEPAs).

Several wetlands were found within the region however, only riverine features such as alluvial floodplains and riparian thickets dominated by *Vachellia karroo*, *Searsia lancea*, *Euclea undulata* and *Gymonsporia buxifolia* were observed. However, this will be confirmed during a more detailed assessment of the project footprints in the EIA phase.



The study area is not located within an International Bird Area (IBA) or a Strategic Water Resource Area and did not contain any Wetland Clusters or listed Threatened Ecosystems.

Plate 3.3: National Wetland Inventory wetlands and waterbodies (van Deventer et al., 2020).

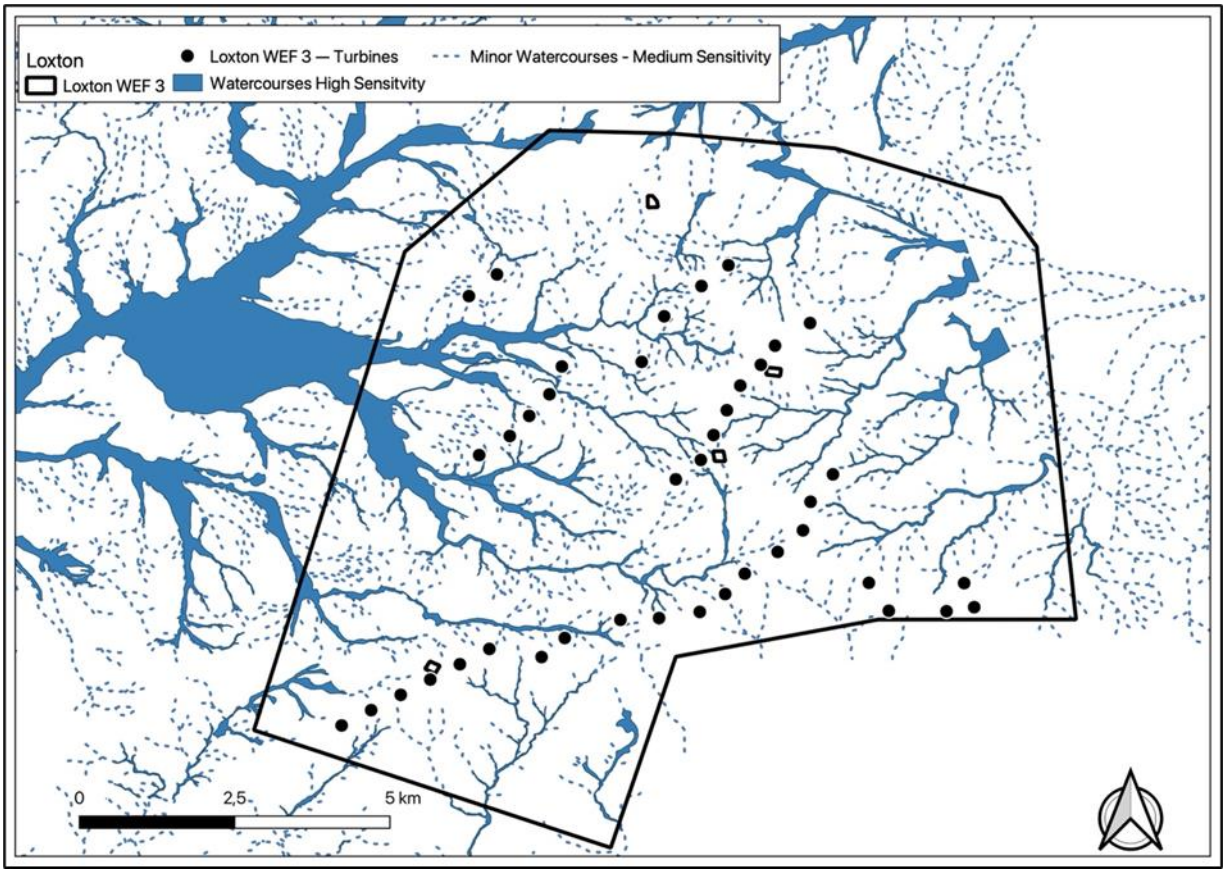


Plate 3.4: Waterbodies delineated in this assessment based on ground-truthing information collected.

The Present Ecological State (PES) of a river represents the extent to which it has changed from near pristine condition (Category A) towards a highly impacted system where there has been an extensive loss of natural habit and biota, as well as ecosystem functioning (Category E). All of the systems assessed by DWS (2014) on a Subquaternary level within the study area were rated as PES B = Largely Natural to C = Moderately Modified. While these were also rated as High in terms of Ecological Sensitivity and Low in terms of Ecological Importance respectively. Based on the information collected during the preliminary field investigations, these ratings were verified and upheld for the riverine systems. The high ecological sensitivity rating for the natural water sources was further substantiated by the fact that some of the affected catchments are included in both the National Freshwater Priority Atlas and the respective provincial Biodiversity Spatial Plan CBA spatial layers. Overall, these catchment areas and subsequent rivers / watercourses are largely in a natural state with localised impacts in some areas, which include the following:

- Erosion and sedimentation associated with road crossings, and
- Impeded water flow due to several in channel farm dams and weirs.

3.2.6 Terrestrial Biodiversity

a. Flora

Vegetation Types

The national vegetation map (Mucina & Rutherford 2006 & SANBI 2018 update) for the study area is depicted below in Plate 5 5. The majority of the Loxton WEF 3 site is classified as falling within the Eastern Upper Karoo vegetation type, with some Bushmanland Vloere in the north and a small extent of Upper Karoo Hardeveld also in the north of the site. This is clearly an oversimplification of the vegetation of the site and the on-site field assessment for the Loxton Wind Energy Facility 3 site indicates that there are much more extensive tracts of Upper Karoo Hardeveld within the site, as well as more extensive areas of riparian vegetation which would currently fall into the Bushmanland Vloere vegetation type but are more-closely allied to the Southern Karoo Riviere vegetation type. These three vegetation types are described and illustrated briefly below.

Eastern Upper Karoo
The whole of the Loxton WEF 3 is mapped under the Vegmap as falling within the Eastern Upper Karoo vegetation type. Eastern Upper Karoo has an extent of 49 821 km2 and is the most extensive vegetation type in South Africa and forms a large proportion of the central and eastern Nama Karoo Biome. This vegetation type is classified as Least Threatened, and about 2% of the original extent has been transformed largely for intensive agriculture. Eastern Upper Karoo is however poorly protected and less than 1% of the 21% target has been formally conserved. Mucina & Rutherford (2006) list eight endemic species for this vegetation type, which considering that it is the most extensive unit in the country, is not very high. As a result, this is not considered to represent a sensitive vegetation type.

Within the study area, this is dominant vegetation type and forms the matrix in which the other vegetation units are embedded. There is however a fairly large degree of variation in the structure and composition of Eastern Upper Karoo within the site, driven largely by the substrate conditions, with the main differences being associated with dolerite-derived soils vs. shale and mudstone- derived soils. Overall, these tend to be represented by large tracts of fairly homogenous landscapes of low plant diversity. Dominant and characteristic species include low woody shrubs such as *Pentzia globosa, Rosenia humulis, Asparagus capensis, Eriocephalus ericoides, Pteronia sordida, Pteronia incana, Plinthus karooicus, Helichrysum luciloides, Felicia muricata*, with a varying density of low succulent shrubs such as *Zygophyllum lichtensteinii, Aridaria noctiflora* and *Ruschia spinosa*, with a variable grass layer dominated by *Stipagrostis ciliata, Stipagrostis obtusa, Enneapogon desvauxii* and *Tragus berteronianus.*

Upper Karoo Hardeveld
The extent of Upper Karoo Hardeveld within the site as mapped by the VegMap significantly under-represents this vegetation type within the site. The majority of dolerite outcrops and hills within the site can be considered to represent this vegetation type. The Upper Karoo Hardeveld vegetation type is associated with 11 734 km2 of the steep slopes of koppies, buttes mesas and parts of the Great Escarpment covered with large boulders and stones. The vegetation type occurs as discrete areas associated with slopes and ridges from Middelpos in the west and Strydenburg, Richmond and Nieu-Bethesda in the east, as well as most south-facing slopes and crests of the Great Escarpment between Teekloofpas and eastwards to Graaff-Reinet. Altitude varies from 1000-1900m. Mucina & Rutherford (2006) list 17 species known to be endemic to the vegetation type. This is a high number

given the wide distribution of most karoo species and illustrates the relative sensitivity of this vegetation type compared to the surrounding Eastern Upper Karoo.

The Upper Karoo Hardeveld vegetation type usually consists of very rocky ground and is often associated with steep slopes, with the result that it is considered vulnerable to disturbance but is also an important habitat for fauna. It also contains a higher abundance of protected plant species than the adjacent areas of Eastern Upper Karoo. In addition, these areas are considered to represent sutiable habitat for the Karoo Dwarf Tortoise (VU). Consequently, it is generally considered higher ecological sensitivity than the surrounding areas. This habitat creates a wide variety of microhabitats for fauna and flora and the areas with large amounts of exposed rock have therefore been mapped as high sensitivity.

Southern Karoo Riviere
Although not all areas associated with this vegetation type have been mapped in the VegMap, the vegetation along the major rivers within the site corresponds with the Southern Karoo Riviere vegetation type. The Southern Karoo Riviere vegetation type is associated with the rivers of the central karoo such as the Buffels, Bloed, Dwyka, Gamka, Sout, Kariega and Sundays Rivers. About 12% has been transformed as a result of intensive agriculture and the construction of dams. Although it is classified as Least Threatened, it is associated with rivers and drainage lines and as such represents areas that are considered ecologically significant. Common and dominant species in the drainage lines and within the adjacent floodplain vegetation include Sporobolus ioclados, *Helichrysum pentzioides, Drosanthemum lique, Pentzia globosa, Salsola aphylla, Tribulis terrestris, Felicia muricata, Atriplex vestita, Zygophyllum retrofractum, Cynodon dactylon, Chrysocoma ciliata, Stipagostis namaquensis, Lycium pumilum, Lycium cinereum, Artemisia africana, Tripteris spinescens, Exomis microphylla* and *Derverra denudata*.

Although there are no large drainage systems present within the Loxton WEF 3 site with habitat that is considered highly suitable for the Riverine Rabbit, there are areas with confirmed Riverine Rabbit sightings adjacent to the site in the area bounded by Loxton in the west and R63 in the north. In general, the drainage features within the site are poorly developed without extensive areas of riparian vegetation

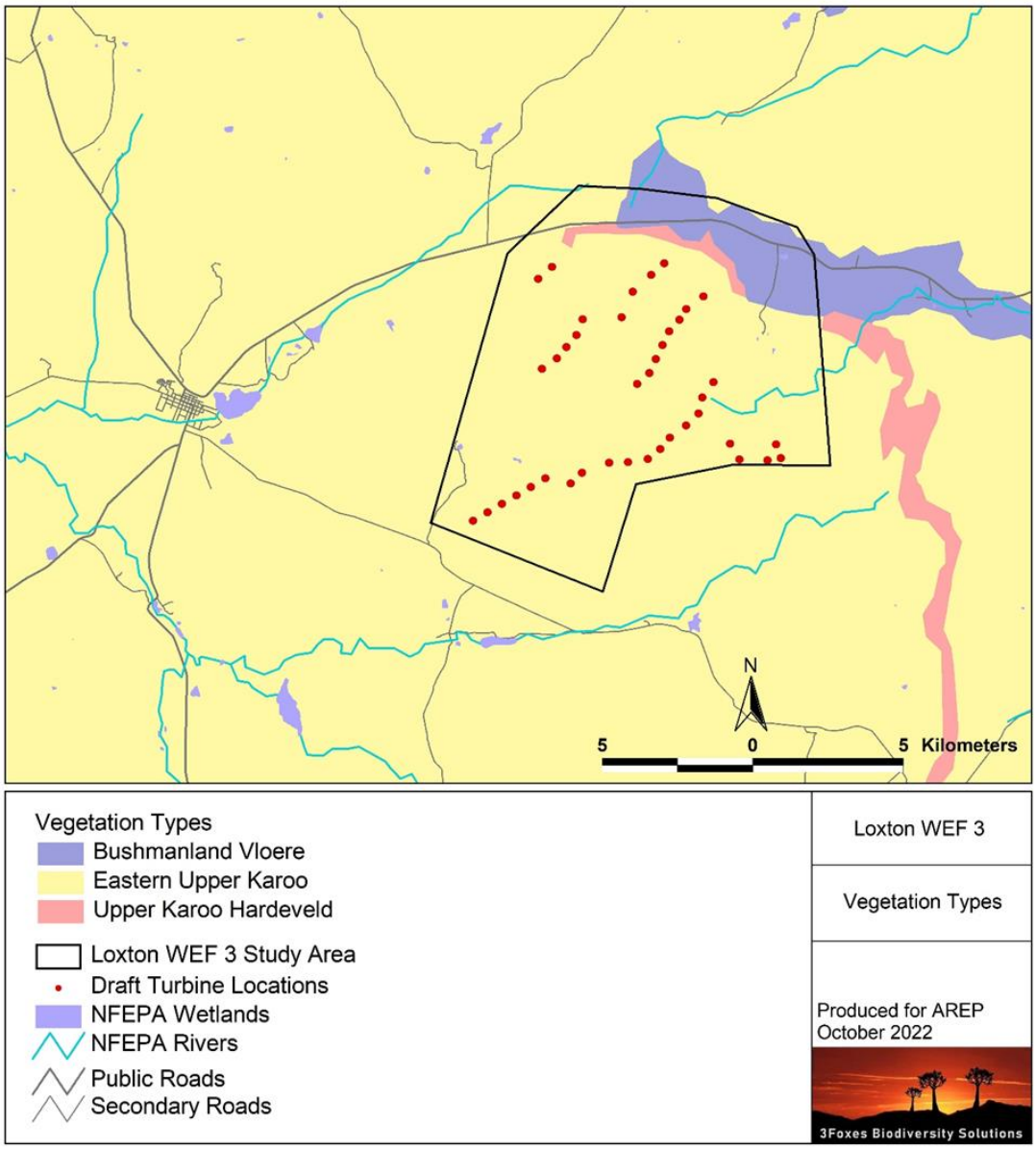


Plate 3-3: The national vegetation map (SANBI 2018 Update) for the Loxton Wind Energy Facility 3 and surrounding area.

b. Fauna

Mammals

As many as 70 mammals are listed for the wider study area in the MammalMap database, but many of these are introduced or conservation-dependent and approximately 48 can be considered to be free-roaming and potentially impacted by the development. Species confirmed present through camera trapping or direct observation include African Wildcat, Steenbok, Cape Hare, Yellow Mongoose, Honey Badger, Cape Grey Mongoose, Springhare, Water Mongoose, Rock Hyrax, Cape Porcupine, Kudu, Caracal, Suricate, Aardvark, Cape Fox, Bat-eared Fox. Red-listed species that potentially occur in the area include the Riverine Rabbit *Bunolagus monticularis* (CR), Black-footed Cat Felis nigripes (VU), Grey *Rhebok Pelea capreolus* (NT), Mountain Reedbuck *Redunca fulvorufula* (EN) and Brown *Hyena Hyaena brunnea* (NT). However, none of these listed species were captured by the

camera traps, suggesting that these species are either absent or only rarely occur in the area. There is however suitable habitat for the Riverine Rabbit within the site and some avoidance of the habitat for this species should be implemented at the site. In general, the mammalian community of the site is likely to be typical of the area.

In terms of the sensitivity mapping relating more generally to mammals, the larger riparian areas have been classified as Very High sensitivity based on their value as Riverine Rabbit habitat but also as a result of their general ecological significance. The rocky hills and steep slopes have been classified as Very High sensitivity on account of the value of these areas as habitat for mammals associated with rocky areas and the more general ecological value of these areas. While these features occupy a fairly large proportion of the site, the overall degree of potential conflict between the development and these areas appears to be fairly low.

The Riverine Rabbit is potentially of concern for the Loxton WEF 3 development. This species has been detected south and east of the site and has a high fidelity to specific riparian communities associated with the larger drainage systems of the area. Although this species was not detected within the site, the demarcated areas of suitable habitat should be buffered from development by 500 m as a precaution. These buffers have been integrated into the turbine no-go layer and should be used to inform the final location of turbines at the site. Based on the preliminary layout for the Loxton WEF 3, there are no turbines located within the Riverine Rabbit buffer zones. The development of the Loxton WEF 3 would not have a significant impact on the areas of Riverine Rabbit habitat as the few roads that would need to pass through these areas are along existing roads with the result that the additional habitat loss would be low.

Reptiles

Reptile diversity in the wider area is relatively high which can be ascribed to the diversity of habitats present, especially along the Nuweveld escarpment south of the site. Approximately 63 reptile species are known from the general region and may potentially occur within the study area, with 14 being of confirmed occurrence, 45 of probable occurrence and four of possible occurrence. Species of potential concern include the local endemic, Braack's Pygmy Gecko and the Karoo Padloper. Braack's Pygmy Gecko *Goggia braacki* is a Western Cape endemic with an extremely restricted distribution range. Most of its distribution is associated with a section of the Hoogland Mountains range within the Karoo National Park. It is however not currently red-listed, but it can perhaps be regarded as the reptile icon for the Hoogland Mountains/Beaufort West region. It has thus far, not been recorded in the current area, but it may possibly (not probably) be present within the wind farm area. The only threatened (Red Listed) reptile species in this region is the Karoo Padloper (EN). This small tortoise is seldom observed, even when specifically targeted during herpetofaunal surveys as it is active for only very short parts of the day and may also aestivate for extended periods during unfavourable environmental conditions. They are associated with dolerite ridges and rocky outcrops of the southern Succulent and Nama Karoo biomes. Threats to this species include habitat degradation due to agricultural activities and overgrazing, and predation by Pied Crows which in recent decades have expanded in distribution range. There is suitable habitat within the Loxton WEF 3 site and this species should be considered present. Fortunately, tortoises are one of the few groups of reptiles that have been specifically studied with regards to their responses to wind energy development and no significant negative impacts have been detected within population's resident on wind farms (Agha *et al*. 2015, Lovich *et al*. 2011). Consequently, habitat loss for this species is likely to be the major avenue of potential impact resulting from the wind farm development. Specific attention to potential habitat loss for this species was paid during the sensitivity mapping and all areas which represent highly favourable habitat for this species have been mapped as no-go areas for turbines. There would however, still be

some impact on the smaller ridges due to turbines and access roads and hence some degree of habitat loss for this species.

Amphibians

The diversity of amphibians in the study area is relatively low with only 11 species having being recorded in the area. Species observed at the vicinity of the site include the Karoo Toad, Clawed Toad and Poynton's River Frog. There are no listed amphibian species known from the area although the Giant Bull Frog *Pyxicephalus adspersus* was previously listed as Near Threatened but has revised to Least Concern. This species is associated with temporary pans in the Karoo, Grassland and Savannah Biomes, but is not commonly recorded in the study area and its presence at the site is considered unlikely. Within the sites, the major drainage lines present have permanent or long-lived pools that can be used by toads and frogs for seasonal breeding purposes. But given that these areas are considered important for Riverine Rabbits and other ecological considerations, areas important for amphibians are captured through other sensitivities and there are no areas that would need to be avoided on specific account of amphibians. Given the localised nature of important amphibian habitats at the site as well as the generally arid nature of the site and the low overall abundance of amphibians, a significant long-term impact on amphibians is unlikely.

Critical Biodiversity Areas & Broad-Scale Processes

The whole of the site is mapped as CBA 1 and CBA 2. There are three turbines located within a CBA 1 and the other 41 turbines are located within CBA 2 areas. The estimated footprint of the development within CBAs is estimated at 65 ha. Although there are some NPAES Focus Areas which project into the site, there are no turbines within these areas and it is likely that roads and other infrastructure will avoid these areas also. As such there would not be any habitat loss within the NPAES Focus Areas.

Although development in CBAs is not desirable as this may negatively impact the ecological functioning and integrity of the underlying biodiversity features of the CBA, each case should also be examined and evaluated on its own merits as to the acceptability of the proposed development. This includes an evaluation of the nature of development and the threat it poses to the natural environment as well as an examination of the biodiversity features present in the affected area and the extent to which the development would pose a risk to these features and the overall functioning of the affected ecosystem. The various features underlying the CBA layer are detailed and apart from representation of the Eastern Upper Karoo and Upper Karoo Hardeveld, the presence of wetlands is an important feature which appears to drive the selection of these areas as CBAs. However, it is important to note that the CBAs are based on large hexagonal planning units (1 600 ha) and the actual features that require protection have not been mapped in detail apart from buffers that have been created around drainage features. As these features have been verified in the field and mapped at a high resolution in this study and classified as no-go areas where appropriate, the impact of the development on the more important underlying biodiversity features would be low. Important features observed in the field that correspond well with the CBA mapping include the large floodplain areas along the R63 which are outside of the current site boundary as well as the large areas of Upper Karoo Hardeveld that lie in the northeast of the site. Although the footprint within the CBA 2 areas is relatively large, impact on the underlying notable biodiversity features is seen as being relatively low given the avoidance that has been implemented. Nevertheless, as the footprint within the CBA is relatively large, there is potential for cumulative impact on CBAs that is less easily mitigated. This raises a question as to the need for an offset to account for these residual impacts. This question is not dealt with here apart from indicating that an offset needs analysis should accompany the EIA-phase reporting.

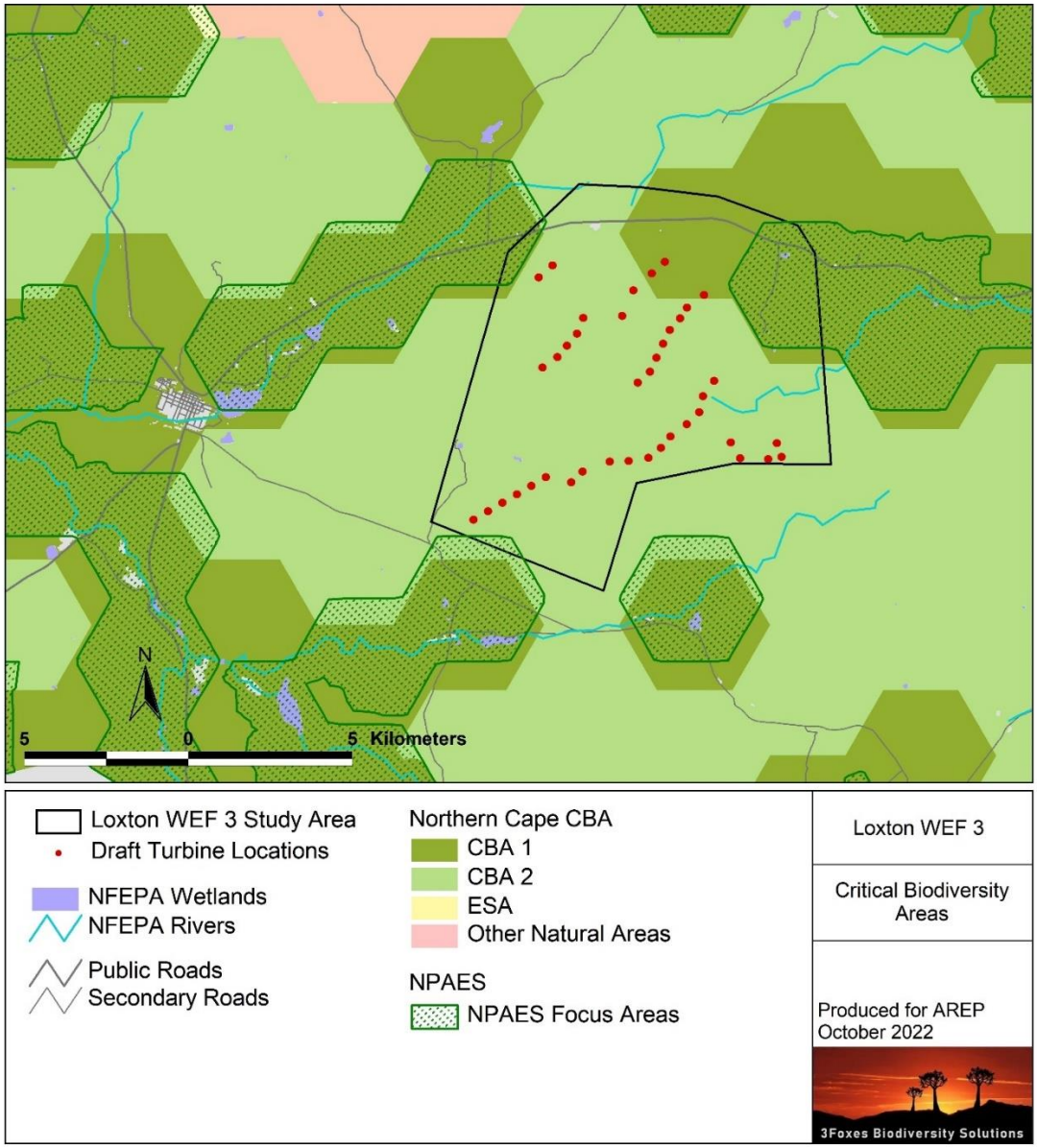


Plate 3-6: Extract of the Northern Cape CBA map for the study area, showing that the whole of the site falls within a CBA.

c. Avifauna

A number of micro habitats are available to birds in the area which includes: man-made dams, wetlands, streams / drainage lines, rocky ridges and small cliffs, limited grassland, Karoo shrubland and small areas of pasture / crops.

In general terms, the proposed project lies in a wilderness area, little disturbed by anthropogenic factors. Very few if any vertical man-made structures exist in this landscape currently. Human presence and noise pollution are very low. The proposed project would therefore result in a significant change from the *status quo* for avifauna.

The avifaunal community is comprised perhaps most importantly of raptors and large terrestrials. The larger raptors' breeding sites have been avoided by placing large No-go buffers around nests in accordance with current Best Practice Guidelines. These species have however still been recorded flying outside of these areas and on site. Large terrestrials

such as cranes, bustards and korhaans are more dispersed on site but spend less time in flight.

The South African Bird Atlas Project 2 (SABAP 2) has a relatively low reporting rate across the 16 pentads that span the site boundary, ranging between 0 – 13 full protocol cards submitted per pentad (some, if not most, of these cards have been contributed by our own monitors). The SABAP 2 assemblage of 164 reported species were similar to what the observers reported. The SABAP 2 dataset has thus been excluded and is not presented in addition to the comprehensive findings of the specialist monitoring and assessment programme.

Throughout the year of avifaunal monitoring, observers identified 165 bird species on site across all methodologies, and incidentally. Totals per site visit were as follows: 95 species in site visit 1 (S1), 103 in S2, 145 in S3 and 125 in S4. The third site visit fell over the summer period and produced the greatest species list, as expected, when migrant species were present on site.

Eleven species observed to occur on the site are Red Listed: Martial Eagle (*Polemaetus bellicosus*), Ludwig's Bustard (*Neotis ludwigii*) and Black Harrier (*Circus maurus*) are Endangered; Verreaux's Eagle (*Aquila verreauxii*), Lanner Falcon (*Falco biarmicus*), Secretarybird (*Sagittarius serpentarius*) and Black Stork (*Ciconia nigra*) are Vulnerable, and Blue Crane (*Grus paradisea*), Karoo Korhaan (*Eupodotis vigorsii*), Sclater's Lark (*Spizocorys sclateri*) and African Rock Pipit (*Anthus crenatus*) are Near-Threatened. Twenty-four of the recorded species are either endemic or near endemic to South Africa, or endemic to South Africa, Lesotho and Eswatini.

A total of 67 bird species was recorded on the Walked Transects on the site through the year. This included 811 records of 2 173 individual birds. Transects were completed at six of the Vantage Points on site, and totalled 18km per Site Visit, or 72km overall. An average of 30 birds per walked kilometre was calculated. A total of 12 large terrestrial and raptor species were recorded across the six Drive Transects totalling 321.2 kilometres on the site through the year. This included 287 individual birds from 64 records.

Table 5.1 below presents the seasonal presence of each priority species on the site and a qualitative assessment of the risk of each type of impact (pre-mitigation) occurring for each of the priority species if the proposed wind farm is built. Species are presented in descending order of regional conservation status. This assessment was made on the basis of the data collected on site during the monitoring programme.

Table 3-5: Priority bird species (Species of Conservation Concern) assessment and risk profile

Common Name	Scientific Name	Red List: Regional, Global (Endemism)	Collision risk (Retief *et al.* 2014)	S1	S2	S3	S4	Specialist Risk Assessment (pre mitigation)	Likely impacts
Bustard, Ludwig's	*Neotis ludwigii*	EN, EN	14	√	√	√	√	**High**	Collision with turbines
Eagle, Martial	*Polemaetus bellicosus*	EN, VU	4	√	√	√	√	**Medium**	Collision with turbines
Harrier, Black	*Circus maurus*	EN, EN (NE)	6			√		**Medium**	Collision with turbines
Eagle, Verreaux's	*Aquila verreauxii*	VU, LC	3	√	√	√	√	**High**	Collision with turbines
Falcon, Lanner	*Falco biarmicus*	VU, LC	24	√		√	√	**Low**	Collision with turbines
Secretarybird	*Sagittarius serpentarius*	VU, EN	13	√	√		√	**Low**	Collision with turbines, Disturbance & Displacement
Stork, Black	*Ciconia nigra*	VU, LC	10		√	√		**Low**	Collision with turbines
Crane, Blue	*Grus paradisea*	NT, VU	11			√		**Low**	Collision with turbines, Disturbance & Displacement
Korhaan, Karoo	*Eupodotis vigorsii*	NT, LC	51	√	√	√	√	**Low**	Collision with turbines, Disturbance & Displacement
Lark, Sclater's	*Spizocorys sclateri*	NT, NT (NE)	50	√	√			**Low**	Collision with turbines
Pipit, African Rock	*Anthus crenatus*	NT, LC (SLS)	78			√	√	**Low**	Collision with turbines, Disturbance & Displacement
Buzzard, Jackal	*Buteo rufofuscus*	(NE)	43	√	√	√	√	**High**	Collision with turbines
Francolin, Grey-winged	*Scleroptila afra*	(SLS)	80	√	√	√		**Low**	Collision with turbines
Buzzard, Common	*Buteo buteo*		67		√	√		**Low**	Collision with turbines
Courser, Double-banded	*Rhinoptilus africanus*		72	√	√	√	√	**Low**	Collision with turbines, Disturbance & Displacement
Eagle, Black-chested Snake	*Circaetus pectoralis*		60	√		√	√	**Low**	Collision with turbines
Eagle, Booted	*Hieraaetus pennatus*		59	√	√	√		**Low**	Collision with turbines
Falcon, Amur	*Falco amurensis*		66			√		**Low**	Collision with turbines
Falcon, Peregrine	*Falco peregrinus*		49			√		**Low**	Collision with turbines
Goshawk, Pale Chanting	*Melierax canorus*		75	√	√	√	√	**Low**	Collision with turbines
Hawk, African Harrier-	*Polyboroides typus*		85	√		√	√	**Low**	Collision with turbines

Common Name	Scientific Name	Red List: Regional, Global (Endemism)	Collision risk (Retief *et al.* 2014)	S1	S2	S3	S4	Specialist Risk Assessment (pre mitigation)	Likely impacts
Kestrel, Greater	*Falco rupicoloides*		95			√		**Low**	Collision with turbines
Kestrel, Lesser	*Falco naumanni*		64			√		**Low**	Collision with turbines
Korhaan, Northern Black	*Afrotis afraoides*		90	√	√	√	√	**Low**	Collision with turbines
Lark, Melodious	*Mirafra cheniana*		91			√		**Low**	Collision with turbines
Owl, Cape Eagle-	*Bubo capensis*		42	√			√	**Low**	Collision with turbines
Owl, Spotted Eagle-	*Bubo africanus*		98	√		√	√	**Low**	Collision with turbines
Sparrowhawk, Rufous-breasted	*Accipiter rufiventris*		101	√		√		**Low**	Collision with turbines

3.3 Bats

Based on current taxonomic information and bat occurrence data, 10 bat species could occur within the study area. The proposed development is in the arid Nama Karoo Biome and the landscape is characterised by relatively flat or gently sloping plains interspersed with mountainous terrain (inselbergs and koppies).

Bat roosting sites are relatively limited and unlikely to support large congregations of bats. The closest known major bat roost is approximately 55 km north of the development site. Rocky outcrops are present on site and these geological features may provide roosting spaces for species such as Roberts's flat-headed bat, Egyptian free-tailed bat, Lesueur's wing-gland bat, and Long-tailed serotine that roost in rocky crevices (Monadjem et al. 2018). The Long-tailed serotine roosts in small groups of a few individuals while Roberts's Flat-headed bat tends to roost communally in small groups of tens of individuals (Jacobs and Fenton 2002). Egyptian free-tailed bats can roost in groups of tens to a few hundred individuals (Herselman and Norton 1985).

Bats are also likely to roost in buildings associated with farmsteads within and bordering the project especially Cape serotine and Egyptian Free-tailed Bat (Monadjem et al. 2018). Trees growing at these farmsteads, and in limited places elsewhere on site usually at livestock water points, could also provide roosting spaces for bats although the extent of this is limited since these trees are typically not large and day-time temperatures may be too hot to use them as roosts (Monadjem et al. 2018). The building inspections on site did not reveal any roosting bats although bats do typically use these structures for roosts and visible signs of bat presence (brown, stained exit/entry points) was found at some buildings.

Sensitive features at which bat foraging activity may be concentrated include farmsteads, wetlands, farm dams, irrigated cultivated areas, the livestock water points, rocky outcrops, and along drainage networks/riparian areas. The presence of water, vegetation and lighting at these features could promote insect activity and hence attract foraging bats. For example, Long-tailed serotine have been captured foraging for flies at a livestock kraal (Shortridge 1942). Activity could also be concentrated along the non-perennial rivers and smaller streams.

3.4 Noise

Due to the height of the wind turbines, as well as the position where they may be developed (on top of the hills and ridges), it is unlikely that topographical features will limit the propagation of sound from the wind turbines.

There are no formal residential areas within 5,000 m from the WEF, with the town of Loxton located approximately 20 km south of the closest wind turbines of the preliminary layout. There are no roads that carry sufficient traffic to be considered of acoustic significance. Land use is mostly wilderness, including ecotourism and game farming, with some agricultural activities - mainly sheep farming.

The R63 road passes the development area at the west, though traffic on this road is low and does not influence ambient sound levels within the development area. There are a number of small access roads leading from the R63, mainly to serve the farmers in the area. Traffic volumes on these small access roads are low and are of no acoustical significance.

Potential Noise-sensitive receptors (NSR) were initially identified using aerial images as well as the DFFE Screening Tool, with the statuses of the NSR verified during the site visit in June 202, refer to Plate 5.2 below. The NSR as identified were given buffers of either 500

m, 1,000 m or 2,000 m. Generally, noise from wind turbines, depending on the layout as well as the specific sound power emission levels of the selected wind turbine:

- Could be significant within 500 m, with receptors staying within 500 m from operational wind turbines subject to noises at a potentially sufficient level to be considered disturbing;
- Are normally limited to a distance of approximately 1,000 m from operational wind turbines. Night-time ambient sound levels are elevated and the potential noise impact might be measurable. Cumulative noises from multiple wind turbines surrounding an NSR may be high and exceed 45 dBA;
- May be audible up to a distance of 2,000 m at night; and
- Are generally of a low concern at a distance greater than 2,000 m.

Plate 5-7: Arial Image Indicating Closest Identified Noise- Sensitive Developments

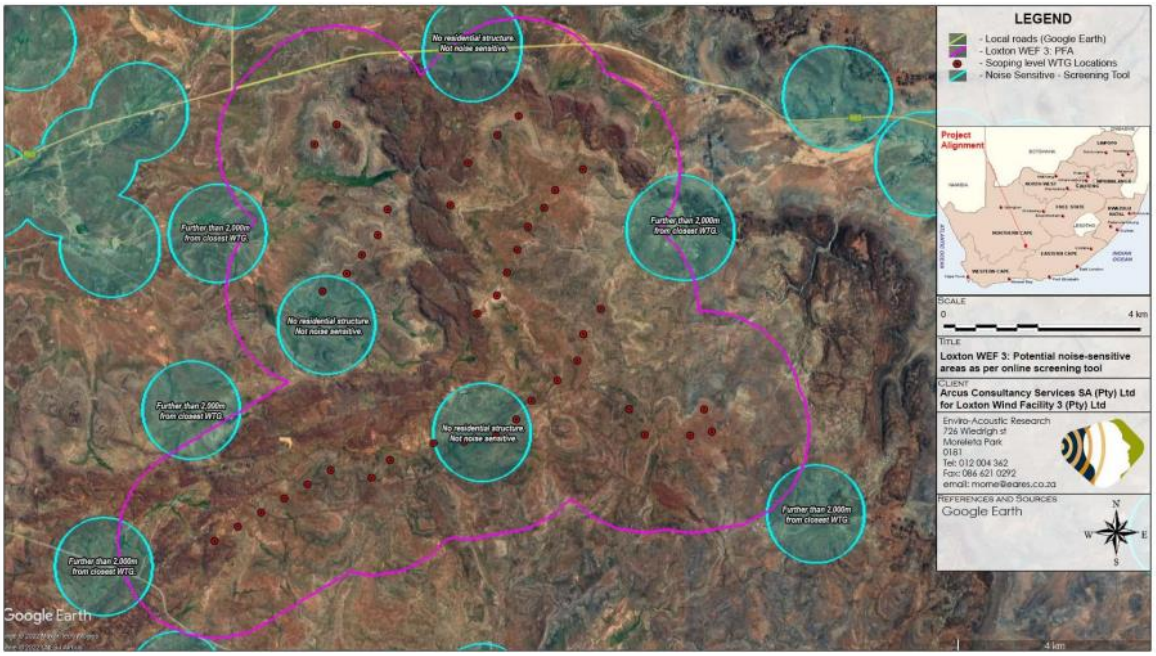


Plate 5-8: Areas Defined to be of "Very High" Sensitivity in terms of Noise by the online Screening Tool

3.5 Heritage and Archaeology

Loxton was established in 1899 on the farm Phezantefontein and was named after A.E. Loxton, the last owner of the farm (Raper n.d.). The town was given municipal status in 1905 and the first town dam was built in 1912 (Schoeman 2013). The town is quite famously associated with Deon Meyer, the well-known South African crime novelist. There does not seem to have been any significant Anglo-Boer War action in the vicinity of Loxton. The name Loxton does not appear in Packenham (1993) or Grobler (2004), but since the town was only established and named on the eve of the war this might be unsurprising.

The site is comprised of long, low sandstone hills with intervening river valleys. Occasional dolerite outcrops occur and vegetation tends to be sparse and very low. Farmsteads occur in places and the only infrastructure on the site is related to farming (e.g. tracks, fences, dams, wind pumps). Archaeological resources were found to be very rare in the areas targeted for development, with most sites being in river valleys. Rare artefact scatters from the MSA and LSA were seen, while historical resources included ruins of houses, kraals and other features along with some artefactual debris. The farmsteads and surrounding arable lands are pockets of cultural landscape, while the broader landscape also has cultural significance. Bedrock is exposed in places but, aside from some dolerite ridges in the northern part, usually only in small patches.

Stone Age materials were found in a few places but were generally not common. No ESA artefacts were seen and just one site was ascribed to the MSA. There was a scatter of well-patinated artefacts on hornfels and no formal tools were noted but the scar pattern on the dorsal surfaces of some flakes suggests that they date to the MSA. Three LSA sites were found, the largest on high ground far from any obvious source of water. The artefacts were almost all on dolerite, with a chert flake being the exception. A few pieces of ostrich eggshell were present, while a single glass fragment may be a chance inclusion or might indicate that the site is very late. An adze and an endscraper were seen along with some ostrich eggshell fragments.

A few historical archaeological sites were also found. No graves were seen during the survey. Although the Springfontein farmstead itself was not visited, the eastern part of the

broader werf was examined and a number of archaeological features were seen. These included a stone-walled house ruin with two rooms and a scatter of historical debris around it, a low density dump of 19th and 20th century artefacts, two very well-preserved stone kraals, and the remains of a circular feature assumed to have been a threshing floor.

North of Springfontein the river emerges from a dolerite poort. To the north of this poort is the aptly named Rooipoort complex. It is in ruin and abandoned and, although not visited, many stone-walled kraals were seen on aerial photography.

The landscape of the study area is largely a natural landscape but with many pockets of cultivation and other anthropogenic features. These are farm complexes that lie along the rivers. Although it is true that the entire Karoo is a cultural landscape, the smaller cultural landscape features are more important to the present assessment. Some farmsteads are abandoned while others continue to be occupied. Key elements of these agricultural landscapes are the many in-stream dams that have been built over the years. Many of them have been breached.

The study area lies east of the R63 which, as one of the main roads through the area, can be regarded as a scenic route. It links Victoria West to the east with Loxton and the proceeds north to Carnarvon, and west to Williston and Calvinia. As such, it is probably the most important route through the western Karoo.

3.6 Palaeontology

The project area comprises semi-arid, gently hilly, rocky to sandy and gravelly terrain of the Upper Karoo, situated at elevations between c. 1390 and 1580m amsl. to the east of the small town of Loxton and the Loxton – Carnarvon road (R63) as well as straddling the R63 road sector between Loxton and Victoria West (1: 250 000 sheet 3122 Victoria West; 1: 50 000 sheets 3122AB Alarmskraal, 3122 AD Loxton, 3122BC Schimmelfontein, 3122CB Slangfontein, 3122DB Slypfontein). Much of the terrain is of fairly subdued, rolling relief, with occasional dolerite-capped koppies and ridges, especially in the south (e.g. Kleinberg 1534 m, Die Rooikoppie 1514 m, Rooiaar dyke just east of the project area). There are no major rivers; much of the area is drained by a network of small, mostly unnamed, non-perennial streams (e.g. Springbokfontein se Leegte), variously draining SW into the Loxton Dam and Biesjespoort Dam and the Soutpoortrivier or eastwards into the Klein-Brakrivier and the Bitterwaterspruit.

Historical palaeontological site mapping for the region between Loxton and Victoria West reveals a paucity of recorded vertebrate fossil sites within the project area. This is supported by recent palaeontological field surveying undertakan by the specialist both within the development area and in neighbouring WEF project areas, which shows that: (1) Levels of Beaufort Group bedrock exposure are very limited here due to pervasive cover by Late Caenozoic superficial sediments; (2) Intensive intrusion by dolerite sills and dykes has compromised fossil preservation over large areas; and (3) The Beaufort Group bedrocks span the catastrophic end-Middle Permian Extinction Event which is associated with an unusually low abundance of well-preserved fossil remains.

The project area is largely underlain at depth by continental (fluvial / lacustrine) sediments of the Lower Beaufort Group (Karoo Supergroup) of Middle to Late Permian age (*c*. 260 to 256 Ma = million years ago) (Johnson *et al.* 2006). The sedimentary succession in the north-western sector of the Main Karoo Basin represented here broadly gets younger from north to south. The beds here are assigned to the Abrahamskraal Formation and the lowermost, sandstone-rich part of the Teekloof Formation (Poortjie Member), while the overlying mudrock-dominated Hoedemaker Member only crops out within the associated Grid Connection corridor towards Victoria West (to be separately assessed). The fine-scale lithostratigraphy of the Lower Beaufort Group succession in this sector of the Main Karoo

Basin - including the correlation of the main channel sandstone packages such as the Poortjie Member - remains unresolved (*cf* Day & Rubidge 2020a).

Over the course of eight days, only a handful of fossil sites were recorded, the majority of which are poorly preserved and of limited scientific or conservation significance. Even occasional small areas showing excellent, fresh mudrock exposure ideal for palaeontological recording yielded hardly any fossils. No fossil sites were recorded within the Late Caenozoic superficial deposits.

In this subregion of the Upper Karoo the Beaufort Group sediments are intruded by an extensive network of dyke and sill complexes of the Early Jurassic Karoo Dolerite Suite, especially in the southern sector of the combined project area (*e.g.* Kleinberg 1534 m, Die Rooikoppie 1514 m, Rooiaar dyke just east of the project area) (Chevallier & Woodford 1999, Duncan & Marsh 2006). These intrusions have thermally metamorphosed and altered the adjoining country rocks, locally compromising fossil preservation as well as generating large volumes of tough quartzitic colluvial and eluvial rubble that mantles the neighbouring potentially fossiliferous bedrocks. Kimberlite pipes or other intrusions are not mapped within the project area itself but do occur shortly to the east (small black diamond symbols on the geological map).

Levels of tectonic deformation (including folding, cleavage development) within the wider region are probably low; satellite imagery suggests that the Beaufort Group sediments are fairly flat-lying while they are also cut by numerous small faults which are often picked out by dark lines of shrubs as well as by dolerite dykes.

The Permian and Jurassic bedrocks within the project area are extensively mantled by a range of Late Caenzoic superficial deposits, limiting exposure levels of fresh (unweathered), potentially fossiliferous Permian sediments. In addition to thick alluvial sediments along numerous active or defunct drainage lines, these younger cover sediments include pan and spring deposits, colluvial (slope) and eluvial (downwasted) surface gravels, pedocretes (*e.g.* calcrete hardpans, especially in doleritic terrain) *plus* a spectrum of mainly sandy to gravelly soils.

The Middle to Late Permian Abrahamskraal and Teekloof Formation bedrocks in the combined Loxton Cluster study area are characterised by fossil assemblages of the *Tapinocephalus* and *Endothiodon* Assemblage Zones (the latter was previously termed the *Pristerognathus* and *Tropidostoma* Assemblage Zones (Kitching 1977, Keyser & Smith 1977-78, Rubidge 1995, Rubidge 2005, Van der Walt *et al.* 2010, Smith *et al.* 2012, Smith *et al.* 2020, Day & Rubidge 2020b, Day & Smith 2020). They include a wide range of fossil tetrapods - especially reptiles and therapsids ("mammal-like reptiles" or protomammals"") - as well as fish, amphibians, plant remains (*e.g.* petrified wood, plant compressions), microfossils and trace fossils (*e.g.* vertebrate and invertebrate burrows, trackways). These fossil assemblages and the sedimentary bedrocks within which they occur are of special scientific interest because they span the environmentally critical boundary between the Middle and Late Permian Periods which was associated with the catastrophic end-Capitanian Mass Extinction Event of *c*. 260 Ma (million years ago) (Day *et al.* 2015).

Only a few historical vertebrate fossil sites are mapped near Loxton on the published 1: 250 000 geological map and in the key early review by Kitching (1977). The Karoo fossil vertebrate site map of Nicolas (2007) shows low density of fossil records east of Loxton with just a few sites recorded south and north of the town. The region between Loxton and Victoria West is the subject of ongoing palaeontological research by Professor Bruce Rubidge of the Evolutionary Studies Institute (ESI), Wits University as well as Dr Mike Day of the Natural History Museum, London. Important concentrations of fossil sites are known *c.* 20 km east of the WEF project area near Melton Wold and west of Gamma Substation as a result of a long history of palaeontological fieldwork in the Biesiespoort area (close to the eastern sector of the proposed associated Grid Connection Corridor). Recent

palaeontological fieldwork by the specialist in the broader Loxton – Victoria West – Beaufort West region (*e.g.* Nuweveld WEFs, Hoogland WEFs, Modderfontein WEF, Victoria West WEF Cluster, Skietkuil / iLanga project areas – see References under Almond) and earlier research by other Karoo palaeontologists (*e.g.* Smith 1993) suggest that unrecorded fossil sites of scientific and conservation value are likely to occur here. However, vertebrate fossil records are often sparse in areas intruded by dolerite. New tetrapod fossil finds within the project area should help resolve outstanding lithostratigraphic ambiguities in the region as well as contributing to on-going scientific research concerning palaeoenvironmental and evolutionary events before and during the catastrophic end-Middle Permian Extinction Event of *c.* 260 million years ago as well as during the succeeding biotic recovery (Retallack *et al.* 2006, Day *et al.* 2015).

Most of the varied Late Caenozoic superficial sediments within the project area are largely of low palaeosensitivity. However, relict and often consolidated older (Neogene / Pleistocene) alluvial deposits along drainage lines might contain sporadic fossil assemblages of mammals (bones, teeth, horn cores), freshwater invertebrates (*e.g.* unionid bivalves) and trace fossils (*e.g.* calcretised termitaria, rhizoliths / plant root casts).

While additional, unrecorded fossil sites of high palaeontological and conservation value are likely to occur at and beneath the land surface, they are probably very sparse and sporadic in distribution and can be effectively handled in the Construction Phase through a Chance Fossil Finds Protocol, which will be recommended for inclusion in the EMPr during the EIA Phase.

3.7 Visual / Landscape

The proposed development is located in the Great Karoo to the north of the town of Loxton. The site lies to the east of the R63 Provincial Main Road, between Loxton and Carnarvon. It is an expansive semi-arid landscape, with widely scattered farmsteads. The large farms mainly support merino sheep, and occasionally dorper sheep, goats and horses, as well as game, such as small antelope.

The landscape in this part of the Great Karoo has been eroded over time, the once deeply buried Beaufort Group mudstones and sandstones and the dolerite intrusions having been exposed to form the present-day Karoo landscape. The regional plateau is characterised by horizontal sills and dykes of erosion-resistant dolerite forming steep slopes in places, boulder-strewn mesas and flat-topped koppies that are the main scenic features of the study area. The gentler, lower hillslopes and plains consist of more easily weathered mudstone, with occasional narrow ledges of harder sandstone. The flattish plains are at around 1400-1500 m elevation, and the dolerite ridges and mesas around 1600 m elevation in the study area.

The flat-topped hills and dolerite ridges are a characteristic feature of the Great Karoo in an otherwise fairly featureless, parched landscape, an area noted mainly for its empty, uncluttered landscapes, stillness, red sunsets, dark nights and starry skies.

Springbok and many other smaller antelope roam free on game farms, the isolated farmsteads forming green oases in the semi-arid landscape.

Plate 3-9: Altona farmstead looking north, 5,3km from the proposed Loxton WEF 3. Wind turbines would be partly visible to the north.

Plate 3-10: Erasmuskraal farmstead looking west, 3,8 km from the proposed Loxton WEF 3. Wind turbines would be partly visible to the north-east.

Plate 3-11: Arizona farmstead looking north, 5km from the proposed Loxton WEF 3. The wind turbines would be partly visible to the west and south-west.

Plate 3-12: Figure 6: View from R63 Route of scarp edge. Proposed Loxton WEF 3 turbines would be partly visible on the skyline.

3.8 Traffic and Transportation

The road network within the study area, servicing the proposed development is well-established consisting of a combination of national roads, first, second and third-order roads, which provides the proposed development accessibility to local towns and the major commercial centres within South Africa. Majority of these public roads are surfaced roads while the minor / private access roads to the proposed development from the main roads are gravel roads.

During desk top study, three existing access routes were identified, however these will only be finalised during the design phase of the project. The existing access points to proposed development from the TR 01606 and the TR 01607 are shown in Plate 5.3 below:

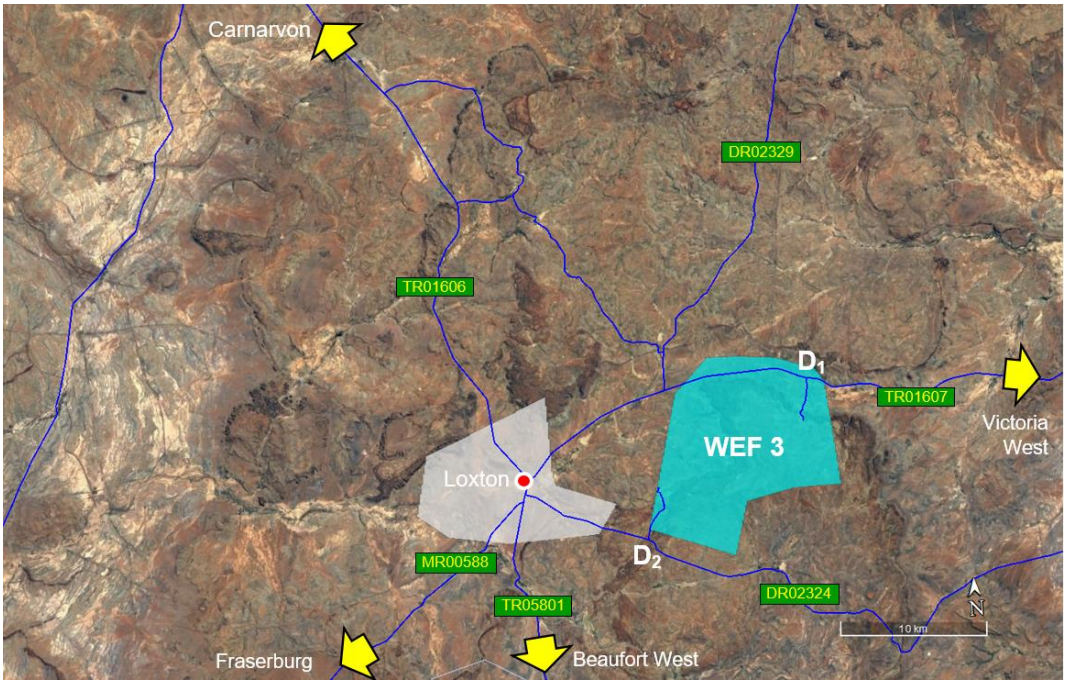


Plate 3-13: Site Access to Loxton WEF 3

3.9 Transportation Routes

Commuter Routes

The towns in this part of the country are few and far apart. There are several towns within a 100 km radius of the proposed development from which the workforce is to be drawn for the proposed development, which include Carnarvon, Loxton, and Victoria West. The commuting routes to the proposed development from the surrounding towns are as follows

- Carnarvon – travel approximately 43 km south on the TR 01606, turn left onto Road B.
- Loxton – travel approximately 20 km north on the TR 01606, turn right onto Road B.
- Victoria West – travel approximately 69 km west on the TR 01607, turn right onto DR 02329 for 2.5 km, turn left onto Road C.

The proportionality of the workforce from the surrounding towns is based on a 'working-age' population, modified by a 'weighting factor', calculated based on the distance travelled to the proposed development from the relevant town.

Freight Routes

Transnet Port Terminals is a division of Transnet SOC Limited, South Africa's state-owned freight transport company, which owns and operates the terminal at several Ports in South African. Operations are divided into the major market sectors: containers, bulk, breakbulk, and automotive, organised into three geographical regions – Eastern Cape, Western Cape, and Kwa-Zulu Natal. The port of entry into South Africa for all import WTG components is limited to Ngqura (located close to Gqeberha) or Saldanha Terminals. The possible routes from these terminals to the proposed development is via Victoria West. The preferred transportation route would ultimately be identified by the logistic company appointed to transport the various WTG components from the port of entry to the proposed development.

The most likely transportation routes for domestically supplied and manufactured components from the major commercial centres to the proposed development are either Cape Town or Johannesburg (or any supplier along these routes).

3.10 Socio-economic Baseline

The study area is located within the Ubuntu Local Municipality (ULM), which forms part of the Pixley Ka Seme District Municipality (PKSDM). The PKSDM is made up of eight category B local municipalities which include Emthanjeni, Kareeberg, Thembelihle, Siyathemba, Renosterberg, Ubuntu, Siyancuma and Umsobomvu municipalities (Figure 3.2). The town of Victoria West is the administrative seat of the ULM. The project area is located in Ward 3 of the ULM.

Population

The population of the ULM in 2016 was 19 471 (Community Household Survey 2016). Of this total, 38.6% were under the age of 18, 55.9% were between 18 and 64, and the remaining 5.5% were 65 and older. The population of Ward 3 in 2011 was 4 715. Of this total, 37% were under the age of 18, 58% were between 18 and 64, and the remaining 5% were 65 and older. The ULM and Ward 3 therefore have a high percentage of the population that fall within the economically active group of 18-65. The figures are similar to the figures for the PKSDM and Northern Cape (58.5% and 57.7% respectively).

The dependency ratio is the ratio of non-economically active dependents (usually people younger than 15 or older than 64) to the working age population group (15-64). The higher the dependency ratio the larger the percentage of the population dependent on the economically active age group. This in turn translates reduced revenue for local authorities to meet the growing demand for services. The national dependency ratio in 2011 was 52.7%, while the Northern Cape Province was 55.7%. The high provincial dependency ratio is also reflected at a local municipal and ward level. The traditional approach is based people younger than 15 or older than 64. The information provided provides information for the age group under 18. The total number of people falling within this age group will therefore be higher than the 0-15 age group. However, most people between the age of 15 and 17 are not economically active (i.e. they are likely to be at school).

Using information on people under the age of 18 is therefore likely to represent a more accurate reflection of the dependency ratio. Based on these figures, the dependency ratios for the ULM (2016) and Ward 3 (2011) were 79% and 72% respectively. Based on this approach the figures are similar to the figure for the Northern Cape (73.3%). The high dependency ratios reflect the limited employment and economic opportunities in the area.

In terms of race groups, Coloureds made up 73% of the population on the ULM, followed by Black Africans, 22.5% and Whites, 4.5%. In Ward 3, Coloureds made up 77.3% of the population, followed by Whites, 14.8% and Black Africans, 6.7The main first language spoken in both the ULM and Ward 3 was Afrikaans, 82.5% and 92.5% respectively.

Households and house types

There were a total number of 6 034 (2016) and 1 609 (2011) households in the ULM respectively. Of these 90.4% (ULM) and 92.4% (Ward 7) were formal houses. 6.6% of the structures in the ULM and 1.2% in Ward 3 were shacks. The majority of dwellings in the ULM and Ward 3 are therefore formal structures. The majority of the properties in the ULM (59.2%) were owned and fully paid off. In Ward 3 the majority of properties were occupied rent free. This figure reflects the rural nature of Ward 3 and the rent-free status of farm workers. Approximately 33.6% of the households in the ULM and 18.8% of the households in Ward 3 were headed by women. These figures are lower than the rate for the PKSDM (37%) and Northern Cape (39%). Despite the figures for the ULM being lower than the district and provincial averages, women headed households tend to be more vulnerable.

Household income

Based on the data from the 2011 Census, 11.7% of the population of the ULM had no formal income, 3.6% earned less than R 4 800, 6.2% earned between R 5 000 and R 10 000 per annum, 24.1% between R 10 000 and R 20 000 per annum and 24% between R 20 000 and 40 000 per annum (2016). For Ward 3, 5.9% of the population had no formal income, 2.5% earned less than R 4 800, 5.1% earned between R 5 000 and R 10 000 per annum, 30.9% between R 10 000 and 20 000 per annum and 29% between R 20 000 and 40 000 per annum (Census 2011).

The poverty gap indicator produced by the World Bank Development Research Group measures poverty using information from household per capita income/consumption. This indicator illustrates the average shortfall of the total population from the poverty line. This measurement is used to reflect the intensity of poverty, which is based on living on less than R3 200 per month for an average sized household (~ 40 000 per annum). Based on this measure, in the region of 69.6% of the households in the ULM and 73.4% in Ward 3 live close to or below the poverty line. The low-income levels reflect the rural nature of the local economy and the limited formal employment opportunities outside in the area. This is also reflected in the high unemployment rates. The low-income levels are a major concern given that an increasing number of individuals and households are likely to be dependent on social grants. The low-income levels also result in reduced spending in the local economy and less tax and rates revenue for the ULM. This in turn impacts on the ability of the ULM to maintain and provide services.

Household income levels are likely to have been impacted by the COVID-19 pandemic. The number of households in the ULM and Ward 3 that live close to or below the poverty line is likely to have increased over the last 18 months. This, coupled with the high dependency ratio, is a major cause of concern for the area.

Employment
The official unemployment rate in the ULM in 2011 was 18.1%, while 44.2% were employed, and 33.2% were regarded as not economically active. The figures for Ward 3 in 2011 were 6.8% unemployed, 62.5% employed and 28.4% not economically active. The unemployment rates for the ULM and Ward 3 are lower than the Provincial rate of 14.5% and the District rate of 14.8%. However, the COVID-19 pandemic is likely to have resulted in an increase in unemployment rates in both the ULM and Ward 3. Recent figures released by Stats South Africa also indicate that South Africa's unemployment rate is in the region of 36%, the highest formal unemployment rate in the world.

Education
In terms of education levels, the percentage of the population over 20 years of age in the ULM and Ward 3 with no schooling was 11.8% (2016) and 20.7% (2011) respectively, compared to 7.9% and 11.1% for the Northern Cape Province in 2016 and 2011 respectively. The percentage of the population over the age of 20 with matric was 23.2% and 15.6% respectively, compared to 29.1% (2016) and 25.2% (2011) for the Northern Cape. The lower education levels are linked to rural, isolated nature of the area.

4 ALTERNATIVES ASSESSMENT

In accordance with the requirements of Appendix 1 of the 2014 EIA Regulations (as amended), an assessment report must contain consideration of all alternatives, which can include activity alternatives, site alternatives, location alternatives and the "No Development" alternative. At a minimum, this chapter must address:

- 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.

Alternatives are required to be assessed in terms of social, biophysical, economic and technical factors.

When assessing alternatives, they should be "practical", "feasible", "relevant", "reasonable" and "viable", and that I&APs should be provided with an opportunity to provide input into the process of formulating alternatives. In this instance, this chapter provides an overview of the alternatives that have been considered for this development.

4.1 The No Development Scenario or "No-Go Option"

This 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 development, the implications of this scenario include:

- The land-use remains agricultural, with no further benefits derived from the implementation of a complementary land use;
- There is no change to the current landscape or environmental baseline;
- No additional electricity will be generated on-site or supplied through means of renewable energy resources. This would have negative implications for the South African government in achieving its proposed renewable energy target, given the need for increased generation;
- There would be a lost opportunity for South Africa to generate renewable energy. This would represent a significant negative social cost;
- There is no opportunity for additional employment (permanent or temporary) in the local area where job creation is identified as a key priority; and
- The national and local economic benefits associated with the proposed project's REIPPPP commitments and broader benefits would not be realised.
- The purpose of the proposed development is to generate renewable electricity and export this to the national grid. Other socio-economic and environmental benefits will result from the proposed development such as:
- Reduced air pollution emissions - burning fossil fuels generates CO_2 emissions which contributes to global warming. Emissions of sulphurous and nitrous oxides are produced 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 a minimal amount of water during operation. As a water stressed country, South Africa needs to be conserving such resources wherever possible;
- Improved energy security – renewables can be deployed in a decentralised way close to consumers, improving grid strength while reducing expensive transmission and distribution losses. Renewable energy projects contribute to a diverse energy portfolio;
- Exploit significant natural renewable energy resources – biomass, solar and wind resources remain largely unexploited;
- Sustainable energy solutions – the uptake of renewable energy technology addresses the country's energy needs, generation of electricity to meet growing demands in a manner which is sustainable for future generations; and
- Employment creation and other local economic benefits associated with support for a new industry in the South African economy.

The development compliments agriculture by providing an additional income source, without excluding agriculture from the land, or decreasing production. Therefore, the negative agricultural impact of the no-go alternative is more significant than that of the development, and so, purely from an agricultural impact perspective, the proposed development is the preferred alternative between the development and the no-go.

The 'No Development' alternative would not assist the government in addressing climate change, energy security and economic development.

If the project were not implemented, then the site would stay as it currently is. Although the heritage impacts with implementation would be greater than the existing impacts, the loss of socio-economic benefits is more significant and suggests that the No-Go option is less desirable in heritage terms.

Addressing climate change is one of the benefits associated with the implementation of this proposed development. 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.

Although the proposed development will likely affect the avifaunal community on site, they do not appear to have pushed key species towards extinction in most cases. Furthermore, existing impacts to birds, such as agrochemical poisoning (accidental), fence entanglement, road kill, power line electrocution and collision, disturbance of breeding, subsistence hunting, snaring and others, would not be replaced by the proposed project, they would all still persist in addition to the new impacts associated with the wind farm. The No-Go alternative therefore has much lower impacts on avifauna than the proposed project and would be preferred from an avifaunal perspective. However, since the No-go constraints/buffers have already been taken into account, and with the recommended mitigation measures implemented going forward, the preference for developing the project is also acceptable.

Based on the above, the 'No Development' alternative is not a preferred alternative.

4.2 Site Selection

The Applicant identified the Loxton WEF 3 after conducting a series of pre-feasibility assessments by considering aspects such as climatic conditions (wind speed databases, pre-dominant wind directions), grid connection scenarios, site geography and topography, ecological features and site accessibility.

Feasibility studies undertaken by the Project Applicant indicated that the Loxton WEF site is suitable to develop and operate a wind farm as it satisfies the following criteria:

- Feasibility of access for wind turbine delivery as the site is easily accessible from the national road;
- Viable wind resource;
- The surrounding area is not densely populated;
- The proposed site is largely previously transformed agricultural land and current land use is grazing;
- Willingness of landowner to host a wind farm on their property; and
- No environmental fatal flaws identified in the screening assessment.

The unique features of this site eliminates the possibility of alternatives with similar site conditions. Alternatives are restricted to on-site aspects such as turbine footprints and layouts, roads and related infrastructure options.

At this phase, it was concluded, based on available information, that the Loxton WEF 3 site is suitable for the construction and operation of the WEF.

4.3 Design Evolution Alternatives

Following the selection of a suitable site, consideration is given to the design of the WEF. It is important that wind turbines are sited in the optimum position to maximise the wind energy yield whilst minimising environmental impacts as far as possible.

Information collated during the scoping phase will be used to inform the design of the WEF progressively. Best practice advises that the EIA should be an iterative process rather than

a post design environmental appraisal. In this way, the findings of the technical environmental studies will be used to inform the design of a development.

This approach will be adopted with respect to this proposed development, and where potentially significant impacts are identified, efforts will be made to avoid these through evolving the design of the proposed development. This will be referred to as mitigation to be embedded in the layout and design, or 'embedded mitigation'.

A preliminary layout was produced showing suggested locations of wind farm turbines on the site. This layout will be adjusted, based on the initial scoping assessment and specialists' findings. This adjusted layout will be called the 'preferred layout' and will be assessed in further detail during the EIA Phase.

4.4 Technology Alternatives

Additional renewable energy technologies include hydro-electric power, photovoltaic solar or concentrated solar power. The site itself has no resource for hydro-electricity. Solar electricity generation would require a much greater infrastructure footprint to generate the equivalent energy of the proposed WEF.

Based on the site's physical characteristics and existing land uses, the renewable energy technology best suited to the site, taking into account the potential environmental impacts, is a WEF, however the specific design at the site should be informed by the EIA process.

Various wind turbine designs and layouts will be considered for the site in order to maximise the electricity generation capacity and efficiency, whilst taking into account environmental constraints.

Two alternatives for the placement of the laydown area and on-site substation were provided to specialists. The placement of either of these alternatives is acceptable from the specialist perspectives.

5 DESCRIPTION OF THE PREFERRED ALTERNATIVE

The proposed Loxton WEF is located 20 km north of Loxton within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality in the Northern Cape Province.

The proposed development will consist of:

- Up to 41 wind turbines, with a maximum hub height of up to 200 m and a rotor diameter of up to 200 m;
- A transformer at the base of each turbine;
- Concrete turbine foundations with a permanent footprint of up to 6 ha;
- Each turbine will have a crane hardstand of 70 m x 45 m. The permanent footprint for turbine hardstands will be up to 13 ha;
- Each turbine will have a temporary blade hardstand of 80 m x 45 m. The temporary footprint for blade hardstands will be up to 15 ha;
- Temporary laydown areas (with a combined footprint of up to 25 ha) which will accommodate the boom erection, storage and assembly area;
- Battery Energy Storage System (with a footprint of up to 5 ha);
- Cabling between the turbines, to be laid underground where practical and feasible;
- One on-site substations of up to 2 ha in extent to facilitate the connection between the wind farm and the electricity grid;
- Access roads to the site and between project components inclusive of stormwater infrastructure. A 12 m road corridor may be temporarily impacted upon during construction and rehabilitated to 6 m wide after construction. The WEF will have a total road network of up to 50 km;
- A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha);
- Operation and Maintenance buildings (with a combined footprint of up to 2 ha) including a gate house, security building, control centre, offices, warehouses, a workshop and visitor's centre; and
- Total permanent development footprint of up to 65 ha.

5.1 Wind Energy Facility Components

The WEF will comprise components described below. It should be noted that as the design of the proposed development is not yet finalised, all dimensions are maximums as is required by the EIA process. The final design may include infrastructure which is of equal or less than dimensions to those stated below, but not more than.

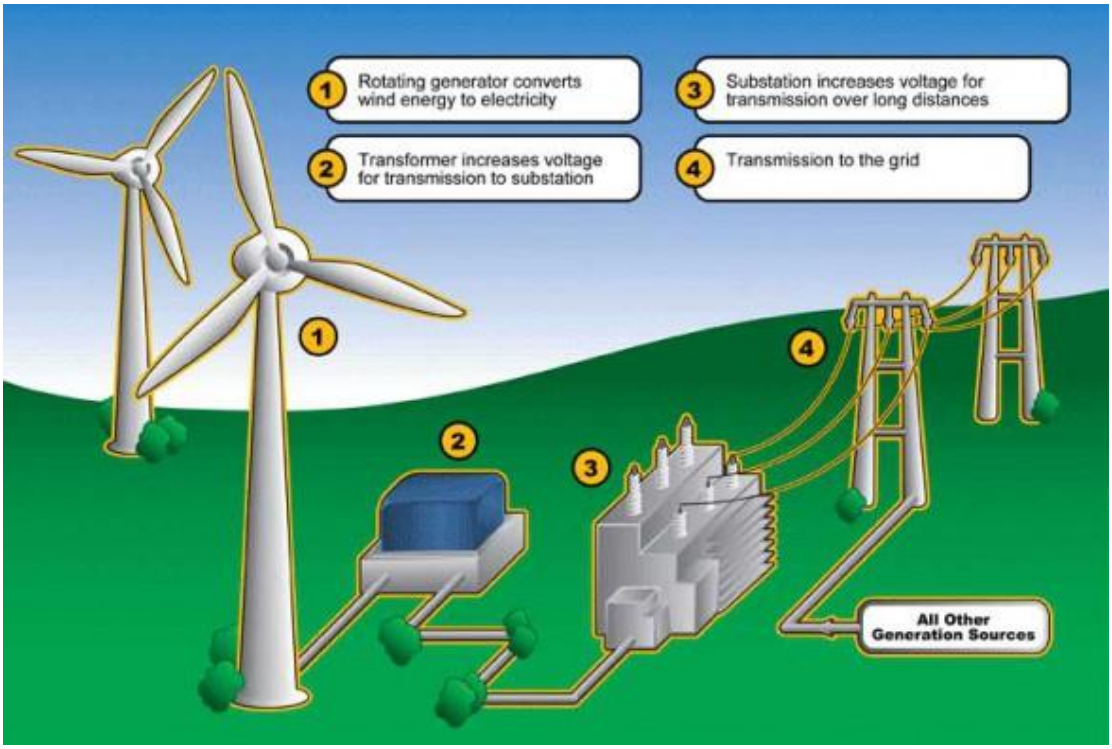


Plate 7-4: Simple illustration of a typical Wind Energy Facility operating sequence

5.1.1 Wind Turbine Generators and Hardstand Areas

The proposed WEF will comprise of up to 41 turbines.

At this stage, it is envisaged that the turbines will each have a capacity to generate up to 8 MW of power. The turbines will be three-bladed horizontal-axis design with a hub height of up to 200 m, a rotor diameter of up to 200 m and a blade length of up to 100 m. The exact turbine model has not yet been selected and will be identified based on the wind resource distribution, technical, commercial and site specific considerations.

The turbine rotor speed will vary according to the energy available in the wind, the wind speed. The turbines will generate power in wind speeds between approximately 3 metres per second (m/s) and 28 m/s (depending on the model of turbine) with maximum power output usually achieved at wind speeds of around 10 - 12 m/s. On average, wind speeds greater than approximately 25 m/s the turbines will automatically turn the angle of the blade to reduce energy capture (this is known as 'feathering') and stop turning to prevent damage.

Each turbine will require a transformer that will be located within the turbine tower.

Each turbine will have a circular foundation with a diameter of up to 32 m and this will be placed alongside the 45 m wide hardstand resulting in an area of about 32 m x 45 m that will be permanently disturbed for the turbine foundation. The combined permanent footprint for the turbine foundations will be approximately 6 ha.

Each turbine will have a crane hardstand of 70 m x 45 m. The permanent footprint for turbine hardstands will be approximately 13 ha.

Each turbine will have a blade hardstand of 80 m x 45 m. The temporary footprint for turbine hardstands will be approximately 15 ha.

The precise location of the turbines within the WEF site has not yet been finalised and will be confirmed during the EIA process, following the assessment of technical and environmental constraints.

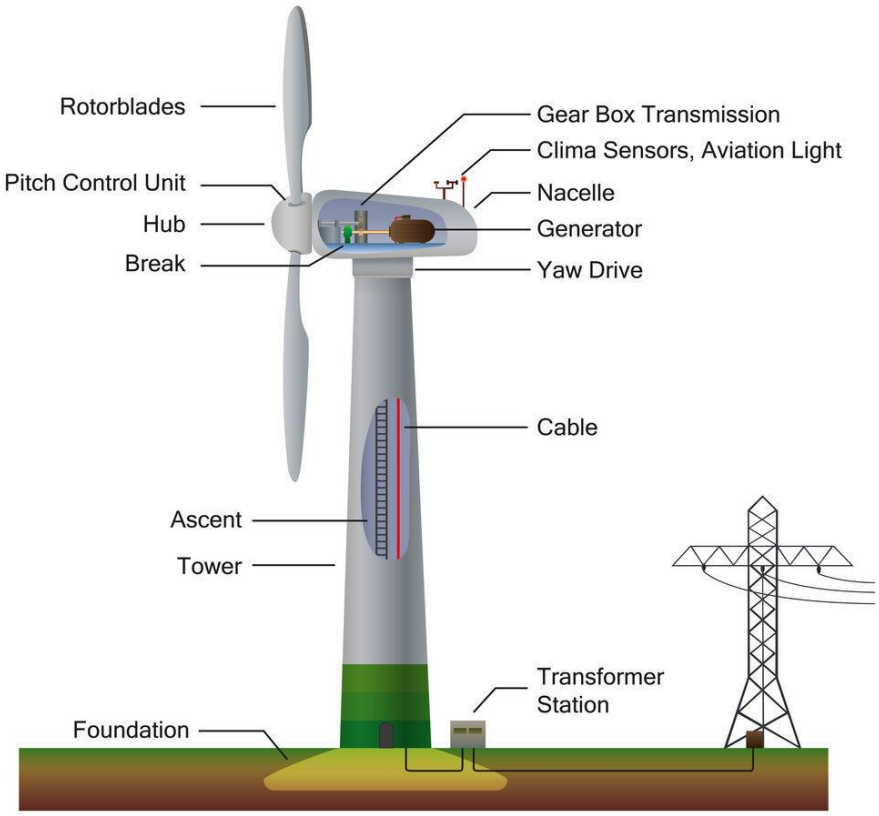


Plate 7-5: An illustration of typical components of a wind turbine generator (WTG)

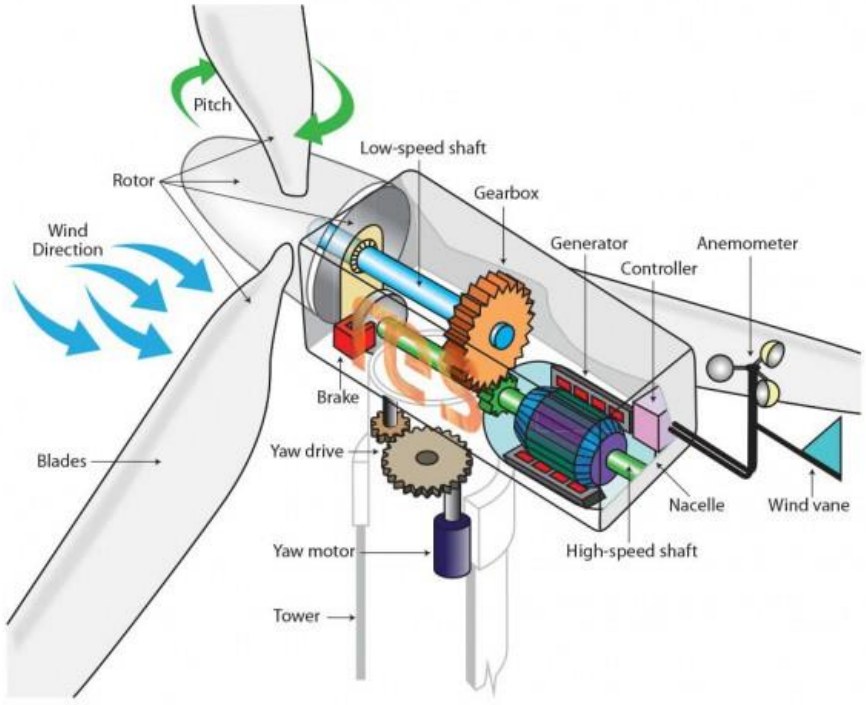


Plate 7-6: The inside operation of a typical wind turbine

Plate 7-4: Illustration of a typical Turbine Hardstand and Laydown Area

5.1.2 Electrical Cabling and On-site Substation

Medium-voltage (MV) power lines internal to the WEF will be entrenched and located adjacent to the access roads and /or within the footprint of the internal roads to an onsite Facility Substation. The 132 kV high-voltage (HV) powerline that transmits power from the Eskom Switching Station on site to the proposed Loxton WEF Cluster Collector Substation (assessed as part of a separate S&EIR) will be strung overhead, supported either on monopole or lattice tower structures. The 400 kV high-voltage (HV) powerline that transmits power from the Loxton WEF Cluster Collector Substation to the Gamma MTS (assessed as part of a separate application process) will be strung overhead, supported either on lattice tower or cross-rope suspension structures.

The general height of the substation will be a maximum of 10 m and approximately 100 m x 200 m (2 ha), however will include switchgear portals up to 15 m in height and lightning masts up to 25 m in height.

5.1.3 Battery Energy Storage System

The substation area will also house the battery energy storage system (BESS). The function of the BESS will be to store peak kinetic energy produced by the Loxton WEF 3 for use in the following ways:

- To power the operation of the proposed development when the national grid is strained by high (or peak) demand, often resulting in load-shedding.
- To provide excess generation to the national grid which will assist with stabilizing electricity supply during peaks and troughs of demand.
- To reduce the impact caused by the variability and limited predictability of wind generation.

The preferred battery technology being considered would be Solid-State, Lithium Ion (Li-Ion) batteries, which consists of multiple battery cells that are assembled together to form module. Each cell contains a positive electrode, a negative electrode and an electrolyte. A module may consist of thousands of cells working in conjunction. Modules are normally packaged inside containers (similar to shipping containers) and these containers are delivered pre-assembled to the project site.

The containers will have approximate dimension ranges of: height 2 m - 5 m, width 1.5 m - 3 m, length 7 m - 20 m. The containers are raised slightly off the ground and are bunded to prevent possible environmental damage resulting from any equipment malfunction. The proposed development is considering the option of stacking these containers vertically to a maximum of two container layers or a height of 8 m.

The BESS storage capacity will be up to 1000 (MWh) with up to four hours of storage, and will be placed on a concrete footprint of up to 5 ha. The BESS will be located in close proximity to the on-site substation, will be fenced off and will be linked to the substation via internal cables and will not have any additional office / operation / maintenance infrastructure as those of the substation.

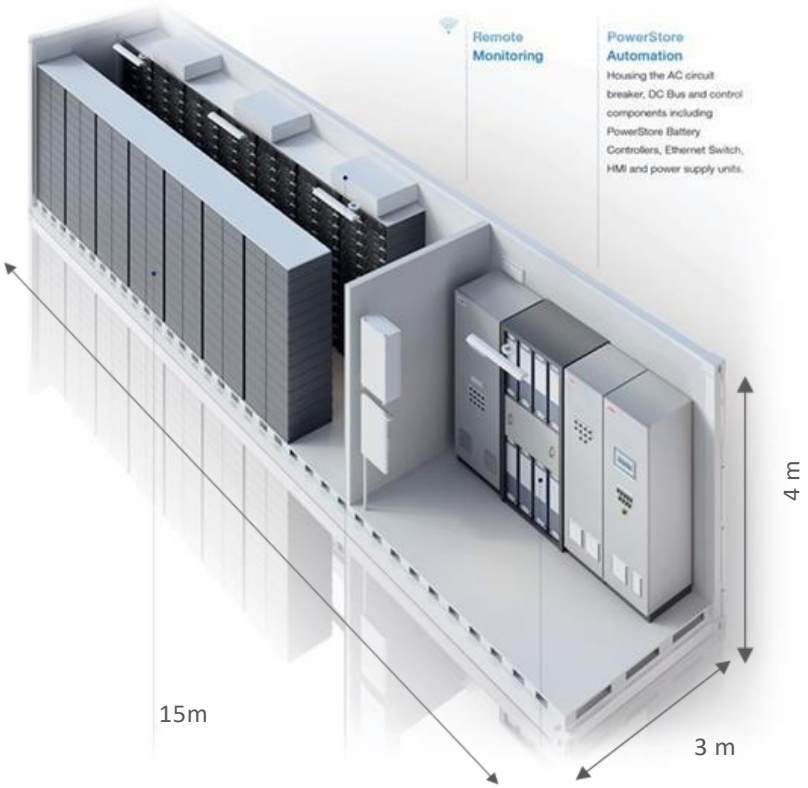


Plate 7-5: Typical representation of how batteries and battery modules are housed and assembled.

This proposed development will have similar project components and will be designed in a similar manner.

Plate 7-6: SolarCity's Tesla Battery Storage facility, Hawaii.

Plate 7-7: A stock image of a similar development with an on-site substation and BESS.

5.1.4 Laydown Areas and Site Offices

Individual turbine temporary laydown areas including crane boom laydown areas, blade laydown areas and other potential temporary areas will be up to a maximum of 6000 m^2. A total footprint of approximately 22.8 ha.

The construction laydown area will be up to 6 ha.

5.1.5 Internal Site Access Roads

Permanent roads will be 6 m wide and may require side drains on one or both sides. All roads may have underground cables running next to them. A 12 m wide road corridor may be temporarily impacted during construction and rehabilitated to 6 m wide after construction. The WEF will have a total road network of about 50 km (approximately 30 ha). Temporary clearing of up to 50 m may be required in areas where cut and fill may be required as well as for the construction of the bell mouth road junction, turning circles and temporary passing lanes.

5.2 Service Provision

5.2.1 Health and Safety

The IFC guidelines for Health and Safety are based on the Occupational Health and Safety Act (OHSA) of America and are subsequently aligned with South African legislation (OHS Act no 85 of 1993). It is understood that the project infrastructure and equipment will be designed to good industry standards to minimise risks personnel working at the proposed development site.

Loxton Wind Facility 3 (Pty) Ltd will institute a Health and Safety (H&S) Plan prior to construction, for all persons working at the proposed development site. The policy will need to evaluate the risks and impacts to the health and safety of the affected community during the design, construction and operation of the proposed development, and establish preventive measures to address them in a manner commensurate with the identified risks

and impacts within this assessment. Such measures need to adhere to the precautionary principle for the prevention or avoidance of risks and impacts over minimization and reduction.

5.2.2 *Water Requirements*

Water will be sourced from either the Local Municipality, supplied from a contractor and trucked in, from existing boreholes located within the application site or from a new borehole if none of these options are available. Note, however, that should municipal water supply not be confirmed, the Applicant will investigate other water sources considering any necessary and relevant legal requirements.

High water use is only anticipated during the first six months of the construction phase mainly for purposes of the turbine foundations, roads and dust suppression. Thereafter the water usage will decrease drastically. The anticipated water usage for the proposed development for the duration of the construction phase includes the following:

- Drinking;
- Ablution facilities;
- Access Road construction;
- Dust suppression;
- Fire-fighting reserve;
- Cleaning of facilities; and
- Construction of foundations for the WEF infrastructure, i.e., turbines and substation, etc.

The water use requirement during the operational phase will be primarily for human consumption and sanitation purposes.

5.2.3 Stormwater Management

Stormwater drainage systems will be constructed and kept separate from the sewerage effluent system on site to ensure that stormwater run-off from site is appropriately managed. Water from these systems is not likely to contain any chemicals or hazardous substances and will be released into the surrounding environment based on the natural drainage contours.

Wastewater and sludge will be managed by local authorities and service providers. All waste water will be handled in accordance with the *Guidelines for the Utilisation and Disposal of Wastewater Sludge Volumes 1 to 6 (Herselmann & Snyman, 2006)*.

5.2.4 Waste

During the construction phase, it is estimated that the Wind Energy Facility would generate solid waste which includes (but is not limited to) packaging material, building rubble, discarded bricks, wood, concrete, plant debris and domestic waste. Solid waste will be collected and temporarily stockpiled within designated areas on site during construction, and thereafter removed and disposed of at a nearby registered waste disposal facility on a regular basis as per agreement with the local municipality. Where possible, recycling and re-use of materials will be encouraged.

During the operational phase, the Wind Energy Facility will typically produce minor quantities of general non-hazardous waste mainly resulting from the O&M and office areas. General waste will be collected and temporarily stockpiled in skips in a designated area on site and thereafter removed and disposed of at a nearby registered waste disposal facility (or registered landfill) on a regular basis as per agreement with the local municipality. Where possible, recycling and re-use of materials will be encouraged.

Any hazardous waste such as chemicals or contaminated soil as a result of spillages, which may be generated during the construction and operational phases, will be temporarily stockpiled within a designated area on site and thereafter removed off site by a suitable service provider for safe disposal at a registered hazardous waste disposal facility.

5.2.5 *Sewage*

The Wind Energy Facility will require sewage services during the construction and operational phases. Low volumes of sewage or liquid effluent are estimated during both phases. Liquid effluent will be limited to the ablution facilities during the construction and operational phases. Portable sanitation facilities (i.e. Chemical toilets) will be used during the construction phase, which will be regularly serviced and emptied by a registered contractor on a regular basis.

The Applicant may consider a conservancy tank system which will be employed on site during the operational phase for which a registered company will be contracted to store and transport sewage from site to an appropriate municipal wastewater treatment facility.

5.2.6 Electricity

Electricity on site will be from on-site diesel generators as well as sourced from the national grid distribution networks.

5.3 Summary of Project Information

WEF Technical Details

Component	Description/Dimensions
Location of the site	Approximately 15 km east of Loxton within the Ubuntu Local Municipality and the Pixley Ka Seme District Municipality.
Facility Area	Approximately 65 hectares. This is the permanent development footprint
Maximum Generation Capacity	Up to 240 MW
Number of Turbines	Up to 41
WTG Hub Height from ground level	Up to 200 m
Blade Length	Up to 100 m
Rotor Diameter	Up to 200 m

Component	Description/Dimensions
Area occupied by both permanent and construction laydown areas	• Concrete turbine foundations with a permanent footprint of up to 6 ha; • Each turbine will have a crane hardstand of 70 m x 45 m. The permanent footprint for turbine hardstands will be up to 13 ha. • Each turbine will have a temporary blade hardstand of 80 m x 45 m. The temporary footprint for blade hardstands will be up to 13 ha. • Temporary laydown areas (with a combined footprint of up to 25 ha) which will accommodate the boom erection, storage and assembly area; • Temporary construction laydown areas of up to 6 ha; and • A temporary site camp establishment and concrete batching plants (with a combined footprint of up to 1 ha).
Operations and maintenance buildings (O&M building) with parking area	Up to 2 ha including a gate house, security building, control centre, offices, warehouses, a workshop and visitor's centre.
Site Access	Access roads to the site and between project components inclusive of stormwater infrastructure. A 12 m road corridor may be temporarily impacted upon during construction and rehabilitated to 6 m wide after construction. The WEF will have a total road network of up to 50 km.
Area occupied by inverter transformer stations/substations	Up to 2 ha
Capacity of on-site substation	132 kV
Battery Energy Storage System footprint	Footprint of up to 5 ha
BESS MWh	The BESS will comprise of a selection of electrochemical batteries together with chargers, inverters, and related equipment. The BESS will have a maximum height of 8 m (as recommended) and have a capacity of 1000 MWh.
Length of internal roads	Up to 50 km
Width of internal roads	6 - 12 m including road reserve.
Proximity to grid connection	~ 50 – 100 km, depending on the preferred alternative route.
Internal Cabling	Electrical cabling between the turbines, to be laid underground where practical
Height of fencing	Up to 5 m
Type of fencing	Palisade fencing or similar

6 NEED AND DESIRABILITY

The EIA Regulations, 2014, as amended state that the objective of the scoping process includes to, through a consultative process, motivate the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location.

6.1 The Need & Desirability of Renewable Energy Facilities

WEFs can play a role in mitigating or reducing climate change, addressing South Africa's energy resource constraints and producing low-cost energy. In addition, operating WEFs in South Africa contribute significantly to the economic development of the areas in which they are located through the requirements of the REIPPPP adjudication process. This section of the report highlights the national, provincial and local plans and policies that are in support of renewable energy facilities. Throughout this section, it is demonstrated that at all levels of governance, policy supports the development of renewable energy in order to address energy supply issues, and to promote economic growth in South Africa.

6.1.1 Mitigating Climate Change

The scientific consensus is that climate is changing and that these changes are in large part caused by human activities[8]. Of these human activities, increase in carbon dioxide (CO_2) levels due to emissions from fossil fuel combustion is regarded as a significant contributor to anthropogenic climate change.

South Africa is one of the world's largest emitters of CO_2 in absolute and per capita terms.

As explained in National Treasury's Carbon Tax Policy Paper (May 2013)[9], addressing the challenges of climate change through facilitating a viable and fair transition to a low-carbon economy is essential to ensure an environmentally sustainable economic development and growth path for South Africa. Further the Policy Paper states that the South African government is of the view that South Africa needs to reduce its greenhouse gas emissions while working to ensure economic growth, increase employment, and reduce poverty and inequality[10].

Renewable energy projects will play a significant role in meeting the targets of the Paris Agreement and assisting the transition to a low-carbon economy.

6.1.2 Diversification and Decentralisation of Supply

With its abundant coal supplies, approximately 89% of South Africa's energy needs are currently met through coal-fired generators, with nuclear energy contributing approximately 5% and the balance by pumped storage and hydroelectric (3.6%), renewable energy (2.4%) and gas turbines (0.1%). Electricity generation is dominated by state-owned power company Eskom, which currently produces over 96.7% of the power used in the country.

A diversification of energy supplies and producers, particularly with respect to renewable energy sources, would lead to greater energy security and economic and environmental benefits.

[8] http://adsabs.harvard.edu/abs/2013ERL.....8b4024C.
[9] National Treasury Carbon Tax Policy Paper. Available online http://www.treasury.gov.za/public%20comments/Carbon%20Tax%20Policy%20Paper%202013.pdf
[10] http://www.treasury.gov.za/public%20comments/Carbon%20Tax%20Policy%20Paper%202013.pdf

The deployment of various renewable technologies increases the diversity of electricity sources and, through local decentralised generation, contributes to the flexibility of the system and its resistance to central shocks.

According to the International Energy Agency, *"renewable energy resources ... exist virtually everywhere, in contrast to other energy sources, which are concentrated in a limited number of countries. Reduced energy intensity, as well as geographical and technological diversification of energy sources, would result in far-reaching energy security and economic benefits.*"[11]

The renewables programme has resulted in over 6 000 MW of generation capacity being allocated to bidders across a variety of technologies, principally in wind and solar in South Africa. Progress in this regard has been made under the DoE REIPPPP. According to the DoE's Integrated Resource Plan for Electricity 2010-2030, South Africa is aiming to procure 9200 MW of wind power by 2030.

6.1.3 Economic Development and Job Creation

The REIPPPP requires Economic Development ("ED") commitments from onshore wind energy projects and projects are adjudicated according to their ED commitments. The main ED beneficiaries of approved projects are currently communities living within a 50 km radius of renewable energy facilities. Projects are bid and thereafter adjudicated according to tariff (70%) and Economic Development (30%). There is therefore an incentive for projects to focus on Economic Development of the Local Community and to assign as much revenue, jobs, procurement etc. to local people as well as South African companies and people as possible in order to stand a chance of having a successful project.

Table 3-6: REIPPP points weighting

Economic Development Elements	Weighting
Job Creation	25%
Local Content	25%
Ownership	15%
Management Control	5%
Preferential Procurement	10%
Enterprise Development	5%
Socio-Economic Development	15%
Total	**100%**
Total points	**30 points**

A number of these elements will have a significant and positive impact on the Local Community.

In terms of job creation, bidders are required to indicate the actual number of jobs that will be created for South African citizens, Skilled People, Black People, Skilled Black People and Citizens from the Local Communities. Significant skilled and unskilled job opportunities will be created in the Local Communities, particularly during the construction period.

For Ownership, bidders are required to indicate the total shareholding of the Project Company in the hands of Black People and Local Communities. The minimum ownership percentage for Local Community is 2.5% but projects have committed up to 40% Local Community Ownership in order to have a competitive project. Broad-based community

[11] www.iea.org/textbase/npsum/ETP2012SUM.pdf

trusts are established as a vehicle for Local Community Ownership to received dividend revenue from an operating project that will be invested in socio-economic development imperatives as determined by trustees. The ownership stake is funded either through debt or through equity partners ("a free-carry").

The Socio-Economic Development and Enterprise Development commitments 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). Projects in the REIPPPP receive additional points if the socio-economic and enterprise development investments are committed to be invested in the Local Community.

WEFs in South Africa will create skilled and unskilled jobs, particularly during the construction period. Under the REIPPPP, projects are incentivised to maximise the direct job creation opportunities, particularly for people in the communities surrounding the project.

WEFs tend to be constructed in rural areas with small communities and limited infrastructure and social amenities. A wind farm would create indirect jobs in accommodation, catering and other services that would support a wind farm and cater for the material and social needs of wind farm workers.

Localisation is considered one of the major contributors to job creation and general improvement of the economy of South Africa. Localisation through the construction of new manufacturing facilities to build wind turbine towers and other turbine components in South Africa is currently progressing.

Wind energy can provide technical skills to South Africans and thus improve the technical skills profile of the country and the regions where wind energy facilities are located. Through the REIPPPP, developers' own initiatives and through support from international donor agencies, a number of young South Africans are being trained on various aspects of wind farm construction and operation.

These projects, if successfully implemented, have the potential to transform for the better key development areas of South Africa and would assist South Africa in meeting its development goals, while meeting its carbon emission reduction targets as per international protocols.

6.2 Policies in Support of Renewable Energy

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. The National Climate Change Adaptation Strategy[12] (NCCAS) for The Republic of South Africa Version UE10, 13 November 2019, explains that the South African primary sectors, such as agriculture and mining, which are natural resource dependent are high consumption uses of energy. The NCCAS is adopting a cluster approach to assist with the changing climate conditions and the affect it has on various sectors. An action in support of this development is the approach to "create a more adaptive energy system to reduce dependence on a centralised system and increase distributed generation, especially in rural areas". "This will involve encouraging the development of an adaptive and decentralised energy system so that the system is more resilient to climate disruptions".

[12] https://www.environment.gov.za/sites/default/files/docs/nationalclimatechange_adaptationstrategy_ue10november2019.pdf

Both national and provincial policies and planning documents support the development of renewable energy facilities. The development of and investment in renewable energy is supported by the National Development Plan (NDP), New Growth Path Framework, Integrated Resource Plan (IRP) and National Infrastructure Plan. At a provincial level, the development of renewable energy is supported by the Northern Cape Provincial Development and Resource Management Plan / Provincial Spatial Development Framework (PSDF) of 2020, Pixley Ka Seme District Municipality Integrated Development Plan (IDP) for 2022-2027, and Spatial Development Framework; and the Ubuntu Local Municipality Integrated Development Plan for 2022 - 2023.

The need and desirability for renewable energy developments play a role in South Africa meeting its energy and climate change targets and provides a socio-economic boost at the local level in areas that are in need of it.

Aside from environmental considerations, investment in renewables have been driven by dramatic reductions in their costs. Plate 5.1 shows this trend and that in the six years between bid windows 4 and 5, the average price of electricity purchased through the REIPPPP fell by 54% (Magoro, 2021).

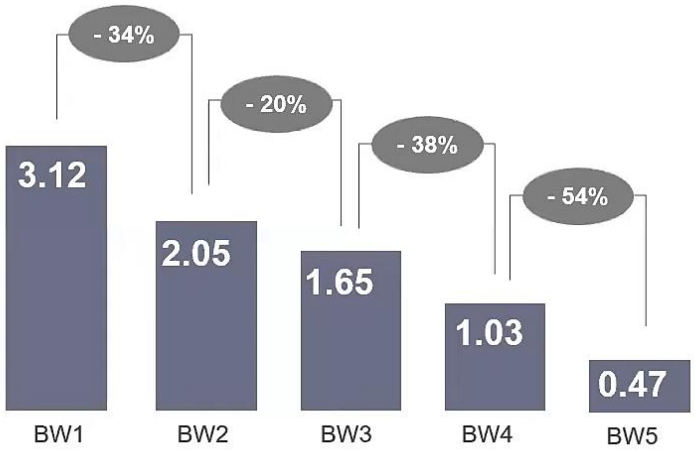


Plate 3-7: REIPPP average bid prices in April 2021 terms (Magaro, 2021)

6.3 Need & Desirability Guideline

Reference is made to the Department of Forestry, Fisheries and Environment (DFFE) 2017 Guideline on Need and Desirability[13] 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 guidelines pose questions that should be considered in this investigation, which will be addressed in EIA Phase.

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

7 PUBLIC PARTICIPATION PROCESS

The Public Participation Process follows the requirements of Section 24 (5) and Chapter 6 (41, 42, 43, and 44) of GN R. 326 of NEMA EIA Regulations, 2014 (as amended), as well as the Public Participation Guidelines in terms of NEMA, 1998 EIA Regulations, 2014.

A PPP is an important part of any application. The aim of PPP is:

- To inform I&APs of the proposed amendments;
- To identify and respond to issues, comments and concerns as raised by I&APs;
- To promote transparency of the project and its potential consequences and ensure I&APs understanding of the proposed amendments;
- 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 amendment; and
- To ensure that all I&AP issues and comments are accurately recorded, addressed and documented in a Comments & Response Report.

7.1 Pre-Scoping Phase Public Participation Process

The initial notification phase gives opportunity to the public to register as an I&AP and receive all correspondence and notification regarding the application process. During this phase the following was conducted:

- Site notices were erected on the site boundary in November 2022;
- Poster notices were erected in the town of Loxton in in November 2022;
- Advertisements were placed in the *Victoria West Newspaper* and the *Diamond Field Advertiser* Newspaper in November 2022; and
- Initial notification e-mails were distributed on to all pre-identified I&APs, including the affected landowner and occupiers of the site, municipal councillor(s), ratepayers in the area, affected district and local municipalities, and organs of state. I&APs who responded to the newspaper and notices were also sent an initial notification email.

7.2 Scoping Phase Public Participation Process

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

The following tasks are undertaken during the scoping process:

- All issues, underlying concerns and suggestions raised by I&APs are understood, documented and addressed; and
- Areas that require further specialist investigation are identified and feedback is provided to I&APs.

The PPP for this Scoping and EIA process takes cognisance of the DFFE (2017) Public Participation Guidelines in terms of NEMA EIA Regulations, as amended.

Throughout the process, stakeholders will be encouraged to communicate with the PPP team to raise issues, ask questions or make suggestions. Communication will be through telephonic means or in written form. All issues will be included into the Comments and Responses Trail, and responded to and addressed by the project team.

Registration of I&APs will continue throughout the Scoping & EIA process. Comments on the draft reports will need to be received within the specified time periods to ensure they can be taken into account within the final documents, and submitted to the DFFE within the legislated timeframes.

7.3 Summary of Comments and Responses

No comments, queries or request for registration was received before submission of the Draft Scoping Report to the DFFE.

The comments and responses trail will be updated as comments / queries are raised and will be adequately addressed and responded to by the project team and submitted with the final Scoping Report for approval.

8 SCOPING PHASE ASSESSMENTS OF POTENTIAL IMPACTS

This section provides the preliminary scoping phase potential impact assessment of the proposed development.

8.1 Soil, Land Use and Agricultural Potential

An Agricultural Compliance Statement was produced to assess the agricultural impacts following the requirements of the NEMA, as amended, Protocols.

The compliance statement thus only indicates whether or not the proposed development will have an unacceptable impact on the agricultural production capability of the site and provides a substantiated statement on the acceptability, or not, of the proposed development and a recommendation on the approval, or not of the proposed development.

When the agricultural impact of a development involves the permanent or long term loss / non-agricultural use of potential agricultural land, as it does in this case, the focus and defining question of the agricultural impact assessment is: "Does the loss of future agricultural production potential that will result from this development, justify keeping the land solely for potential agricultural production and therefore not approving the development?"

If the loss is small, then it is unlikely to justify non approval. If the loss is big, then it is likely to justify it.

The extent of the loss is a direct function of two things, firstly the amount of land that will be lost and secondly, the production potential of the land that will be lost. In the case of wind farms, the first factor, amount of land loss, is so small that the total extent of the loss of future agricultural production potential is insignificantly small, regardless of how much production potential the land has. This is because the required spacing between turbines means that the amount of land actually excluded from agricultural use is extremely small in relation to the surface area over which a wind farm is distributed. Wind farm infrastructure (including all associated infrastructure and roads) typically occupies less than 2 % of the surface area, according to the typical surface area requirements of wind farms in South Africa (DFFE, 2015). Most wind energy facilities, occupy less than 1% of the surface area. All agricultural activities are able to continue unaffectedly on all parts of the farmland other than this small agricultural footprint and the actual loss of production potential is therefore insignificant.

In this case, the second factor, the production potential of the land, is also low which means that the loss of future agricultural production potential as a result of the proposed development is entirely insignificant.

It is also important to note that renewable energy facilities have both positive and negative effects on the production potential of land and so it is the net sum of these positive and negative effects that determines the extent of the change in future production potential. The significance of the small loss of production potential is reduced even more because it is compensated by the positive impacts that enhance production potential.

Another aspect to consider is the scale at which the significance of the agricultural impact is assessed. The change in production potential of a farm or significant part of a farm is likely to be highly significant at the scale of that farm, but may be much less so at larger scales. This assessment considers a regional and national scale to be the most appropriate one for assessing the significance of the loss of agricultural production potential because, as has been discussed above, the purpose is to ensure the conservation of agricultural land required for national food security.

There is ultimately only ever a single agricultural impact of a development and that is a change to the future agricultural production potential of the land. This impact occurs by way of different mechanisms some of which lead to a decrease in production potential and some of which lead to an increase. It is the net sum of positive and negative effects that determines the overall agricultural impact.

Two direct mechanisms have been identified that lead to decreased agricultural potential by:

Occupation of Land - Agricultural land directly occupied by the development infrastructure will become restricted for agricultural use, with consequent potential loss of agricultural productivity for the duration of the project lifetime. As discussed above, the small and widely distributed nature of the agricultural footprint of the facility means that only an insignificant proportion of the available agricultural land is impacted in this way.

Soil Erosion and Degradation – Erosion can occur as a result of the alteration of the land surface run-off characteristics, predominantly through the establishment of hard surface areas including roads. Soil erosion is completely preventable. The storm water management that will be an inherent part of the road engineering on site and standard, best practice erosion control measures recommended and included in the EMPr, are likely to be effective in preventing soil erosion. Loss of topsoil can result from poor topsoil management during construction related excavations.

Two indirect mechanisms have been identified that lead to increased agricultural potential through:

Increased Financial Security for Farming Operations – Reliable and predictable income will be generated by the farming enterprises through the lease of the land to the energy facility. This is likely to increase their cash flow and financial security and could improve farming operations and productivity through increased investment into farming.

Improved Security Against Stock Theft and Other Crime due to the presence of security infrastructure and security personnel at the energy facility.

Considering what is detailed above, the extent to which any of these mechanisms is likely to actually affect levels of agricultural production is small and the overall impact of a change in agricultural production potential is therefore small.

Furthermore, the agricultural protocol requires confirmation that all *reasonable measures have been taken through micro-siting to minimize fragmentation and disturbance of agricultural activities*. As long as the agricultural footprint avoids all areas used for crop production, which it does, the exact position of the footprint and all infrastructure within it will not make any material difference to agricultural impacts and disturbance.

Due to the low potential impact and the low sensitivity of the site, the specialist study is scoped out and will not be addressed further in the application process and will not be assessed in the EIA phase.

8.2 Freshwater and Wetlands (Aquatics)

During this scoping phase investigation it was found that the greatest number of impacts could occur within the construction phase, but if the High sensitivity / No-Go areas are avoided, then the impacts would be limited to a low number of road / cable and transmission line crossings only.

The final aquatic impact assessment will be conducted once the proposed designs, that take all of the development constraints into consideration in the EIA phase of the assessment. This will also then focus on any further cumulative impacts.

The following potential impacts were assessed with regard aquatic environment that would be affected by the proposed development:

- Impact 1: Loss of vegetation and in particular species / habitats that could contain listed as Critically Endangered and or Vulnerable species
- Impact 2: Loss of any critical corridors and connect habitats that are linked to any future conservation plans or protected areas expansion
- Impact 3: Changes to water quality
- Impact 4: Changes to the hydrological regime and increased potential for erosion
- Impact 5: Cumulative impacts

8.2.1 Construction and Decommissioning Phase

Impact Phase: Construction and Decommissioning					
Nature of the impact: Loss of vegetation and in particular species / habitats that could contain listed as Critically Endangered and or Vulnerable species (direct)					
Description of Impact: Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made or large hard engineered surfaces are placed within the buffer zones. Loss can also include a functional loss, through change in vegetation type via alien encroachment, reducing aquatic biodiversity					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Medium Term	Irreversible	Low	Probable
Score	2	3	5	2	3
With Mitigation	Site	Short Term	Recoverable	Very Low	Improbable
Score	1	2	3	1	1
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (36)**		**Low Negative Impact (7)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to reduce residual risk or enhance opportunities: • A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout. • Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.					

• Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc). To minimise the impact of the access roads: • Use existing roads or upgrade existing tracks to cross wetlands rather than constructing entirely new roads wherever possible. • Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly, before any construction commences. • Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils. • All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that headcut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert. • The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown. • Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities. • Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted. • All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated. • It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.	
Residual impact	Very low and acceptable with adoption of mitigation measures

Impact Phase: Construction and Decommissioning					
Nature of the impact: Loss of any critical corridors and connect habitats that are linked to any future conservation plans or protected areas expansion (direct)					
Description of Impact: Activities resulting in physical disturbance of aquatic systems which provide ecosystem services, especially where new crossings are made, or large hard engineered surfaces are placed within the buffer zones and have been included in any Critical Biodiversity Areas.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Medium Term	Irreversible	Low	Probable
Score	2	3	5	2	3
With Mitigation	Site	Short Term	Recoverable	Very Low	Improbable
Score	1	2	3	1	1
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (36)**		**Low Negative Impact (7)**		

Was public comment received?	No.
Has public comment been included in mitigation measures?	No.

Mitigation measures to reduce residual risk or enhance opportunities:

- The aquatic systems have been mapped to a finer scale and have taken cognizance of any potential CBAs. If High / No-Go are avoided by the major infrastructure, then aquatic zones associated with the CBAs can be avoided.
- A pre-construction walkthrough with an aquatic specialist is recommended and they can assist with the development of the stormwater management plan and Aquatic Rehabilitation and Monitoring plan, coupled to micro-siting of the final layout.
- Where large cut and fill areas are required these must be stabilised and rehabilitated during the construction process, to minimise erosion and sedimentation.
- Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through whatever additional interventions maybe necessary (i.e., extension, energy dissipaters, spreaders, etc).

To minimise the impact of the access roads:

- Use existing roads or upgrade existing tracks to cross wetlands rather than constructing entirely new roads wherever possible.
- Use the smallest possible working corridor. Outside the working corridor, all watercourses are to be considered no go areas. Any unnecessary intrusion into these areas is prohibited. Where intrusion is required, the working corridor must be kept to a minimum and demarcated clearly, before any construction commences.
- Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils.
- All pipe culverts must be removed and replaced with suitable sized box culverts, where road levels are raised. Crossings that are installed below the natural ground level are to be constructed with an appropriate drop inlet structure on the upstream side to ensure that head cut erosion does not develop as a result of the gradient change from the natural ground level to the invert level of the culvert.
- The channel profile, regardless of the current state of the river / water course, will be reinstated thus preventing any impoundments from being formed. The related designs must be assessed by an aquatic specialist during a pre-construction walkdown.
- Water diversions must be temporary in nature and no permanent walls, berms or dams may be installed within a watercourse. Sandbags used in any diversion or for any other activity within a watercourse must be in a good condition, so that they do not burst and empty sediment into the watercourse. Upon completion of the construction at the site, the diversions shall be removed to restore natural flow patterns. Under no circumstance shall a new channel or drainage canals be excavated to divert water away from construction activities.
- Any fauna (frogs, snakes, etc.) that are found within the construction area must be moved to the closest point of similar habitat type outside of the areas to be impacted.
- All disturbed areas beyond the construction site that are intentionally or accidentally disturbed during the construction phase must be rehabilitated.
- It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas.

Residual impact	Very low and acceptable with adoption of mitigation measures

Impact Phase: Construction and Decommissioning
Nature of the impact: Potential impact on localised surface water quality (indirect)
Description of Impact: During construction or decommissioning, earthworks will expose and mobilise earth materials, and a number of materials as well as chemicals will be imported and used on site and may end up in the surface water, including soaps, oils, grease and fuels, human wastes, cementitious

wastes, paints and solvents, etc. Any spills during transport or while works area conducted in proximity to a watercourse has the potential to affect the surrounding biota. This can result in possible deterioration in aquatic ecosystem integrity and species diversity.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Medium Term	Recoverable	Low	Probable
Score	2	3	3	2	3
With Mitigation	Site	Short Term	Reversible	Very Low	Improbable
Score	1	2	1	1	1
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Low Negative Impact (30)**		**Low Negative Impact (5)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to reduce residual risk or enhance opportunities: • All liquid chemicals including fuels and oil, including for the BESS, must be stored in with secondary containment (bunds or containers or berms) that can contain a leak or spill. Such facilities must be inspected routinely and must have the suitable PPE and spill kits needed to contain likely worst-case scenario leak or spill in that facility, safely. • Washing and cleaning of equipment must be done in designated wash bays, where rinse water is contained in evaporation/sedimentation ponds (to capture oils, grease cement and sediment). • Mechanical plant and bowsers must not be refuelled or serviced within 100m of a river channel. • All construction camps, lay down areas, wash bays, batching plants or areas and any stores should be more than 50 m from any demarcated water courses. • Littering and contamination associated with construction activity must be avoided through effective construction camp management. • No stockpiling should take place within or near a water course. • All stockpiles must be protected and located in flat areas where run-off will be minimised and sediment recoverable. • ESO monitors the site on a daily basis to ensure plant is in working order (minimise leaks), spills are prevented and if they do occur, are quickly rectified.					
Residual impact	Low risk and acceptable, with adoption of mitigation measures and monitoring				

8.2.2 Construction and Operation Phase

Impact Phase: Construction and Operation					
Nature of the impact: Impact on riparian systems through the possible increase in surface water runoff on form and function during the construction and into the operational phase, i.e. changes to the hydrological regime (indirect)					
Description of Impact: Increase in hard surface areas, and roads that require stormwater management will increase through the concentration of surface water flows that could result in localised changes to flows (volume) that would result in form and function changes within aquatic systems. Additionally, crossings that concentrate flows can lead to further erosion and sedimentation of downstream areas. These impacts can result in deterioration in freshwater ecosystem integrity, and a reduction in the supply of ecosystem services.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Long term	Recoverable	Moderate	Probable

Score	2	4	3	3	3
With Mitigation	Site	Short Term	Reversible	Very Low	Low Probability
Score	1	2	1	1	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (36)**		**Low Negative Impact (10)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				

Mitigation measures to reduce residual risk or enhance opportunities:

- The buffer area must be considered as a No-Go area for development and large infrastructure.
- A stormwater management plan must be developed in the preconstruction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems.
- The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area.
- The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion.
- Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil. Contingency plans must be in place for high rainfall events which may occur during construction.
- Monitoring of the project activities is essential to ensure the mitigation measures are implemented. Compliance with the mitigation recommendations must be audited by a suitably qualified independent Environmental Control Officer with an appropriately timed audit report.

Residual impact	Very low and acceptable, with adoption of mitigation measures and monitoring

8.2.3 Cumulative Impact

Impact Phase: Cumulative impacts on the aquatic resources of the area

Nature of the impact: Cumulative impacts on the aquatic resources of the area

Description of Impact: The cumulative impact assessment considers the combined impact of the remaining Loxton WEF projects and several other PV projects within a 30km radius, that are also in the development phase and the associated grid lines on the aquatic resources. The rating below is based on the premised that important or sensitive features will be avoided by the various projects, while the mitigations proposed will ensure that the form and or function of downstream areas remain intact.

Impact Status: Negative

	E	D	R	M	P
Without Enhancement	Regional	Permanent	Recoverable	Low	Probable
Score	3	5	3	2	3
With Enhancement	Local	Long Term	Reversible	Very Low	Low Probability
Score	2	2	1	1	2
Significance Calculation	**Without Enhancement**		**With Enhancement**		

S=(E+D+R+M)*P	Moderate Negative Impact (39)	Low Negative Impact (12)
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	
Mitigation measures to enhance opportunities: • The project should share roads and infrastructure where possible to reduce the overall footprint and reduce stormwater and erosion and sedimentation related impacts • The projects should collaborate with provincial roads authority to upgrade the main access routes and improve the crossings and stormwater controls.		
Residual impact	Low risk and acceptable, with adoption of mitigation measures and monitoring	

8.3 Terrestrial Biodiversity (Flora and Fauna)

The proposed development is likely to result in a variety of impacts, associated largely with the disturbance, loss and transformation of intact vegetation and faunal habitat during construction. During operation, the impacts would be reduced and restricted largely to potential noise impacts and occasional disturbance from operational activities. The following impacts are identified as the major impacts that are likely to be associated with the development of the Loxton Wind Energy Facility 3. These will be assessed further in the EIA phase, following the plan of study presented in this report.

Impact 1 - Impacts on vegetation and listed or protected plant species

The development would require vegetation clearing for turbines, roads, underground cabling and substations with associated battery facility, as well as for temporary site camp and general laydown areas. In addition, it is likely that the turbine foundations and some roads would require blasting which would generate dust and debris fallout near these locations. Apart from the direct loss of vegetation within the development footprint, listed and protected species are likely to be impacted. These impacts would occur during the construction phase of the development, with additional vegetation impacts during operation likely to be low. Although the abundance of plant species of concern appears to be relatively low, there are numerous provincially protected species present.

Impact 2 - Direct Faunal Impacts

Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed if proper management and monitoring is not in place. Traffic at the site during all phases of the project would pose a risk of collisions with fauna. Slower types such as tortoises, snakes and certain mammals would be most susceptible, and the impact would be largely concentrated to the construction phase when vehicle activity is high. Some mammals and reptiles would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present.

Impact 3 - Impact on the Riverine Rabbit

Although the Riverine Rabbit has not been confirmed present within the site, there is some suitable habitat present and as a precaution, these areas are assumed to be occupied, largely as a planning-level tool to ensure adequate avoidance of these areas by the development and ensure that these areas remain viable as potential habitat into the future.

Unless additional camera trapping indicates that Riverine Rabbits are present within the development area, a direct impact on this species is unlikely.

Impact 4 - Impact on the Karoo Padloper

The Karoo Padloper would potentially experience habitat loss due to construction of turbines, roads and other infrastructure as well as an increased risk of poaching or illegal collecting. During operation, impacts would likely be reduced to some residual habitat loss as evidence from other parts of the world indicates that the operation of wind turbines does not appear have a significant impact on the health and abundance of tortoises within operational wind farms in similar arid regions (Agha et al. 2015, Lovich et al. 2011).

Impact 5 - Increased Erosion Risk

The large amount of disturbance created during construction would leave the affected areas vulnerable to wind and water erosion. Some parts of the site are steep and specific mitigation and avoidance would be necessary to reduce this impact to acceptable levels. This impact is also of concern given the significance of the drainage lines in the area as Riverine Rabbit habitat and the consequent need to prevent and limit impact on these features.

Impact 6 - Impacts on CBAs and broad-scale ecological processes

There are three turbines located within CBAs and the development would result in some habitat loss within the affected CBA. In addition, the development would cause general habitat fragmentation and pose some impact on broad-scale ecological processes in the area. These impacts cannot be well mitigated and there is likely to be some residual impact on broad-scale ecological processes due to the presence and operation of the wind energy facility. The analysis however suggests that these impacts would be relatively low, given the avoidance of significant biodiversity features.

Impact 7 - Impact on PAES Focus Areas

The development would result in a small amount of habitat loss (ca. 5-10ha) within PAES Focus Areas. The affected vegetation type and habitats present are however widely available and the loss of this relatively small amount of habitat within the context of the greater landscape which is still overwhelmingly intact, would be low.

Impact 8 - Cumulative Impacts

The proposed development would result in habitat loss and an increase in overall cumulative impacts on fauna and flora in the area. This would be in addition to the three phases of the approved Nuweveld Wind Farms, which would result in approximately 300ha of habitat loss and the in-process Hoogland WEFs. Although the area currently experiences a relatively low level of impact, there are numerous developments currently being planned in the area and it is highly likely that cumulative impacts are going to increasingly become a concern.

8.3.1 Construction Phase

Issue	**Impacts on vegetation and plant SCC**	
Description of Impact		
Impact on vegetation and plant SCC due to construction-phase habitat loss.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Low	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite / Continuous	Possible/Frequent
Significance	**Medium -**	**Low -**
Degree to which impact can be reversed	The affected environment will not be able to recover from the impact - permanently modified	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts. While there is some scope for avoidance of sensitive species and habitats, some vegetation loss is an inevitable consequence of development that cannot be avoided.	
Mitigation actions		
The following measures are recommended:	• Undertake a pre-construction walk through of the development footprint to refine the layout through micrositing of turbines, buildings, substation (and associated battery facility), access roads and internal roads where it impacts on SCC. • Adhere to the sensitivity maps and limits of acceptable change provided within this assessment when determining the final layout of the Wind Farm and associated infrastructure. • Existing roads or disturbance footprints should be used as far as possible and should especially be used through very high sensitive areas. Should access roads, internal cables and overhead lines traverse drainage lines and riparian areas which are classified as Very High sensitivity these should be microsited by a suitably qualified ecological and aquatic specialist before construction in that area starts to ensure any potential impacts are minimised. • Develop an alien vegetation management plan, soil erosion management plan, revegetation	

	and rehabilitation plan based on the site attributes and environmental constraints.
Monitoring	
The following monitoring is recommended:	• Ensure that all vegetation-related preconstruction permits, surveys and walk-throughs have been conducted prior to the commencement of construction activity. • Monitoring of vegetation clearing during construction by the EO to ensure that any plant SCC within the development footprint area are translocated to safety where necessary.
Cumulative impacts	
Nature of cumulative impacts	The contribution of the development to cumulative impacts on vegetation and plant species of concern is considered low due to the current low levels of transformation in the area and the relatively low total footprint of the development.
Rating of cumulative impacts	**Without Mitigation**: **Medium -** / **With Mitigation**: **Low -**

Issue	**Direct and indirect faunal impacts**	
Description of Impact		
Increased levels of noise, pollution, disturbance and human presence during construction will be detrimental to fauna. Sensitive and shy fauna are likely to move away from the area during the construction phase as a result of the noise and human activities present, while some slow-moving species would not be able to avoid the construction activities and might be killed.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	High
Duration	Short-term	Short-term

Extent	Local	Local
Consequence	Medium	Medium
Probability	Definite / Continuous	Possible / frequent
Significance	**Medium -**	**Low -**
Degree to which impact can be reversed	The affected environment will be able to recover from the impact. While there is some scope for avoidance of sensitive habitats, some disturbance and habitat loss for fauna is an inevitable consequence of development that cannot be entirely avoided.	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts	
Mitigation actions		
The following measures are recommended:	• Adhere to the development restrictions placed on areas of Very High sensitivity. Where necessary, these areas include areas of high fauna importance. • All vehicles should adhere to a low-speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. • Appropriate design of roads and other infrastructure to minimise faunal impacts and allow fauna to pass over, through or underneath these features as appropriate. • All laydown areas, construction sites etc with waste disposal bins, should be provided with lockable bins that are tamper proof by baboons, monkeys and other fauna. • Search and rescue for reptiles and other vulnerable species during construction, before areas of intact vegetation are cleared. Such search and rescue should be conducted by relevant experts with experience in search and rescue of the faunal groups concerned. • Limiting access to the site and ensuring that construction staff and machinery remain within the demarcated construction areas during the construction phase. Environmental induction for all staff and contractors on-site. • Develop an open space management plan as part of the project EMPr. • No excavated holes or trenches should be left open for extended periods as fauna may fall in become trapped.	

	• The design should ensure that there are no electrical fencing around substations (and associated battery facility) or other features within 20cm of the ground as tortoises become stuck against such fences and are electrocuted to death.
Monitoring	
The following monitoring is recommended:	• Ensure that all fauna-related preconstruction permits, surveys and walk-throughs have been conducted prior to the commencement of construction activity. • Monitoring of site clearing during construction by the EO to ensure that any fauna remaining within the development footprint area are translocated to safety where necessary. Monitoring of construction activities to ensure that the development remains within the demarcated development footprint. • Holes and trenches that are open should be checked on a regular basis (preferably daily) to ensure that any fauna that have fallen in and become trapped can be rescued to safety.
Cumulative impacts	
Nature of cumulative impacts	The development would result in some disturbance of fauna during the construction phase which would occur in addition to other faunal disturbance occurring in the area. However, as the area is largely undeveloped, larger fauna would be able to move away from disturbance during construction and return thereafter. However, the current developments would contribute approximately 120ha to long-term habitat loss in the area. However, given the largely intact nature of the

	area, this is considered a relatively low contribution that would be acceptable.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	**Low -**

Issue	**Construction phase impact on the Riverine Rabbit**	
Description of Impact		
Impacts on Riverine Rabbit as a result of construction phase activities, including vehicle collisions, disturbance and habitat loss.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	High
Duration	Medium-term	Short-term
Extent	Regional	Regional
Consequence	High	Medium
Probability	Probable	Improbable
Significance	**Medium -**	**Low -**
Degree to which impact can be reversed	The affected environment will only recover from the impact with significant intervention	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts	

Mitigation actions		
The following measures are recommended:	• All construction vehicles should adhere to a low speed limit (30km/h on site and 40km/h) in areas where Riverine Rabbits are likely to be active, both within the wind farm as well as on the public roads to the site. • During construction, driving between sunset and sunrise should be reduced as far possible as this is when Riverine Rabbits are most active and the risk of collisions is highest. • No dogs should be allowed on site and precautions to ensure that there is poaching or other direct faunal disturbance on site should be implemented. • Where any new roads, cabling and/or overhead lines traverse areas mapped as High Riverine Rabbit habitat sensitivity, the route should be microsited by a suitably qualified ecological specialist before construction commences to ensure any potential impacts are minimised. Existing tracks through these areas should be used where present.	
Monitoring		
The following monitoring is recommended:	• There should be a monitoring programme for Riverine Rabbit roadkill during construction that should be used to inform any additional mitigation and avoidance that should be implemented. Should rabbits be killed by traffic, then the traffic management to and from the site should be reviewed in collaboration with the EWT Drylands Programme, to identify additional mitigation and avoidance that should be implemented to further reduce roadkill. • Ensure that riparian areas near to the development footprint are clearly demarcated as no-go areas with appropriate signage and barriers.	
Cumulative impacts		
Nature of cumulative impacts	The development would contribute to cumulative impacts on Riverine Rabbits especially due to vehicle collisions, but this would be transient and the overall contribution to cumulative impact would be low.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	**Low -**

Issue	**Construction phase impact on the Karoo Padloper**	
Description of Impact		
Impact on the Karoo Padloper as a result of construction phase activities, including disturbance, poaching and habitat loss.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Medium
Duration	Medium-term	Short-term
Extent	Local	Local
	Medium	Medium
Probability	Probable	Possible / frequent
Significance	**Medium -**	**Low -**
Degree to which impact can be reversed	Mitigation exists and will notably reduce significance of impacts	
Degree to which impact may cause irreplaceable loss of resources	The affected environment will only recover from the impact with significant intervention	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts	
Mitigation actions		
The following measures are recommended:	• Avoidance of areas identified as potential Padloper habitat at the planning and design phase. This has been implemented via the sensitivity mapping which has included areas of likely potential habitat as high or very high sensitivity. • Limiting access to areas outside the construction footprint during construction to ensure that poaching and similar impact is minimised. • Search and rescue for the Padloper and other reptiles within the development footprint prior to clearing within areas that have been identified as potential habitat.	
Monitoring		
The following monitoring is recommended:	• Monitoring of construction activities to ensure that potential impacts on the Padloper are reduced as far as possible. This should include monitoring of personnel activities to reduce poaching potential, noise and general disturbance.	
Cumulative impacts		

Nature of cumulative impacts	The development would contribute to cumulative impacts on the Padloper, but this would be transient and the overall long-term contribution to cumulative impacts on this species would be low.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	**Low -**

Issue	**Impacts on Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs)**	
Description of Impact		
Construction phase impact on CBAs and ESAs		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Low
Probability	Certain	Certain
Significance	**Medium -**	**Medium -**
Degree to which impact can be reversed	The affected environment will only recover from the impact with significant intervention	
Degree to which impact may cause irreplaceable loss of resources	The affected environment will only recover from the impact with significant intervention	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts. The footprint within CBAs is low and considered acceptable.	
Mitigation actions		

The following measures are recommended:	• Should access roads, internal cables and overhead lines traverse drainage lines and riparian areas mapped as CBAs these should be microsited by a suitably qualified ecological and aquatic specialist before construction in that area starts to ensure any potential impacts are minimised • Minimise the development footprint as far as possible, which includes locating temporary-use areas such as construction camps and lay-down areas in low sensitivity or previously disturbed areas. The current layout depicts that the substations, camps and lay-down areas are in low sensitivity areas, and this is therefore acceptable. • Avoid impact to restricted and specialised habitats such as pans, wetlands and rock pavements. The final development footprint to be authorised should be checked for such sensitive features in the field, such that there is a high degree of confidence that the final layout avoids such features so that significant changes to turbines or roads are not required at the preconstruction phase. • Minimise the development footprint near watercourses and other ecologically significant features.	
Monitoring		
The following monitoring is recommended:	• Monitoring of construction activities to ensure that the development footprint within CBAs is restricted to the authorised development footprint.	
Cumulative impacts		
Nature of cumulative impacts	As the total extent of habitat loss within CBAs within the site is moderate at 65 ha, the potential to contribute to cumulative impacts on CBAs is also seen as being moderate.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	**Medium -**

8.3.2 Operational Phase

Issue	**Operational phase faunal impacts**
Description of Impact	
Operational phase impacts on fauna (Vehicle collision/disturbance/electrocutions)	
Type of Impact	Indirect
Nature of Impact	Negative

Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Site
Consequence	Medium	Low
Probability	Possible / frequent	Conceivable
Significance	**Low**	**Low -**
Degree to which impact can be reversed	The affected environment will be able to recover from the impact	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts. Habitat loss and disturbance will persist for the lifetime of the facility. The habitat could be partly restored thereafter.	
Mitigation actions		
The following measures are recommended:	• Adhere to the open space management plan which makes provision for the favourable management of the facility and the surrounding area for fauna. • A log should be kept detailing and fauna-related incidences or mortalities that occur on site, including roadkill, electrocutions etc. These should be reviewed annually and used to inform operational management and mitigation measures.	
Monitoring		
The following monitoring is recommended:	• Monitoring of any fauna-related mortalities from roadkill or other sources at the site. • Monitoring of any fauna-related conflicts at the site such as problems with baboons or Vervet monkeys.	
Cumulative impacts		
Nature of cumulative impacts	Cumulative impacts on fauna are predicted to be low because there are no fauna species of high conservation concern that are likely to be compromised by the development and habitat loss in general would be low.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	**Low -**

Issue	**Operational Phase impact on the Riverine Rabbit**
Description of Impact	

There would potentially be impact on Riverine Rabbits at the site during operation due to operational activities (vehicles/disturbance) as well as turbine noise.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Possible / frequent	Possible / frequent
Significance	**Low -**	**Low -**
Degree to which impact can be reversed	The affected environment will be able to recover from the impact	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	Mitigation does not exist; or mitigation will slightly reduce the significance of impacts.	
Mitigation actions		
The following measures are recommended:	• Adherence to a Riverine Rabbit Monitoring Plan	
Monitoring		
The following monitoring is recommended:	• All incidents involving Riverine Rabbits should be documented and reported to the local EWT field office in Loxton. If Rabbits are killed, the carcases should be collected and provided to EWT for the collection of DNA and other samples.	
Cumulative impacts		
Nature of cumulative impacts	In terms of specific cumulative impacts, impacts on the Riverine Rabbit would be a concern but as this species has not been located within the site, cumulative impacts associated with the current project are considered acceptable.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	**Low -**

Issue	**Increased soil erosion during operation**
Description of Impact	
Increased soil erosion risk during operation	
Type of Impact	Direct
Nature of Impact	Negative

Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Long-term	Medium-term
Extent	Local	Local
Consequence	Medium	Low
Probability	Probable	Conceivable
Significance	**Medium -**	**Very Low -**
Degree to which impact can be reversed	The affected environment will be able to recover from the impact	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	With mitigation, this impact can be well avoided, and erosion reduced to a low level.	
Mitigation actions		
The following measures are recommended:	• Annual rehabilitation activities in line with the EMPr requirements. Any erosion problems observed on-site should be rectified as soon as possible using the appropriate revegetation and erosion control works.	
Monitoring		
The following monitoring is recommended:	• Annual monitoring and surveys for erosion. Disturbed areas near to drainage lines should receive priority in rehabilitation and operational phase monitoring.	
Cumulative impacts		
Nature of cumulative impacts	Erosion would contribute to habitat degradation in the area and add to the existing erosion and degradation present in the area which results largely from historical land use practices.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	**Low -**

8.3.3 Decommissioning Phase

Issue	**Direct and indirect faunal impacts**	
Description of Impact		
Increased levels of noise, pollution, disturbance and human presence during decommissioning will be detrimental to fauna.		
Type of Impact	Indirect	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Medium
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Medium

Probability	Probable	Possible / frequent
Significance	**Medium -**	**Low -**
Degree to which impact can be reversed	The affected environment will be able to recover from the impact. While there is some scope for avoidance of sensitive habitats, some disturbance and habitat loss for fauna is an inevitable consequence of decommissioning that cannot be entirely avoided.	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	Mitigation exists and will notably reduce significance of impacts	
Mitigation actions		
The following measures are recommended:	• All vehicles should adhere to a low speed limit on site. Heavy vehicles should be restricted to 30km/h and light vehicles to 40km/h. • 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. • No excavated holes or trenches should be left open for extended periods as fauna may fall in become trapped. • All above-ground infrastructures should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact, however, this should be in accordance with the facilities' decommissioning and recycling plan.	
Monitoring		
The following monitoring is recommended:	• Monitoring of site decommissioning by the EO to ensure that any fauna remaining within the affected area are translocated to safety where necessary. • Monitoring of decommissioning activities to ensure that the infrastructure clearing and waste material removal remains within the demarcated development footprint. • Holes and trenches that are open should be checked on a regular basis (preferably daily) to	

	ensure that any fauna that have fallen in and become trapped can be rescued to safety.	
Cumulative impacts		
Nature of cumulative impacts	Decommissioning will contribute towards cumulative impacts on fauna in the area, but this would be transient and no long-term impacts from decommissioning are likely to occur. However, as there are extensive tracts of largely undeveloped habitat present, larger fauna would be able to move away from disturbance sources during decommissioning and return thereafter. In the long-term the decommissioning would result in the development footprint being restored to a near-natural state at which time it would be become available to fauna again.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	**Low -**

Issue	**Increased Soil erosion**	
Description of Impact		
Increased soil erosion risk following decommissioning		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Decommissioning	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	High	Low
Duration	Long-term	Medium-term
Extent	Local	Local
Consequence	High	Low
Probability	Probable	Conceivable
Significance	**High-**	**Very Low -**
Degree to which impact can be reversed	The affected environment will be able to recover from the impact	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	With mitigation, this impact can be well avoided, and erosion reduced to a low level.	
Mitigation actions		
The following measures are recommended:	• Decommissioning disturbance within or near the drainage lines should be kept to a minimum and any disturbance in these areas should be rehabilitated as quickly as possible. • An erosion monitoring programme should be put in place for at least 3 years after decommissioning. Any problems observed should be rectified as soon as possible using the	

	appropriate revegetation and erosion control works.	
Monitoring		
The following monitoring is recommended:	• Annual monitoring and surveys for erosion for at least 3 years following decommissioning. Disturbed areas near to drainage lines should receive priority in rehabilitation and decommissioning phase monitoring.	
Cumulative impacts		
Nature of cumulative impacts	Erosion would contribute to habitat degradation in the area and add to the existing erosion and degradation present in the area which results largely from historical land use practices.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	**Low -**

8.3.4 Cumulative Impact

Issue	**Cumulative habitat loss and impact on broad-scale ecological processes**	
Description of Impact		
Cumulative impact on broad-scale ecological processes		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Long-term	Long-term
Extent	Local	Local
Consequence	Medium	Medium
Probability	Probable	Conceivable
Significance	**Medium -**	**Low -**
Degree to which impact can be reversed	The affected environment will be able to recover from the impact	
Degree to which impact may cause irreplaceable loss of resources	The resource is not damaged irreparably or is not scarce	
Degree to which impact can be mitigated	With avoidance and mitigation, impact on ecological processes can be reduced to low levels.	
Mitigation actions		
The following measures are recommended:	• Adhere to the sensitivity maps and limits of acceptable change provided within this assessment when determining the final layout of the Wind Farm and associated infrastructure. • Demarcate sensitive habitats as no-go areas during construction and at decommissioning.	
Monitoring		

The following monitoring is recommended:	• Ensure that all the operational phase management plans are fully implemented and that the associated monitoring and feedback mechanisms to management are in place.	
Cumulative impacts		
Nature of cumulative impacts	The development would contribute to habitat loss and fragmentation for some species. However, given the current low levels of transformation in the area, the contribution of the current development to cumulative impacts on broad-scale ecological processes is considered moderate given the porous nature of wind farm developments for most fauna as well as the widely distributed, but low overall footprint.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	**Medium -**

8.4 Avifauna

The potential impacts to the avian community is provided for each proposed phase, i.e., construction, operation and decommission of the proposed development.

8.4.1 Construction Phase

Impact Phase: Construction Phase					
Nature of the impact: Destruction of avifaunal habitat					
Description of Impact: With the current proposed layout of up to 41 turbines and associated infrastructure such as roads, laydown areas, collector substations etc, the wind farm will impact on natural habitat through its clearing for construction. Given the relatively undisturbed nature of vegetation on site, most of this is likely to be natural vegetation. This is a small proportion of the overall site extent, and the habitat is neither particularly unique, nor threatened, or in limited availability. However, the fragmented nature of the remaining habitat will experience an "edge effect", whereby an area greater than the exact footprint of construction is affected by the impact under consideration. Of course, the effect on the avifaunal community is not as simple as the surface area affected. In addition to surface area alteration, the effect of large, dispersed infrastructure projects such as wind farms on birds is likely to be far more complex through factors such as habitat fragmentation, disruption of territories and other factors. These effects have however proven extremely difficult to measure. Since this habitat destruction is largely unavoidable, and our confidence in the effectiveness of habitat rehabilitation is uncertain, we anticipate that the impact significance will remain unchanged by mitigation.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Site	Long term	Recoverable	Moderate	Highly probable
Score	1	4	3	3	4
With Mitigation	Site	Long term	Recoverable	Low	Highly probable
Score	1	4	3	2	4
Significance Calculation	**Without Mitigation**		**With Mitigation**		

S=(E+D+R+M)*P	Moderate Negative Impact (40)	Moderate Negative Impact (36)
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	
Mitigation measures reduce residual risk or enhance opportunities: • The constraint areas identified should be adhered to. • A pre-construction avifaunal walk down should be conducted to confirm final layout and identify any sensitivities that may arise between the conclusion of the EIA process and the construction phase. This can be done in any season, although May to October would be raptor breeding season and should be prioritised if possible. • All human activities associated with construction, operation and decommissioning should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • Existing roads and tracks should be used as far as possible. • Movement of all staff, vehicle and machinery activities should be strictly controlled at all times so as to ensure that the absolute minimum of surface area is impacted. • Care should be taken not to introduce or propagate alien plant species/weeds during construction. • Any underground cabling should follow roads at all times to reduce the impact on the habitat by grouping these linear infrastructures. • The "during construction" and "post-construction" monitoring programme (see Section 11) should be implemented according to the latest available version of the Best Practice Guidelines at the time. The findings from operational phase monitoring should inform an adaptive management programme to mitigate any impacts on avifauna to acceptable levels. In particular, any Verreaux's Eagle fatalities should be reported to Dr Megan Murgatroyd in order to close the feedback loopback to the VERA modelling performed for this.		
Residual impact	The destruction of habitat is inevitable, and the significance remains at Moderate with mitigation	

Impact Phase: Construction Phase					
Nature of the impact: Disturbance of birds					
Description of Impact: Effects of disturbance on birds are particularly likely during breeding and could include loss of breeding productivity; temporary or permanent abandonment of breeding; or even abandonment of nest site. The avoidance measures (in the form of large No-go buffers) already taken to protect the various eagle nests and their breeding have reduced the significance of this impact.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Short term	Reversible	Low	Probable
Score	2	2	1	2	3
With Mitigation	Local	Short term	Reversible	Low	Probable
Score	2	2	1	2	3

Significance Calculation	Without Mitigation	With Mitigation
S=(E+D+R+M)*P	Low Negative Impact (21)	Low Negative Impact (21)
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	

Mitigation measures to reduce residual risk or enhance opportunities: • The constraint areas identified should be adhered to. • A pre-construction avifaunal walk down should be conducted to confirm final layout and identify any sensitivities that may arise between the conclusion of the EIA process and the construction phase. This can be done in any season, although May to October would be raptor breeding season and should be prioritised if possible. • All human activities associated with construction, operation and decommissioning should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • Existing roads and tracks should be used as far as possible. • Movement of all staff, vehicle and machinery activities should be strictly controlled at all times so as to ensure that the absolute minimum of surface area is impacted. • Care should be taken not to introduce or propagate alien plant species/weeds during construction. • Any underground cabling should follow roads at all times to reduce the impact on the habitat by grouping these linear infrastructures. • The "during construction" and "post-construction" monitoring programme (see Section 11) should be implemented according to the latest available version of the Best Practice Guidelines at the time. The findings from operational phase monitoring should inform an adaptive management programme to mitigate any impacts on avifauna to acceptable levels. In particular, any Verreaux's Eagle fatalities should be reported to Dr Megan Murgatroyd in order to close the feedback loopback to the VERA modelling performed for this.	
Residual impact	The disturbance of birds is somewhat inevitable, although the most sensi-tive receptors have already been protected through impact avoidance, through the application of no-go buffers.

8.4.2 Operation Phase

Impact Phase: Operation Phase					
Nature of the impact: Disturbance of birds					
Description of Impact: The indications from operational wind farms are that this impact may be of fairly low importance, although it is acknowledged that a longer term or more detailed means of measuring this impact may be required. The impact of human-induced disturbance during the operational phase of the development is likely to be less severe than during the construction phase.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Long term	Reversible	Low	Probable
Score	2	4	1	2	3
With Mitigation	Local	Long term	Reversible	Low	Probable
Score	2	4	1	2	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Low Negative Impact (27)**		**Low Negative Impact (27)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to reduce residual risk or enhance opportunities: • All human activities associated with construction, operation and decommissioning should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • A post-construction inspection must be conducted by an avifaunal specialist to confirm that all aspects have been appropriately handled and in particular that road and hard stand verges do not					

	provide additional substrate for raptor prey species. It is essential that the new wind farm does not create favourable conditions for such mammals in high risk areas. We therefore recommend that within the first year of operations a full assessment of this aspect be made by the ornithologist contracted for post-construction monitoring. If such conditions have been created, case-specific solutions will need to be developed and implemented by the wind farm. It is strongly recommended that rodenticides not be used at the newly established Operation and Maintenance (O&M) buildings or around auxiliary infrastructure on the project site. While pest control of this nature may be effective, even so-called "environmentally friendly" rodenticides are toxic and pose significant secondary poisoning risk to predatory avifauna, especially owls. • The "during construction" and "post-construction" monitoring programme (see Section 11.4.1) should be implemented according to the latest available version of the Best Practice Guidelines at the time. The findings from operational phase monitoring should inform an adaptive management programme to mitigate any impacts on avifauna to acceptable levels. In particular, any Verreaux's Eagle fatalities should be reported to Dr Megan Murgatroyd in order to close the feedback loopback to the VERA modelling performed for this.
Residual impact	The disturbance of birds is somewhat inevitable, although the most sensitive receptors have already been protected through impact avoidance, through the application of no-go buffers.

Impact Phase: Operation Phase

Nature of the impact: Displacement of birds

Description of Impact: As for disturbance above, the indications from operational wind farms are that this impact may be of fairly low importance, although it is acknowledged that a longer term or more detailed means of measuring this impact may be required. Birds may be displaced from using the landscape for breeding, foraging and commuting purposes due to the loss of habitat, increased noise pollution and human presence. This may reduce population size or force individuals into suboptimal habitat.

Impact Status: Negative

	E	D	R	M	P
Without Mitigation	Local	Long term	Reversible	Low	Probable
Score	2	4	1	2	3
With Mitigation	Local	Long term	Reversible	Low	Probable
Score	2	4	1	2	3

Significance Calculation	**Without Mitigation**	**With Mitigation**
S=(E+D+R+M)*P	**Low Negative Impact (27)**	**Low Negative Impact (27)**
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	

Mitigation measures to reduce residual risk or enhance opportunities:

- All human activities associated with construction, operation and decommissioning should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment.
- A post-construction inspection must be conducted by an avifaunal specialist to confirm that all aspects have been appropriately handled and in particular that road and hard stand verges do not provide additional substrate for raptor prey species. It is essential that the new wind farm does not create favourable conditions for such mammals in high risk areas. We therefore recommend that within the first year of operations a full assessment of this aspect be made by the ornithologist contracted for post-construction monitoring. If such conditions have been created, case-specific solutions will need to be developed and implemented by the wind farm. It is strongly recommended that rodenticides not be used at the newly established Operation and Maintenance (O&M) buildings

	or around auxiliary infrastructure on the project site. While pest control of this nature may be effective, even so-called "environmentally friendly" rodenticides are toxic and pose significant secondary poisoning risk to predatory avifauna, especially owls. • The "during construction" and "post-construction" monitoring programme (see Section 11.4.1) should be implemented according to the latest available version of the Best Practice Guidelines at the time. The findings from operational phase monitoring should inform an adaptive management programme to mitigate any impacts on avifauna to acceptable levels. In particular, any Verreaux's Eagle fatalities should be reported to Dr Megan Murgatroyd in order to close the feedback loopback to the VERA modelling performed for this.
Residual impact	The disturbance of birds is somewhat inevitable, although the most sensi-tive receptors have already been protected through impact avoidance, through the application of no-go buffers.

Impact Phase: Operation Phase

Nature of the impact: Bird collision with turbine blades

Description of Impact: Turbine collisions have been discussed in depth in the literature section of this report. They repre-sent the greatest risk to avifauna at this development. Turbine blades are not always visible to birds flying at rotor swept height and evasive action is not always possible. Striking a moving blade al-most certainly results in death or serious injury. In the case of resident species, or those that occu-py home ranges on a fairly permanent basis, fatalities represent the loss of individuals in the great-er study area, both directly (due to fatalities themselves) as well as indirectly (due to the loss of breeding potential, particularly between monogamous pairs). Human caused fatalities of regionally Red Listed or otherwise threatened bird species are always cause for concern and should be avoid-ed as far as possible. The estimated fatalities we have predicted are therefore of some concern for the relevant species. There are currently no established thresholds for acceptable impacts on bird species in South Africa. To establish these thresholds would require complex modelling incorporat-ing accurate information on many factors for each species (including population size, age-specific fatality rates, breeding productivity, etc). Such modelling and information are not available in South Africa at present. In the absence of this information, we are forced to make a somewhat subjective decision as to the acceptability of the estimated annual fatalities.

Impact Status: Negative

	E	D	R	M	P
Without Mitigation	National	Long term	Irreversible	High	Highly probable
Score	4	4	5	4	4
With Mitigation	National	Long Term	Irreversible	Moderate	Probable
Score	4	4	5	3	3

Significance Calculation	**Without Mitigation**	**With Mitigation**
S=(E+D+R+M)*P	**High Negative Impact (68)**	**Moderate Negative Impact (48)**
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	

Mitigation measures reduce residual risk or enhance opportunities:

- All human activities associated with construction, operation and decommissioning should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment.
- A post-construction inspection must be conducted by an avifaunal specialist to confirm that all aspects have been appropriately handled and in particular that road and hard stand verges do not provide additional substrate for raptor prey species. It is essential that the new wind farm does not create favourable conditions for such mammals in high risk areas. We therefore recommend that

	within the first year of operations a full assessment of this aspect be made by the ornithologist contracted for post-construction monitoring. If such conditions have been created, case-specific solutions will need to be developed and implemented by the wind farm. It is strongly recommended that rodenticides not be used at the newly established Operation and Maintenance (O&M) buildings or around auxiliary infrastructure on the project site. While pest control of this nature may be effective, even so-called "environmentally friendly" rodenticides are toxic and pose significant secondary poisoning risk to predatory avifauna, especially owls. • A bird fatality threshold and adaptive management policy must be designed by an ornithologist for the site. This will be done during the EIA Phase study. This policy should form an annexure of the operational EMPr for the facility. This policy should identify most importantly the number of bird fatalities of priority species which will trigger a management response, appropriate responses, and time lines for such responses. Fatalities of priority bird species are usually rare events (but with very high consequence) and it is difficult to analyse trends or statistics related to these fatalities as they occur. It is therefore important to have a threshold policy in place proactively to assist adaptive management. • Should identified priority bird species fatality thresholds be exceeded in Year 1 and 2, an observer-led turbine Shutdown on Demand (SDOD) programme must be implemented on site. This programme must consist of a suitably qualified, trained and resourced team of observers present on site for all daylight hours 365 days of the year. This team must be stationed at vantage points with full visible coverage of all turbine locations. The observers must detect incoming priority bird species, track their flights, judge when they enter a turbine proximity threshold, and alert the control room to shut down the relevant turbine until the risk has reduced. A full detailed method statement or protocol must be designed by an ornithologist. • The combination of hub height and rotor diameter must be optimised to maximise the lower blade tip height above ground. Raising the lower turbine blade tip height from a typical 30m above ground to 60m above ground (for example) will reduce collision risk for cranes, Ludwig's Bustards, Black Harrier and korhaans, which typically fly low over the ground. Raising the lower blade tip from 30 to 60m above ground as a mitigation measure benefited every target species (in terms of reduced predicted mortality). We strongly recommend that any opportunity to raise the lower blade tip as much as possible, should be taken as this could significantly reduce the bird collision risk. • Turbine blades must be painted according to a protocol currently under development by the South African Wind Energy Association (SAWEA) from the outset. Painting one of the three rotor blades black reduces motion smear and may greatly reduce avian collision risk. Provision must be made by the developer for the resolution of any technical, warranty, and supplier challenges that this may present. • Any residual impacts during the operational phase after all possible mitigation measures have been implemented will need to be mitigated off site. The facility will need to address other sources of mortality of priority species in a measurable way so as to compensate for residual effects on the facility itself. This will need to be detailed in a Biodiversity Action Plan compiled by an ornithologist. Since most priority species for this project face considerable threat through overhead power lines across their range, a likely off-site mitigation measure could be the mitigation of power line impacts on Eskom's network. These are measurable and easily mitigated impacts which could result in a no nett loss or even nett gain scenario for priority bird species. • The "during construction" and "post-construction" monitoring programme (see Section 11.4.1) should be implemented according to the latest available version of the Best Practice Guidelines at the time. The findings from operational phase monitoring should inform an adaptive management programme to mitigate any impacts on avifauna to acceptable levels. In particular, any Verreaux's Eagle fatalities should be reported to Dr Megan Murgatroyd in order to close the feedback loopback to the VERA modelling performed for this.
Residual impact	There is some uncertainty around the effectiveness of bird-turbine colli-sion mitigation at this stage in SA. As a result the significance remains at Moderate post mitig ation.

8.4.3 Decommissioning Phase

Impact Phase: Decommission Phase
Nature of the impact: Disturbance of birds
Description of Impact: Effects of disturbance on birds are particularly likely during breeding and could include loss of breeding productivity; temporary or permanent abandonment of breeding; or even

abandonment of nest site. The avoidance measures (in the form of large No-go buffers) already taken to protect the various eagle nests and their breeding have reduced the significance of this impact.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Short term	Reversible	Low	Probable
Score	2	2	1	2	3
With Mitigation	Local	Short term	Reversible	Low	Probable
Score	2	2	1	2	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	Low Negative Impact (21)		Low Negative Impact (21)		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures reduce residual risk or enhance opportunities: • All human activities associated with construction, operation and decommissioning should be strictly managed according to generally accepted environmental best practice standards, so as to avoid any unnecessary impact on the receiving environment. • Movement of all staff, vehicle and machinery activities should be strictly controlled at all times so as to ensure that the absolute minimum of surface area is impacted.					
Residual impact	The disturbance of birds is somewhat inevitable, although the most sensitive receptors have already been protected through impact avoidance, through the application of no-go buffers.				

8.4.4 Cumulative Impact

The cumulative impacts of wind energy on avifauna in the project area will be carefully assessed in the EIA phase according to the guidance in the DFFE (DEAT (2004) Cumulative Effects Assessment, Integrated Environmental Management, Information Series 7, Department of Environmental Affairs and Tourism (DEAT), Pretoria); and the IFC guidelines (Good Practice Handbook - Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets").

The Screening Tool (accessed 5 October 2022) states that no applications for wind or solar developments were found within 30 km of the proposed area, nor any such developments with Environmental Authorisation within 30 km.

The cumulative impacts will be considered at the EIA stage.

8.5 Bats

Impacts to bats that are likely to occur because of the construction, operation and decommissioning of the wind energy facility are identified and assessed below. The unit of analysis against which impacts were assessed is the local bat community and their associated habitats within the proposed development. Impacts considered for assessment include habitat modification and disturbance, fatality due to collisions with wind turbine blades, and light pollution since these are the major impacts likely to be associated with the project (Kunz et al. 2007b, Cryan and Barclay 2009). For each impact, the respective mitigation measures were categorised into those aimed at first avoiding impacts, then minimising impacts, and finally restoring areas impacted.

8.5.1 Construction Phase

Removal of vegetation, noise and dust generated during construction activities, and the presence of new infrastructure in the landscape, will negatively and indirectly impact bats by removing habitat used for foraging and commuting, through disturbance, and displacement (Kunz et al. 2007b, Millon et al. 2015, Millon et al. 2018, Bennun et al. 2021, Leroux et al. 2022).

Construction of WEF infrastructure could result in destruction (direct impact) of bat roosts (rocky crevices, buildings) and disturbance (indirect impact) of bat roosts potentially resulting in roost abandonment. Bat mortality can occur if roosts which contain bats are destroyed. Installation of new infrastructure in the landscape (e.g., buildings, turbines, road culverts) can provide new roosting spaces for some bat species, attracting them to areas with wind turbines and potentially increasing the likelihood of collisions.

Impact Phase: Construction Phase					
Nature of the impact: Modification and Disturbance of Bat Habitat (Roosting, Foraging, Commuting)					
Description of Impact: Removal of vegetation, noise and dust generated during construction activities, and the presence of new infrastructure in the landscape, will negatively and indirectly impact bats by removing habitat used for foraging and commuting, through disturbance, and displacement. Construction of WEF infrastructure could result in destruction and/or disturbance to bat roosts, and inadvertently provide new roosting spaces for some bat species in risky locations.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Site	Short Term	Recoverable	Moderate	Probable
Score	1	2	3	3	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	2	2	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Low Negative Impact (27)**		**Low Negative Impact (14)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				

Mitigation measures to reduce residual risk or enhance opportunities:

Avoid:

- Limit potential for bats to roost in project infrastructure (e.g., buildings, turbines, road culverts) by ensuring they are properly sealed such that bats cannot gain access.
- No construction activities at night.
- No placement of infrastructure (except roads) in no-go areas.
- No blasting near rocky crevices.

Minimise:

- Minimise clearing of vegetation.
- Minimise disturbance and destruction of rocky outcrops, trees and buildings, and where this is required, these features should be examined for roosting bats.
- Apply good construction abatement control practices to reduce emissions and pollutants (e.g., noise, erosion, waste) created during construction.

Restore:

- Rehabilitate all areas disturbed during construction (including aquatic habitat).

Residual impact	Residual impacts are likely to be minor although buffer distances have been shown to be ineffective at avoiding and minimizing risk to bats because these are two small for some species (Barré et al. 2018)

8.5.2 Operational Phase

Bat mortality (direct impact) through collisions with wind turbine blades is the principal impact of wind energy facilities on bats (Cryan and Barclay 2009, Arnett et al. 2016). Construction of project infrastructure will increase ecological light pollution from artificial lighting associated with the substation and other operational and maintenance buildings. Light pollution can alter ecological dynamics (Horváth et al. 2009). Lighting attracts and can cause direct mortality of insects, reducing the prey base for bats, especially bat species that are lightphobic. These species may also be displaced from previous foraging areas due to lighting. Other bat species forage around lights, attracted by higher numbers of insects. This may bring these species into the vicinity of the project and indirectly increase the risk of collision with wind turbines.

Impact Phase: Operation Phase					
Nature of the impact: Bat Fatality					
Description of Impact: Bat mortality (direct impact) through collisions and/or barotrauma with wind turbine blades is the principal impact of wind energy facilities on bats.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Long Term	Recoverable	High	Highly Probable
Score	2	4	3	4	4
With Mitigation	Local	Long Term	Recoverable	Moderate	Probable
Score	2	4	3	3	3
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (52)**		**Moderate Negative Impact (33)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				

Mitigation measures to reduce residual risk or enhance opportunities:

Avoid:

- No placement of turbines within no-go. Relocate WTG12.
- Maintain a minimum blade sweep of 35 m to avoid impacts to lower flying bats such as clutter-edge species (e.g., Cape serotine, Natal long-fingered bat).

Minimise:

- Minimise the rotor diameter.
- Feather blades to prevent free-wheeling below the turbine cut-in speed.
- Implement post-construction fatality monitoring and apply curtailment or deterrents if fatality thresholds are exceeded.

Residual impact	Curtailment and deterrents can successfully reduce bat fatality (Arnett 2011, Arnett et al. 2016, Weaver et al. 2020), but not completely. Through the application of fatality thresholds, residual impacts should be minimized.

Impact Phase: Operation Phase					
Nature of the impact: Light Pollution					
Description of Impact: Light pollution can alter ecological dynamics.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Long Term	Recoverable	Moderate	Probable
Score	2	4	3	3	3
With Mitigation	Local	Long Term	Recoverable	Moderate	Low Probability
Score	2	4	2	3	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (36)**		**Low Negative Impact (22)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to reduce residual risk or enhance opportunities: Avoid: • No placement of substations and operational and maintenance buildings within no-go areas. • Avoid excessive lighting. Minimise: • Use of motion-sensor lighting, avoid sky-glow by using hoods, increase spacing between lighting units, and use low pressure sodium lights (Rydell 1992, Stone 2012).					
Residual impact	Given the limited extent of light pollution currently in the region, the application of the above mitigation measures is likely to result in minor residual impacts.				

8.5.3 Decommissioning Phase

Impacts during the decommissioning phase will be indirect and involve disturbance to bats through excessive noise and dust, and damage to vegetation.

Impact Phase: Decommissioning Phase					
Nature of the impact: Disturbance of Bats					
Description of Impact: Impacts during the decommissioning phase will be indirect and involve disturbance to bats through excessive noise and dust, and damage to vegetation.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Site	Short Term	Recoverable	Moderate	Probable
Score	1	2	3	3	3
With Mitigation	Site	Short Term	Recoverable	Low	Low Probability
Score	1	2	2	2	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		

S=(E+D+R+M)*P	Low Negative Impact (27)	Low Negative Impact (14)
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	
Mitigation measures to reduce residual risk or enhance opportunities: Avoid: • No decommissioning activities at night. Minimise: • Apply good abatement control practices to reduce emissions and pollutants (e.g., noise, erosion, waste) created during decommissioning activities. Restore: • Rehabilitate all areas disturbed during construction (including aquatic habitat).		
Residual impact	Residual impacts are likely to be minor since ceasing project activities on site is likely to benefit bats.	

8.5.4 Cumulative Impact

Cumulative impacts are defined as the total impacts resulting from the successive, incremental, and / or combined effects of a project when added to other existing, planned and / or reasonably anticipated future projects, as well as background pressures (IFC 2013). The goal of this assessment is to evaluate the potential resulting impact to the vulnerability and/or risk to the sustainability of the bat species affected (IFC 2013).

Impact Phase: Cumulative Phase					
Nature of the impact: Cumulative Impact					
Description of Impact: The total impacts resulting from the successive, incremental, and/or combined effects of the project when added to other existing, planned and/or reasonably anticipated future projects, as well as background pressures.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	National	Long Term	Recoverable	High	Highly Probable
Score	4	4	4	4	4
With Mitigation	Local	Long Term	Recoverable	Moderate	Probable
Score	2	4	3	3	3
Significance Calculation	**Without Mitigation**			**With Mitigation**	
S=(E+D+R+M)*P	**High Negative Impact (27)**			**Moderate Negative Impact (14)**	
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to reduce residual risk or enhance opportunities: The mitigation measures proposed (buffering key habitats used by bats, use of appropriate lighting technology, blade feathering, and using curtailment and/or acoustic deterrents) should be applied to all future projects so that there is a collective management responsibility (IFC 2013).					

Residual impact	Curtailment and deterrents can successfully reduce bat fatality (Arnett 2011, Arnett et al. 2016, Weaver et al. 2020), but not completely. Through the application of fatality thresholds across all projects in the cumulative impact area, residual impacts should be minimized.

8.6 Noise

Increased noise levels are directly linked with the various activities associated with the construction of the proposed development, as well as the operation phase of the activity. In South Africa the document that addresses the issues concerning environmental noise is SANS 10103. It provides the maximum average ambient noise levels, $L_{Req,d}$ and $L_{Req,n}$, during the day and night respectively to which different types of developments may be exposed. For rural areas the Zone Sound Levels (Rating Levels) are:

Day (06:00 to 22:00) - $L_{Req,d}$ = 45 dBA, and
Night (22:00 to 06:00) - $L_{Req,n}$ = 35 dBA.

8.6.1 Construction Phase

There are a number of factors that determine the audibility as well as the potential of a noise impact on receptors. Maximum noises generated can be audible over a large distance, however, these maximum noises are generally of very short duration. If maximum noise levels however exceed 65 dBA at a receptor, or if it is clearly audible with a significant number of instances where the noise level exceeds the prevailing ambient sound level with more than 15 dB, the noise can increase annoyance levels and may ultimately result in noise complaints. Average or equivalent sound levels are another factor that impacts on the ambient sound levels and is the constant sound level that the receptor can experience.

A potential significant source of noise during the construction phase is additional traffic to and from the site, as well as traffic on the site. The use of a borrow pit(s), on site crushing and screening and concrete batching plants will significantly reduce heavy vehicle movement to and from the site. Construction traffic is expected to be generated throughout the entire construction period, expected to take approximately 24 – 36 months, however, the volume and type of traffic generated will be dependent upon the construction activities being conducted, which will vary during the construction period. Noise levels due to traffic can be estimated using various different noise algorithms.

Projected construction noise impacts will only be modelled during the EIA phase, considering a more final wind turbine layout. However, considering the location of the closest wind turbines in relation to the closest potential NSR, WTG construction activities may take place as close as 650 m from the closest NSR (NSR03), not considering road construction activities. Noise levels could exceed 45 dBA, higher than both the day- and night-time rating level (during low wind conditions) for a rural noise district.

The potential impact associated with the construction of access roads (a temporary impact), as well as the influence of construction traffic passing NSR (potentially impact ambient sound levels in the short term), will also only be considered during the EIA Phase.

8.6.2 Operation Phase

The proposed development would be designed to have an operational life of up to 25 years with the possibility to further expand the lifetime of the WEF. The only development related activities on-site will be routine servicing (access roads and light traffic) and unscheduled maintenance. The noise impact from maintenance activities is insignificant, with the main noise source being the wind turbine blades and the nacelle (components inside). Noise emitted by wind turbines can be associated with two types of noise sources. These are aerodynamic sources due to the passage of air over the wind turbine blades and mechanical sources which are associated with components of the power train within the turbine, such as the gearbox and generator and control equipment for yaw, blade pitch, etc. These

sources normally have different characteristics and can be considered separately. In addition, there are other noise sources of lower levels, such as the substations and traffic (maintenance). Although considered rare, there is one other characteristic of wind turbine sound that increases the sleep disturbance potential above that of other long-term noise sources. The amplitude modulation (AM) of the sound emissions from the wind turbines creates a repetitive rise and fall in sound levels synchronized to the blade rotation speed, sometimes referred to as a "swish" or "thump". Even though there are thousands of wind turbine generators in the world, AM is still one subject receiving the least complaints and due to these very few complaints, little research went into this subject and it is not possible to predict whether AM may occur, nor to calculate the potential related impact.

Projected operational noise impacts will only be modelled in detail during the EIA phase. However, considering the location of the closest wind turbines in relation to the closest potential NSR, operational activities may take place as close as 650 m from the closest NSR (NSR03). The equivalent noise level will be less than 45 dBA at NSR03 (using the sound power emission level of 107 dBA re 1 pW), though the basic model does not consider the potential cumulative effect, nor other factors that could attenuation noise levels. This noise level is higher than the proposed night-time rating level for a rural noise district.

The potential noise impact however will be considered in more detail during the EIA phase, using a final WTG layout and a detailed noise propagation model.

A detailed noise propagation model can also consider cumulative noise impacts, as well as factors such as air absorption, character of the noise, surface factors and topography.

8.7 Heritage and Archaeology

Impacts to archaeology (construction phase) and the cultural landscape (all phases) are expected to occur and require assessment. Impacts on graves are theoretically possible but owing to the largely rocky substrate no impacts are expected. Impacts to most heritage resources are likely to be minimal as most sites occur in the valleys. The landscape, however, will be impacted and, due to the size of the turbines, however, these impacts can be reversed with rehabilitation and the project will result in socio-economic benefits which makes the landscape impacts acceptable.

Any impact to an archaeological or palaeontological resource or a grave is deemed unacceptable until such time as the resource has been inspected and studied further if necessary. Impacts to the landscape are difficult to quantify but in general a development that visually dominates the landscape from many publicly accessible vantage points is undesirable. Because of the height of the proposed development, such an impact may well occur but due to the socio-economic benefits the impact is considered acceptable.

There are currently no obvious threats to heritage resources on the site aside from the natural degradation, weathering and erosion that will affect archaeological materials. Trampling from grazing animals and/or farm/other vehicles could also occur. These impacts would be of negligible negative significance. There are no threats to the cultural landscape.

8.7.1 Construction Phase

Direct impacts to archaeological resources would occur during the construction phase when construction begins. Very few archaeological resources were found in the area where turbines would be placed which means that the expected impacts are low negative. No road layout has been provided for assessment at this stage. Roads will need to cross river valleys and those areas are the only areas where some impacts may occur. A pre-construction survey will be needed to identify any areas along the final road alignment where avoidance (through micrositing) or mitigation might be required. After mitigation the

significance still calculates to low negative. There are no fatal flaws in terms of construction phase impacts to the archaeology.

Impact Phase: Construction Phase					
Nature of the impact: Damage to or destruction of archaeological resources					
Description of Impact: Archaeological resources may be impacted during construction when equipment is brought onto site and excavations four foundations, services and roads commence.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Site	Permanent	Irreversible	Low	Low Probability
Score	1	5	5	2	2
With Mitigation	Site	Permanent	Irreversible	Very Low	Low Probability
Score	1	5	5	1	2
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Low Negative Impact (26)**		**Low Negative Impact (24)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Design road layout to avoid known sites and reuse existing roads where possible. • Conduct pre-construction survey of the full layout, including all ancillary infrastructure. This survey will make specific recommendations for any mitigation that might be required.					
Residual impact	There will still be isolated finds of very low cultural significance that might not be found during a survey. These are of no consequence.				

Direct impacts to the cultural landscape would occur throughout the construction phase due to the presence of construction equipment and industrial-type structures in the rural/natural landscape. Impacts would be of fairly high intensity but because of the short duration of the construction period the significance calculates to moderate negative. Mitigation will make very little difference because it is not possible to hide the activity and turbines and after mitigation the significance remains moderate negative. There are no fatal flaws in terms of construction phase impacts to the cultural landscape.

Impact Phase: Construction Phase					
Nature of the impact: Impacts to the cultural landscape					
Description of Impact: The cultural landscape will be negatively affected through the visual intrusion of all the construction equipment and activity and the introduction of the large wind turbines as these are erected.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Regional	Short Term	Recoverable	High	Definite
Score	3	2	3	4	5
With Mitigation	Regional	Short Term	Recoverable	Moderate	Definite

Score	3	2	3	3	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate (60)**		**Moderate (55)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Keep construction period as short as possible. • Minimise landscape scarring by minimizing cut and fill and ensuring rehabilitation of all areas not required during operation. • Use low contrast materials for road surfacing where required. • Place ancillary infrastructure (substations, offices, etc.) in low visibility areas. • Follow visual mitigation measures.					
Residual impact	No matter what measures are applied, nothing can screen the development due to its size and there will always be impacts.				

8.7.2 Operation Phase

Direct impacts to the cultural landscape would occur during the operation phase through the presence of the facility in what is otherwise a rural/natural landscape. Although the extent and magnitude are likely to be limited, the long-term duration means that the significance calculates to high negative. Mitigation will slightly reduce the magnitude and after mitigation the significance is moderate negative. There are no fatal flaws in terms of operation phase impacts to the cultural landscape.

Impact Phase: Operation Phase					
Nature of the impact: Impacts to the cultural landscape					
Description of Impact: The cultural landscape will be negatively affected through the visual intrusion of the large wind turbines and related infrastructure in the landscape.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Regional	Long Term	Recoverable	Moderate	Definite
Score	3	4	3	3	5
With Mitigation	Regional	Long Term	Recoverable	Low	Definite
Score	3	4	3	2	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**High (65)**		**Moderate (60)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Ensure that all maintenance operations remain within designated areas. • Ensure that visual recommendations with regards to lighting are followed.					

Residual impact	No matter what measures are applied, nothing can screen the development due to its size and there will always be impacts.

8.7.3 Decommissioning Phase

Direct impacts to the cultural landscape would occur throughout the decommissioning phase due to the presence of construction equipment and activity and industrial-type structures (which would become less with time) in the rural/natural landscape. Impacts would be of fairly high intensity but because of the short duration of the decommissioning period the significance calculates to moderate negative. Mitigation will make very little difference because it is not possible to hide the activity and equipment and after mitigation the significance remains moderate negative. There are no fatal flaws in terms of decommissioning phase impacts to the cultural landscape.

Impact Phase: Decommissioning Phase					
Nature of the impact: Impacts to the cultural landscape					
Description of Impact: The cultural landscape will be negatively affected through the visual intrusion of all the construction equipment and activity while the turbines and related infrastructure are being removed.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Regional	Short Term	Recoverable	High	Definite
Score	3	2	3	4	5
With Mitigation	Regional	Short Term	Recoverable	Low	Definite
Score	3	2	3	2	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate (60)**		**Moderate (50)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Keep decommissioning period as short as possible. • Ensure effective rehabilitation of all areas following advice of the relevant specialist.					
Residual impact	Minimal landscape scarring will still be visible but will reduce over time as the rehabilitated areas return to normal.				

8.7.4 Cumulative Impact

In relation to an activity, cumulative impact means "the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities" (NEMA EIA Reg GN R982 of 2014). The table below presents an 'average' cumulative impact on heritage resources.

Impact Phase: Cumulative Phase

Nature of the impact: Impacts to the cultural landscape					
Description of Impact: Impacts to archaeology, graves, buildings and the cultural landscape through destruction and/or visual intrusion.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Enhancement	Regional	Short Term	Recoverable	High	Definite
Score	3	2	3	4	5
With Enhancement	Regional	Short Term	Recoverable	Low	Definite
Score	3	2	3	2	5
Significance Calculation	**Without Enhancement**		**With Enhancement**		
S=(E+D+R+M)*P	**High (70)**		**Moderate (36)**		
Can Impacts be Enhanced?	There are no positive impacts to enhance but negative impacts can be reduced through the application of the stipulated mitigation measures.				
Mitigation measures to enhance opportunities: • Apply all relevant mitigation measures as recommended for each project. Pre-construction surveys are an important component of this.					
Residual impact	It is never possible to locate every heritage resource and some impacts will always occur. Through pre-construction surveys, however, the significance of these impacts should be minimised. It is also not possible to hide most developments and visual impacts to the landscape will always occur.				

8.8 Palaeontology

The proposed development will involve substantial surface clearance and bedrock excavations, for example, for wind turbine foundations, access road networks, underground cables, construction laydown areas/camps, O&M buildings, on-site substations and electrical pylon footings, which may disturb, damage or destroy legally projected palaeontological heritage resources of scientific and conservation value.

Despite the substantial project footprints as well as the known occurrence of important vertebrate and other fossil sites elsewhere in the wider region between Loxton and Victoria West, the impact significance of the proposed renewable energy developments on local palaeontological heritage is anticipated to be low. This is based on the inferred Low Palaeo-sensitivity of the project area overall based on desktop and field-based data. These impacts, including cumulative impacts considering other renewable energy projects in the broader region, are expected to fall within acceptable limits.

8.9 Visual / Landscape

Shadow Flicker Effect

Receptors falling within the shadow flicker envelope could potentially be affected by shadow flicker from the rotating wind turbine blades when the sun is low in the sky. However, the blades would need to be orientated toward the receptor, they would need to be rotating and the weather would need to be clear with bright sunlight to cast shadows. The orientation of buildings, as well as topography and trees would all determine the potential flicker effect.

Only two farmsteads within 2 km of the proposed WEFs could potentially be affected, although these are both within the project boundary. Incidences of flicker are therefore expected to be minimal.

8.9.1 Construction Phase

Impact Phase: Construction Phase					
Nature of the impact: Visual effect of construction activities on scenic resources and sensitive receptors					
Description of Impact: Visual intrusion of cranes, heavy vehicles and construction activities required for the erection of wind turbines, and related infrastructure. Temporary construction areas e.g. camps and batching plants. Visual scarring from earthworks for assembly platforms. Soil/ rubble stockpiles from earthworks. Litter generated from construction site. Noise and dust from construction activity.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Short Term	Recoverable	Moderate	Definite
Score	2	2	3	3	5
With Mitigation	Local	Short Term	Recoverable	Moderate	Highly probable
Score	2	2	3	3	4
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (50)**		**Moderate Negative Impact (40)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Disturbed areas to be rehabilitated / revegetated as soon as possible during the construction phase. • Temporary laydown areas and batching plants to be located away from arterial or district roads. • Stockpiles to be located within approved construction footprints. • Recycling and refuse bins to be provided to eliminate litter from the site.					
Residual impact	Visual disturbance caused by vehicles, cranes.				

8.9.2 Operation Phase

Impact Phase: Operation Phase					
Nature of the impact: Visual effect of wind turbines on the rural landscape					
Description of Impact: Potential visual intrusion of tall wind turbines on the rural landscape, scenic resources and sensitive receptors. Change in the pastoral character and sense of place of the local area.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Regional	Long Term	Recoverable	High	Definite
Score	3	4	3	4	5

With Mitigation	Regional	Long Term	Recoverable	High	Definite
Score	3	4	3	4	5
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**High Negative Impact (70)**		**High Negative Impact (70)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Mitigation only achievable by means of avoidance of high visual sensitivity areas and receptors in siting of turbines. This includes the micro-siting of Turbine no. 12.					
Residual impact	Visual intrusion of wind turbines on the exposed landscape.				

Impact Phase: Operation Phase					
Nature of the impact: Visual effect of substation and BESS on the rural landscape					
Description of Impact: Visual effect of industrial-type substations and BESS on the rural landscape. Visual intrusion of internal overhead powerlines, including silhouette effect on skylines of ridges. Visual intrusion of internal access roads and hardstands in the local area.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Long Term	Recoverable	Moderate	Definite
Score	2	4	3	3	5
With Mitigation	Local	Long Term	Recoverable	Moderate	Highly probable
Score	2	4	3	3	4
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (60)**		**Moderate Negative Impact (48)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Substations, BESS and O&M Buildings to be located in unobtrusive low-lying areas away from the R319 and district roads, as per recommended visual buffers, as currently indicated . • On-site signage to be discrete, and billboards prohibited. Signage to be fixed against a backdrop to avoid intrusion on the skyline. • Powerlines to follow valleys and avoid peaks/ridges where possible. (Final route of internal lines to be reviewed). • Security and other outdoor lighting to be fitted with reflectors to conceal light source and prevent light spillage.					

Residual impact	Visual intrusion of industrial facilities on the local landscape.

Impact Phase: Operation Phase					
Nature of the impact: Visual intrusion of lighting at night					
Description of Impact: Visual effect on the rural countryside created by lights on turbines for aircraft navigation. Visual intrusion of area and security lighting around the substations and O&M buildings.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Long Term	Recoverable	Moderate	Definite
Score	2	4	3	3	5
With Mitigation	Local	Long Term	Recoverable	Moderate	Highly probable
Score	2	4	3	3	4
Significance Calculation	**Without Mitigation**		**With Mitigation**		
S=(E+D+R+M)*P	**Moderate Negative Impact (60)**		**Moderate Negative Impact (48)**		
Was public comment received?	No.				
Has public comment been included in mitigation measures?	No.				
Mitigation measures to enhance opportunities: • Use of available technology to minimise the visual effect of navigation lights, conforming with CAA requirements. • Use of reflectors on general area and security lighting to conceal light sources.					
Residual impact	Visual intrusion of light spillage on the local landscape.				

8.9.3 Decommissioning Phase

Impact Phase: Decommissioning Phase					
Nature of the impact: Visual intrusion of activities to remove infrastructure					
Description of Impact: Visual effect of construction activities to remove infrastructure at the end of the life of the project, including wind turbines, substation, buildings, internal overhead powerlines and access roads.					
Impact Status: Negative					
	E	**D**	**R**	**M**	**P**
Without Mitigation	Local	Short Term	Recoverable	Moderate	Definite
Score	2	2	3	3	5
With Mitigation	Local	Short Term	Recoverable	Moderate	Highly probable
Score	2	2	3	3	4

Significance Calculation	Without Mitigation	With Mitigation
S=(E+D+R+M)*P	**Moderate Negative Impact (50)**	**Moderate Negative Impact (40)**
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	
Mitigation measures to enhance opportunities: • Disturbed areas to be rehabilitated / revegetated as soon as possible after the decommissioning phase. • Wind turbines and building structures removed at the end of the life of the project. • Hardstands and access roads no longer required to be ripped and regraded. • Exposed or disturbed areas to be revegetated and returned to grazing pasture or natural veld to blend with the surroundings.		
Residual impact	Visual intrusion of remaining roads and slabs on the local landscape.	

8.9.4 Cumulative Impact

Impact Phase: Cumulative Phase

Nature of the impact: Combined visual effect of existing and proposed WEFs on scenic resources and sensitive receptors

Description of Impact:

To assess cumulative visual impacts within a 35 km radius of the proposed project. The proposed Hoogland North WEF, and Nuweveld WEF by Redcap fall within this radius. Only parts of the Hoogland North WEF would potentially be seen in combination with the Loxton WEF 3, although the nature of the topography would result in some visual screening of the various WEF turbines.

Impact Status: Negative

	E	D	R	M	P
Without Mitigation	Regional	Long Term	Recoverable	Moderate	Highly probable
Score	3	4	3	3	4
With Mitigation	Regional	Long Term	Recoverable	Moderate	Highly probable
Score	3	4	3	3	4

Significance Calculation	Without Mitigation	With Mitigation
S=(E+D+R+M)*P	**Moderate Negative Impact (52)**	**Moderate Negative Impact (52)**
Was public comment received?	No.	
Has public comment been included in mitigation measures?	No.	
Mitigation measures to enhance opportunities: • None.		

Residual impact	Visual effect of existing and proposed WEFs on sense of place.

8.10 Socio-Economic

8.10.1 Construction Phase

The key social issues associated with the construction phase include:

Potential positive impacts

Creation of employment and business opportunities, and the opportunity for skills development and on-site training. The construction phase will extend over a period of approximately 24 - 30 months and create in the region of 300-350 employment opportunities. Members from the local communities in Loxton, Carnarvon and the ULM would qualify for the majority of low skilled and semi-skilled employment opportunities and a number of skilled opportunities. The Most of these employment opportunities will accrue to Historically Disadvantaged (HD) members from the local community. Given relatively high local unemployment levels and limited job opportunities in the area, this will represent a significant, if localised, social benefit. The total wage bill will be in the region of R 150 million (2022 Rand values). A percentage of the wage bill will be spent in the local economy which will also create opportunities for local businesses in the ULM. The capital expenditure associated with the construction phase will be approximately R 6 billion (2022 Rand value). This will create opportunities for local companies and the regional and local economy. The local service sector will also benefit from the construction phase. The potential opportunities would be linked to accommodation, catering, cleaning, transport, and security, etc. associated with the construction workers on the site.

Potential negative impacts

- Impacts associated with the presence of construction workers on local communities.
- Impacts related to the potential influx of jobseekers.
- 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.
- Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles.
- Impact on productive farmland.
- The findings of the Scoping Level SIA indicate that the significance of the potential negative impacts with mitigation will be Low Negative. The potential negative impacts associated with the proposed construction phase can therefore be effectively mitigated if the recommended mitigation measures are implemented.

8.10.2 Operation Phase

The following key social issues are of relevance to the operational phase:

Potential positive impacts

- Generate renewable energy to produce green hydrogen and ammonia.
- Creation of employment opportunities.
- Benefits associated with establishment of community trust.
- Benefits for local landowners.

The proposed project will supplement South Africa's energy and assist to improve energy security. In addition, it will also reduce the country's reliance on coal as an energy source. This represents a positive social benefit.

Potential negative impacts

- Visual impacts and associated impacts on sense of place.
- Potential impact on property values.
- Potential impact on tourism.

The findings of the SIA indicate that the significance of all the potential negative impacts with mitigation will be Low Negative. The potential negative impacts can therefore be effectively mitigated.

8.10.3 Decommissioning Phase

Given the relatively small number of people employed during the operational phase (~50-60), the potential negative social impact on the local economy associated with decommissioning will be limited. In addition, the potential impacts associated with the decommissioning phase can also be effectively managed with the implementation of a retrenchment and downscaling programme. With mitigation, the impacts are assessed to be Low (negative). Decommissioning will also create temporary employment opportunities. The significance was assessed to be Low (positive).

8.10.4 Cumulative Impact

Cumulative impact on sense of place

The establishment of the proposed WEF and other renewable energy facilities in the area will create the potential for combined and sequential visibility impacts. The significance will be assessed during the Assessment Phase.

Cumulative impact on local services and accommodation

The potential cumulative impact on local services and accommodation will depend on the timing construction phases for the different renewable energy projects in the area. With effective planning the significance of the potential impact was rated as Low Negative.

Cumulative impact on local economy

The significance of this impact with enhancement was rated as Moderate Positive.

8.11 Traffic and Transportation

There will be a notable increase in traffic volumes on the public road network within the study area, during the construction phase of the proposed development and less conspicuous traffic volumes during the operational phase. The specialist also assessed the cumulative impact of the additional traffic on the road network within the study area and found that the level of service on these roads is still acceptable.

The increase in traffic volumes on the roads will lead to significant wear and tear, especially during the construction phase of the proposed development, but will not have an undue detrimental impact on the structural integrity of the roads within the study area. Due to budgetary constraints within various spheres of government, only minor maintenance is undertaken on the road network. To this end, it is strongly suggested that the developer contributes towards the ongoing maintenance of the road network associated with the various phases of the proposed development.

There are no serious concerns regarding the public road network accessing the proposed development. All access points onto the proposed development shall be design in accordance with standard geometric requirements and are to be finalised in the design phase of the project.

The traffic delivering material and equipment, including abnormal loads, to the proposed development shall be via Victoria West.

It should be noted that it is not possible to determine the expected traffic volumes generated during the decommissioning phase. It can be assumed that these volumes will be lower than during the construction phase as much of the infrastructure (e.g., roads, platforms, etc.) will be retained by the landowners. As part of the decommissioning process, a separate traffic impact assessment should be undertaken since many of the characteristics related to the traffic impact assessment, i.e., access routes, road geometry, traffic volumes, etc., would have changed over the operational life of the development.

9 SUMMARY OF PRELIMINARY FINDINGS & CONCLUSION

9.1 Soils, Land Use and Agricultural Potential

Impacts assessed are likely to have low impact on future agricultural production potential and are therefore assessed as having very low significance. The site has low agricultural potential and is unsuitable for crop production, and agricultural production is limited to low capacity grazing. The land impacted by the development footprint is verified in this assessment as being of low agricultural sensitivity.

The amount of agricultural land loss caused by the project is well within the allowable development limits prescribed by the agricultural protocol to ensure appropriate conservation of agricultural production land. Based on the specialists' assessment, the footprint of the development is approximately eight times smaller than what the development limits allow. Therefore, this study has been scoped out and will not be assessed further in the EIA phase.

9.2 Freshwater and Wetlands (Aquatics)

It was determined that the impacts upon aquatic biodiversity associated with the project are of low significance, after mitigation. This assumes that the mitigations recommended are considered and that the overall layouts avoid any of the High / No-Go areas, unless making use of areas with impacts such as existing farm tracks. The main riverine systems are noteworthy areas which should be avoided for infrastructure development.

Most of the anticipated impacts include disturbance during the construction phase, while changes to form and function of the site due to increased runoff roads or hard surfaces that would occur in the operational and maintenance (O&M) phase. This is largely based on the assumption that all sensitivity terrestrial habitats will be avoided, which then also includes any of the observed CBAs. Disturbance of any aquatic CBAs, which are closely represented by the Biodiversity Spatial Plan (BSP - river lines only) can be avoided using the existing tracks and roads. This would also then prevent any additional damage to the aquatic systems within the area, while present and opportunity to improve the condition of any of the existing road crossings (improve flows and prevent erosion and sedimentation).

The loss of irreplaceable aquatic habitat and/or important aquatic obligate biota is highly unlikely. The impacts are easily mitigated (provided the mitigation measures and monitoring plan within the EMPr and this report are implemented and adhered to during all phases of the project).

During the EIA phase, the final impact ratings will be revised based on the layouts that will be developed, and any conflicts will be pointed out to the developer.

9.2.1 Permit Requirements

Certain aspects of the proposed development may also trigger the need for Section 21, Water Use License Applications (WULAs) (or General Authorisation (GA) applications) such as river or watercourse crossings or any activities within 500 m of a wetland boundary. DHSWS will determine if a GA or WULA application will be required during the pre-

application phase, and typically if one of the below identified water-uses requires a WULA then all applications will be treated as a WULA and not GA.

Based on an assessment of the proposed activities and past engagement with DHSWS, the following WULs / GA's could be required based on the following thresholds as listed in the following Government Notices:

- DHSWS Notice 538 of 2016, 2 September in GG 40243– Section 21 a, Abstraction of water.
- Government Notice 509 in GG 40229 of 26 August 2016 – Section 21 c & i, Impeding or diverting the flow of water in a watercourse and or altering the bed, banks, course or characteristics of a watercourse.
- Government Notice 665, 6 September 2013 in GG 36820 - Section 21 g, Disposal of waste in a manner that may detrimentally impact on a water source which includes temporary storage of domestic wastewater i.e. conservancy tanks under Section 37 of the Notice.

The application process will be initiated by the Applicant / Developer and will be separate to this S&EIA process and only once a final project scope is known.

	Water Use Activity	**Applicable to this development proposal**
S21(a)	Taking water from a water resource	Yes, if water is abstracted from new and/ or existing boreholes which will also require a change of use from agricultural to industrial. The use of surface water in this region due to the ephemeral nature of the rivers / watercourses is not recommended.
S21(b)	Storing water	Only if water is stored within a instream dam. The use of tanks and or reservoirs is thus advised as these **do not require** a license.
S21(c)	Impeding or diverting the flow of water in a watercourse	If any works (permanent or temporary) are located within a watercourse then a GA process can potentially be followed if the DWS Risk Assessment Matrix indicates that all impacts with mitigation are low.
S21(d)	Engaging in a stream flow reduction activity	Not applicable
S21(e)	Engaging in a controlled activity	Not applicable
S21(f)	Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit	Not applicable
S21(g)	Disposing of waste in a manner which may detrimentally impact on a water resource	Typically, the conservancy tanks at construction camps and the Operations and Maintenance (O&M) buildings require a license (GA if volumes are less than 10 000 m^3).
S21(h)	Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process	Not applicable
S21(i)	Altering the bed, banks, course or characteristics of a watercourse	If any works (permanent or temporary) are located within a watercourse, then a GA process can potentially be followed if the DWS Risk Assessment Matrix indicates that all impacts with mitigation are low.

	Water Use Activity	Applicable to this development proposal
S21(j)	Removing, discharging or disposing of water found underground for the continuation of an activity or for the safety of persons	Not applicable
S21(k)	Using water for recreational purposes	Not applicable

9.3 Terrestrial Ecology (Flora and Fauna)

A variety of avoidance and mitigation measures associated with each identified impact are recommended to reduce the likely impact of the development, these are provided in the specialist scoping report (Volume II).

The proposed development was mapped as falling entirely within the Eastern Upper Karoo vegetation type. However, the assessment indicated that significant areas of Upper Karoo Hardeveld are also present as well as some Southern Karoo Riviere along the major drainage lines of the site. In terms of fauna, there are several listed mammals which occur in the area and which would potentially be impacted by the development. This includes the Riverine Rabbit, Black-footed Cat, Brown Hyena, Grey Rhebok and Mountain Reedbuck. The Riverine Rabbit is of greatest potential concern as it has the highest threat status and has also been confirmed present within the area. None of the listed species were picked up during the study despite extensive camera trapping across the site, suggesting that none of these species are present or regularly occur within the affected area.

In terms of the sensitivity and constraints mapping conducted as part of this study, there are numerous constraints operating across the sites, associated largely with the drainage features of the area, Riverine Rabbit habitat and their associated applied buffers and also the steep slopes and dolerite outcrops of the sites. These occupy a relatively low proportion of each site and the majority of the site consists of extensive open plains and low hills considered to be low to moderate sensitivity and which are suitable for wind energy development. Under the preliminary turbine layout provided, there are no turbines located in areas mapped as very high or high sensitivity. As such, the turbine layout is considered acceptable from a sensitivity mapping perspective and there are no ecological conflicts that appear to represent fatal flaws or which cannot be avoided.

There are some CBAs within the site, and under the layout provided, there are 3 turbines located within CBAs and a fourth turbine on the margin of a CBA which can be relocated outside of the CBA. The affected CBA is also a PAES Focus Area, indicating that this area has been identified for possible future conservation expansion. The footprint within the CBA/PAES Focus Area would be less than 10 ha is not considered to represent a threat to the larger CBA/PAES Focus Area. The impact of the development on CBAs and PAES Focus Areas is therefore considered acceptable.

In terms of potential cumulative impacts in and around the project site, these currently amount to approximately 735ha of planned wind farm projects. The Loxton Wind Energy Facility 3 project would contribute an additional 65ha and 110 ha of long-term habitat loss to this total. The broader area is however still largely intact with no existing renewable energy facilities present thus far, with the result that cumulative impacts associated with the current approved and planned projects are considered acceptable. Cumulative impacts on the Riverine Rabbit are however a potential concern, as this species is confirmed present in the area, but was not detected within the Loxton Wind Energy Facility 3 site. As a precaution and in order to maintain the long-term integrity of the habitat within the site, a 500 m buffer around the identified areas of habitat has been implemented.

Based on the results of the current study, the impacts associated with the Loxton Wind Energy Facility 3 are likely to be medium to low after mitigation. Although there are several

fauna of concern that may occur in the area, none of these were identified within the site despite extensive camera trapping. Impacts on CBAs and PAES Focus Areas as well as more general cumulative impacts associated with the development are considered acceptable. As a result, and with the application of the recommended mitigation and avoidance measures, the impact of the Loxton Wind Energy Facility 3 is considered acceptable and hence, from an ecological perspective, the developments should be allowed to proceed to the EIA phase.

9.4 Avifauna

The Applicant has redesigned the developable area of the proposed Loxton WEF 3 to avoid most of the avian constraints and their buffers, with the exception of one turbine ('WTG20') proposed marginally within the 500 m buffer of a dam. Other aquatic sensitivities as per the National Wetland Map have also been avoided. The species arguably at greatest risk at this wind farm is the Ludwig's Bustard, as much flight activity as well as breeding display behaviour was recorded on site. Risk can be reduced by excluding construction activities entirely from the No-go lek areas and keeping disturbance to an absolute minimum in the High sensitivity zones surrounding them in the breeding months which for this location are from approximately November to April, although breeding appears to be rainfall-dependant (Mucina & Rutherford 2006, Tarboton 2011) and thus subject to unpredictability. Two turbines ('WTG33' & 'WTG34') are currently proposed within these High sensitivity zones and thus require the condition that construction and decommissioning only occur outside of the breeding season. Increasing the minimum turbine blade height above ground from 30m to 60m can potentially reduce collision risk by as much as 75% for this species and for almost every other target species assessed, to varying degrees. Increasing minimum rotor swept height is strongly recommended.

Avifaunal impacts have been assessed and have been mostly determined to be of Low or Moderate Negative significance post-mitigation, with the exception of habitat destruction and the impact of fatalities as a direct result of turbine and power line collisions, which remain at Moderate Negative post mitigation. The 12-month pre-construction data indicated that avifaunal abundance and diversity in the passerine, raptor and large terrestrial sectors are relatively healthy on site, although given the timing of this study at the conclusion of an almost decade-long drought, our findings are possibly a "below-average" to "average" baseline.

Three three bird species were classified as being at High risk should the projects proceed, and two species at Medium risk. High risk species include: Ludwig's Bustard (Endangered), Verreaux's Eagle (Vulnerable) and Jackal Buzzard (endemic, not Red Listed). Martial Eagle (Endangered) and Black Harrier (Endangered) were classified as Medium risk.

Since the turbine model has not been finalised, bird fatalities were estimated using a 'typical rotor envelope' of 30 to 230m above ground. It is estimated that approximately 3.08 bird fatalities could be recorded at the wind farm per year across the 20 target bird species recorded flying on site for a turbine rotor swept area of 30 – 230m. This includes: 0.59 Ludwig's Bustards, 0.43 Verreaux's Eagles and 1.25 Jackal Buzzards. Although the preferred turbine model would result in a lower blade tip 25 – 35m above ground, for illustrative purposes we ran the calculation using a lower blade tip of 60m above ground (as a best case scenario). The fatality estimates could be reduced significantly with an increase in minimum blade height above ground as most bird flight was recorded closer to the ground than 60m.

It is recommended that any opportunity to raise the lower blade tip as much as possible should be taken, as this could significantly reduce the bird collision risk.

The work done to date on the proposed site has established a baseline understanding of the distribution, abundance and movement of key bird species on and near the site.

However, this is purely the 'before' baseline and aside from providing input into turbine micro-siting, it is not very informative until compared to post-construction data. The following programme has therefore been developed to meet these needs. A construction and post construction bird monitoring framework has been produced (Volume II), this will be further refined, if required, during the EIA phase.

9.5 Bats

The assessment was based on eight months of baseline data on bat activity recorded at the project. Based on these data, the key issue for the WEF will be managing collision impacts to high-flying free-tailed bats; specifically, Egyptian free-tailed bat, but also possibly Roberts's flat-headed bat. The magnitude of Egyptian freetailed bat activity was high across the study area, including at 50 m and 100 m, based on median bat activity with reference to MacEwan et al. (2020). While this was restricted to certain nightly time periods and seasons, this high risk needs to be addressed and the mitigation options for high-flying species are relatively limited. This is because these bats are active across most of the rotor swept zone and hence are likely to encounter wind turbine blades should they be foraging or commuting in the vicinity of these structures. Additionally, bats may also be attracted to wind turbines (Guest et al. 2022, Leroux et al. 2022).

The first mitigation measure proposed to manage risk is to adhere to the no-go buffers which aim to spatially avoid impacts by buffering key habitat features used by bats. This measure is likely to be effective for most bat species recorded at the project, but additional mitigation measures are needed to avoid impacts to free-tailed bats, which forage high in the air, and to reduce residual impacts. Turbine design can be effective, and it is recommended to maintain a minimum blade sweep of at least 35 m. However, free-tailed bats will still collide with turbine blades above this height and as such, the rotor diameter must be limited as much as practicable to minimise the space where collisions might occur. The specific dimensions will be investigated further during the EIA phase of the project. Additionally, blade feathering must be implemented to limit the rotation of turbine blades below the turbine cut-in speed when electricity is not being generated.

Mitigation measures to minimise residual impacts after the application of the above measures include curtailment and acoustic deterrents. These measures are effective, and given the predicted risk, it is possible they may need to be implemented because the fatality thresholds are relatively low. As such, the project should consider the cost and feasibility of these measures during the EIA phase. The residual impacts must be monitored using post-construction fatality monitoring for a minimum of two years (Aronson et al. 2020). Curtailment and/or acoustic deterrents must be used if this monitoring indicates that species fatality thresholds have been exceeded (MacEwan et al. 2018) to maintain the impacts to bats within acceptable limits of change and prevent declines in the impacted bat populations.

Pending data from the remaining four months of pre-construction bat monitoring, the proposed project can be approved to continue to the EIA phase, considering that the overall impact to bats was assessed as moderate after the application of the mitigation measures proposed to avoid and minimise impacts to bats. However, on a species level, the project presents differential risk and impacts to bats must be managed adaptively during the operational phase, particularly for those species (e.g. Egyptian free-tailed bat) for which high risk is predicted. This adaptive management will be guided by the Environmental Management Programme for bats which must include the development of a Biodiversity Management Plan (BMP) to manage impacts to bats during the operation of the facility. The BMP for bats must be developed by a bat ecologist before the commencement of operation and must include the post-construction fatality monitoring plan design, fatality thresholds calculations and rationale, a curtailment plan, and an adaptive management

response plan that provides a timeous action pathway for mitigation, including roles and responsibilities, should fatality thresholds be exceeded.

9.6 Noise

Considering the preliminary wind turbine layout (based on the available information), there is a potential of a low to high significance of a noise impact during the construction phase, and of a low to medium significance during the operational phase. Further study is required to assess the impact ratings and provide measures to reduce impacts.

9.7 Heritage and Archaeology

Section 38(3)(d) of the NHRA requires an evaluation of the impacts on heritage resources relative to the sustainable social and economic benefits to be derived from the development. The project will result in construction period jobs as well as a small number of operation phase jobs. However, the biggest benefit to society is in the provision of electricity to the national grid which will assist in stabilising electricity supply and, in general, improve economic activity. These are clear economic and social benefits and, if mitigation is applied as suggested above, then the socio-economic benefits outweigh the residual impacts.

Impacts to the broader cultural landscape may be of high significance but there is little that can be done about this. In time the facility will become an accepted component of the landscape and the perceived impact will diminish. Also, if multiple similar facilities are constructed in the area, then a new electrical 'layer' will develop and become part of the landscape. At the smaller scale, the agricultural landscapes around the historical farmsteads will not be directly affected, although they will, at times, be overshadowed by turbines placed on hills within a few hundred meters of the 50 m buffers around the outside of these landscapes. Other aspects of heritage are of no concern because sites are rare and almost always located along rivers which are avoided by the development. These areas could be of concern in the EIA phase because facility roads will need to cross valleys in some places. Nonetheless, sites requiring *in situ* conservation are not expected to be found and it is expected that any conservation-worthy sites will be very easily sampled in advance of development should avoidance by micrositing not be possible.

From the information supplied for assessment at scoping level, there are no heritage impacts that are unacceptable and any direct impacts that may still occur in the construction phase are expected to be easily mitigated. As such, it is the opinion of the heritage specialist that the project should proceed to the EIA phase.

The proposed recommendations to be included as conditions of the authorisation are listed below:

- The road design must take account of the sensitive areas;
- Existing roads should be reused where possible;
- Where existing roads pass through sensitive areas this is preferred over making new roads but the alignments should ensure the integrity of any specific resources in those sensitive areas;
- If all other factors are equal and there are more turbines positions than required, then preference should be given to dropping turbine 20 due to its proximity to a farmstead;
- A pre-construction survey of all parts of the layout that have not yet been surveyed must be undertaken and this must inform the final layout of the facility and associated infrastructure; and
- 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.

9.8 Palaeontology

Despite the substantial WEF project footprints as well as the known occurrence of important vertebrate and other fossil sites elsewhere in the wider region between Loxton and Victoria West, the impact significance of the proposed renewable energy developments on local palaeontological heritage is anticipated to be low. These impacts, including cumulative impacts considering other renewable energy projects in the broader region, are expected to fall within acceptable limits. There are therefore no objections on palaeontological heritage grounds to authorisation of the proposed development. Therefore, this study has been scoped out and will not be assessed further in the EIA phase.

The potential for unrecorded palaeontological sites of scientific and conservation value cannot be completely excluded. These are best mitigated through the application of a Chance Fossil Finds Protocol by the ECO / ESO during the Construction which will be incorporated into the EMPr during the EIA phase. The qualified palaeontologist responsible for mitigation work will need to apply for a Fossil Collection Permit for the Northern Cape from SAHRA. Minimum standards for PIA reports have been compiled by Heritage Western Cape (2021) and SAHRA (2013). No further assessment will be required during the EIA Phase.

9.9 Visual / Landscape

The layout of the WEF has been subject to an iterative planning process, based on the various specialist findings, including the mapping of scenic resources and sensitive receptors. The currently proposed layout largely succeeds in avoiding visually sensitive areas as indicated on the visual sensitivity maps.

The cumulative visual impact of the WEF and related infrastructure, such as the substations, associated battery facilities and grid connection powerlines, could affect the rural quality, or sense of place of the general area, particularly when seen in combination with other existing or planned wind farms within 35 km. The preliminary visual assessment findings are the following:

- The viewshed is fairly extensive in all directions given the visually open nature of the treeless, hilly landscape.
- There are a number of visual receptors in close proximity to the proposed WEF, these being mainly small farmsteads and guest farms in some cases.
- Turbines 102 and 103 are located in the very high (no-go) visually sensitive area but these could be re-sited.
- The overall visual impact significance for the wind turbines has been rated as high, both before and after mitigation, as there would be a significant change in character to the area.
- The visual impact significance for related infrastructure, (such as substations and O&M buildings) has been rated as medium, being in fairly remote locations.
- The visual impact significance for navigation lights at night has been rated as medium, with some potential for mitigation depending on the technology used.
- The cumulative visual impact significance of the WEF, seen in combination with other renewable energy projects in the area has been rated as medium.
- Effective mitigation for the wind turbines is limited to 'avoidance', such as a reduction in the number of wind turbines, and/or relocating turbines further from nearby receptors.

9.10 Socio-Economic

The findings of the Social Scoping study indicate that the proposed Loxton WEF 3 will create a number of social and socio-economic benefits, including creation of employment and business opportunities during both the construction and operational phase. In addition, the WEF will generate renewable energy and contribute towards reducing South Africa's carbon footprint. The findings also indicate that based on other studies the potential negative impacts associated with both the construction and operational phase are likely to be Low Negative with mitigation. The potential negative impacts can therefore be effectively mitigated if the recommended mitigation measures are implemented. The Loxton WEF 3 is therefore supported by the initial findings of the Social Scoping study.

9.11 Traffic and Transportation

A range of management and mitigation strategies are identified for implementation during the construction and operation phases of the development to minimise traffic impacts, reduce community disruption and the risk of traffic incidents.

Based on the conclusions of the traffic assessment, the following recommendations are made and should be included in the conditions of the environmental authorisation:

- All remedial work or modifications to any of the public roads shall be done in consultation with and have the approval of the local road's authority (as is standard practice, this will be finalised during and be a requirement of the municipal planning approval process);
- The access to the proposed development from the main roads will need to be upgraded by the developer to accommodate the expected transportation requirements. This upgrade would need to be implemented to facilitate the delivery of abnormal loads to the proposed development; and
- The developer shall contribute to the maintenance of all roads affected by the development, during the construction and operational phases of the development.

Thus, from a traffic and transportation perspective, there are no constraints or notable impacts that would jeopardise the implementation of this development.

9.12 Preliminary Site Sensitivity Evaluation

Based on the preliminary specialist studies and assessment Figure 7 contains the Scoping phase no go areas for turbine placement. These areas will be reassessed in the EIA phase, and will be based on additional site visits, where necessary. The majority of the turbines are currently out of no-go areas. Noise and heritage buffers will be included in the EIA phase. Visual buffers were delineated but no considered no go areas and therefore not included in the environmental sensitivity map.

9.13 Conclusion

The effect of the potential impacts associated with the construction and operation of the proposed Loxton WEF 3 development can be limited or reduced to acceptable levels through avoidance, minimisation, and the implementation of mitigation measures during the construction, operation and decommissioning phases. Therefore, based on the outcome of the specialist scoping inputs, potential negative impacts associated with the proposed development are anticipated mainly to be of medium to low significance after mitigation, while some positive socio-economic impacts of moderate significance are expected.

Based on the preliminary assessment of impacts for the proposed development the Environmental Assessment Practitioner (EAP) can conclude that the project **should be allowed to proceed into the EIA phase**. The specialist's assessments have identified areas of further investigation, and these will be assessed during the EIA phase, together

with any additional impacts or concerns raised during the public participation process. A preliminary layout was produced and provided to specialists for consideration during the scoping phase. This layout will be revised further during the EIA phase of the process to be informed by buffers and constraints provided by specialists. Any additional constraints and buffers recommended by the specialists during the EIA phase, will be taken into consideration and a Final Mitigated Layout will be produced and submitted as part of the Final EIA Report. Comments received from I&APs during the public participation comment period will be taken into consideration to inform the final scoping report and EIA.

10 PLAN OF STUDY FOR EIA

A detailed description of the nature and extent of the proposed Loxton WEF 3 and its associated infrastructure, details regarding the Scoping process followed, as well as the issues identified and evaluated through the Scoping Phase have been included in this Scoping Report. The Section of the report provides the Plan of Study for the Environmental Impact Assessment (EIA) for the proposed development.

The EIA Phase of the study includes detailed specialist studies for those impacts recorded to be of potential significance, as well as on-going public consultation.

10.1 Aim of the EIA Phase

The EIA Phase will aim to achieve the following:

- Provide a detailed assessment of the need and desirability of the proposed development taking into consideration specialists findings, I&AP comments as well as the necessary guidance documents;
- Provide an overall assessment of the social and biophysical environment affected by the proposed development;
- Assess potentially significant impacts (direct, indirect and cumulative impacts) associated with the proposed development;
- Identify and recommend appropriate mitigation measures for potentially significant environmental impacts; and
- Undertake a fully inclusive public involvement process to ensure that I&AP's are afforded the opportunity to participate, and that their issues and concerns are recorded.
- The EIA report will address potential environmental impacts and benefits associated with all components of the of the proposed development including the design, construction, operation and decommissioning, and will aim to provide the competent authority with sufficient information to make an informed decision regarding the proposed development. All feasible alternatives (including the no-go alternative) will be assessed.

10.2 Consideration of Alternatives

The following alternatives will be investigated in the EIA:

- The 'do nothing or no-go alternative;
- Design alternatives; and
- Alternative technologies (i.e. various wind turbine options).

10.3 Authority Consultation

Consultation with the regulatory authority (i.e. DFFE and Northern Cape DE consultation will include NC) will be undertaken and will continue throughout the EIA process. On-going consultation will include the following:

- Submission of the Final Scoping Report following a 30-days public review period (and considering of comments received).
- Submission of the EIA Report for a 30-days public review period, as well as the final report including all comments received.
- Consultation and site visit (if required) with the authorities (DFFE) in order to discuss the findings and conclusions of the EIA Report.

10.4 Public Participation Process

A public participation process will be undertaken by Arcus in accordance with the requirements of the EIA Regulations. Consultation with key stakeholders and I&APs will be on-going throughout the EIA process. Through this consultation process, stakeholders and I&APs will be encouraged to provide input to the project, and to comment on the findings of the EIA process.

The EIA Report will be made available for public review for a 30-day period prior to the finalisation and submission to the DFFE for review and decision-making. Comments received during the review period will be captured and addressed the comment and responses report which will form part of the final EIA Report will be submitted to the DFFE for decision making.

10.5 Specialist Plan of Study

10.5.1 Soils, Land Use and Agricultural Potential

Mitigation measures to prevent soil degradation are all inherent in the project design and / or are standard, best-practice for construction sites.

- A system of storm water management, which will prevent erosion, will be an inherent part of the road engineering on site. Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.
- Any excavations done during the construction phase, in areas that will be re-vegetated at the end of the construction phase, must separate the upper 30 cm of topsoil from the rest of the excavation spoils and store it in a separate stockpile. When the excavation is back-filled, the topsoil must be back-filled last, so that it is at the surface. Topsoil should only be stripped in areas that are excavated. Across the majority of the site, including construction lay down areas, it will be much more effective for rehabilitation, to retain the topsoil in place. If levelling requires significant cutting, topsoil should be temporarily stockpiled and then re-spread after cutting, so that there is a covering of topsoil over the entire surface.

10.5.2 Freshwater and Wetlands (Aquatics)

The specialist has no objection to the authorisation of the proposed activities assuming that all mitigations and buffer zones are implemented.

The aquatic features observed on site have been identified as no-go features in this assessment must be excluded from the development layouts (Turbines, hardstands, crane pads, blade fingers and buildings). Roads and transmission lines could cross these areas, where the proposed layout makes use of existing crossings or areas that have been

impacted upon in the past. For this purpose, several additional sensitive areas were mapped along any of the proposed access roads, this would then reduce any cumulative and residual impacts to Low/Negligible from and aquatic standpoint, i.e. loss of riparian vegetation and impendence and diversion of flows, would be low. This would also protect downstream systems from a functional point of view.

10.5.3 Terrestrial Ecology (Flora and Fauna)

Although a significant amount of field work has been conducted to date on the site to date, there are still a few areas of uncertainty that would be addressed to inform the EIA phase of the development. The following activities and outcomes are anticipated:

- Additional focussed camera trapping on the site to further characterise the faunal communities present to a greater degree and in particular greater certainty as to the absence of the Riverine Rabbit on the site.
- A specific species assessment of the Karoo Dwarf Tortoise will be conducted, focussed on the potential presence of this species and the distribution and availability of suitable habitat within the site.
- Additional detailed vegetation surveys across the site will be conducted. Particular attention will also be paid to the presence of rare or specialised habitats on the site. To date, no species of high conservation concern have been observed and should the situation remain the same, the site sensitivity in terms of flora would be low and a compliance statement would be the appropriate level of study for vegetation in the EIA phase.
- Engage with EWT Dryland Programme around the Riverine Rabbit and the habitat buffers and avoidance that has been recommended. Establish any additional applicable mitigation measures that could be applied to further reduce the impact of the development on Riverine Rabbit.
- Verify the final footprint of the development in the field to ensure that it avoids the sensitive features of the site and to confirm site sensitivity from a terrestrial biodiversity perspective.
- Identify in the field and based on the Wind Farm layout any additional impacts that may occur as a result of the development that have not been identified thus far.
- Identify any additional mitigation and avoidance measures for inclusion in the EMPr that should be implemented to further reduce the impacts of the development on terrestrial biodiversity.

In terms of the Site Sensitivity Verification, the following outcomes will inform the EIA Phase of the development:

- Plant Compliance Statement
- Riverine Rabbit Species Assessment
- Karoo Dwarf Tortoise Species Assessment
- Terrestrial Biodiversity Assessment.

10.5.4 Avifauna

According to available information consulted during this study to date, there are no fatal flaws from an avifaunal sensitivity perspective which should prevent the wind farm from proceeding to the EIA phase. The following will be undertaken as part of the EIA phase:

- Avifaunal constraints mapping will be finalised and presented as No-Go, High, Medium and Low sensitivity classes;
- Any changes to the project layout will be considered;
- The cumulative impacts will be considered at the EIA stage;
- The assessment of impacts will be revisited – and updated if deemed necessary, although changes to the final findings are highly unlikely; and

- Any comment or input received from stakeholders will be addressed.

10.5.5 Bats

Best practise for assessing the impact of a wind energy facility on bats in South Africa requires 12 months of bat activity data recorded from the project site. This scoping assessment is based on eight months of data. Hence, additional data will be needed to inform the final impact assessment and the following tasks will be undertaken during the EIA phase of the development:

- Update the bat activity baseline to include the final four months of bat acoustic monitoring.
- Update the impact assessment as required based on the additional data collected.
- Update the cumulative impact assessment to reflect if additional wind farm developments are approved in the EAAA.
- Compile the Environmental Management Programme for bats.
- Confirmation that all project infrastructure (except roads) avoids No-Go areas.

10.5.6 Noise

The assessment for the EIA phase is defined in section 8 of SANS 10328:2008 and will be followed to produce the Noise Impact Assessment Report should the project be approved at scoping phase. The purpose of an environmental noise impact investigation and assessment is to determine and quantify the acoustical impact of, or on a proposed development. The following will be undertaken by the specialist for the EIA Phase:

- Ambient sound level data collected during the site visit conducted from the 3 to 5 June 2022 will be analysed to motivate appropriate noise limits;
- Data, as received from the developer, will be used to model the potential noise impact, and considering the following information:
  - The Sound Power Emission ("SPL") details of potential construction activities and equipment expected at such a facility,
  - The SPL details of a selected or preferred wind turbine that may be used at this WEF,
  - The latest WEF layout to be assessed,
  - The surface contours of the project focus area, and the
  - Surface and meteorological constants;
- The potential noise impact will be evaluated (where possible) in terms of the nature (description of what causes the effect, what/who might be affected and how it/they might be affected) as well as the extent of the noise impact for the construction and operational phases (also considering the operational noise from the Loxton WEF 3 as well as the potential cumulative effect of all the WEFs in the area of influence);
- The potential significance of the identified issues will be calculated based on the evaluation of the issues and / or impacts;
- The development of an Environmental Management Plan and a proposal of potential mitigation measures (if required); and
- Recommendations for inclusion in the EA and EMPr.

10.5.7 Heritage and Archaeology

The EIA Phase layout, which should include the facility roads, will need to be carefully scrutinised to determine whether any potentially sensitive areas might be impacted by development. If deemed necessary, a follow-up site visit might be required to check certain areas. The report will then need to be updated to an EIA Phase report and, once finalised, submitted to SAHRA and NBKB for comment and approval.

10.5.8 Visual / Landscape

The draft visual assessment is based on the current turbine layout for the proposed Loxton 3 WEF. Mitigation measures have been recommended in Section 10 above and visual photomontages have been prepared to depict the current layout. During the EIA phase the specialist will revise the photomontages and provide further recommendations for inclusion in the EA and EMPr.

10.5.9 Socio-Economic

The proposed approach to the SIA is based on the Guidelines for SIA endorsed by Western Cape Provincial Environmental Authorities (DEA&DP) in 2007. The Guidelines are based on accepted international best practice guidelines, including the Guidelines and Principles for Social Impact Assessment (Inter-organizational Committee on Guidelines and Principles for Social Impact Assessment, 1994) and IAIA Guidance for Assessing and Managing Social Impacts (2015). The approach to the EIA study will involve:

- Collection and review of reports and baseline socio-economic data on the area. This includes socio-economic characteristics of the affected areas, current and future land uses, and land uses planning documents relating to the study area and surrounds.
- Identification of the components associated with the construction and operational phase of the proposed project, including estimate of total capital expenditure, number of employment opportunities created and breakdown of the employment opportunities in terms of skill levels (low, medium, and high skilled), breakdown of wages per skill level, assessment procurement policies etc.
- Site visit and interviews with key affected parties, including local communities, local landowners, key government officials (local and regional), the client, local farmers associations, tourism and conservation officials, chamber of commerce etc.
- Review of key findings of the key specialist studies that have a bearing on the SIA, such as the Visual Impact Assessment (VIA). This information will also be used to inform the engagement with the affected landowners.
- Identification and assessment of key social issues and assessment of potential impacts (negative and positive) associated with the construction, operational and decommissioning phase of the project.
- Identification and assessment of cumulative impacts (positive and negative).
- Identification of appropriate measures to avoid, mitigate, enhance, and compensate for potential social impacts.
- Preparation of Social Impact Assessment (SIA) Report.

10.5.10 Traffic and Transportation

The proposed development of the Loxton WEF 3 will have a notable increase in traffic volumes on the road network during the peak construction phase. The EIA phase will provide the assessment of these impact of these additional traffic volumes, on the road network within the study area. The preliminary assessment found that even under the worst-case scenario the roads operate within an acceptable level of service. The increase in traffic volumes will lead to greater wear and tear, especially during construction, but will not have an undue detrimental impact on the road network within the study area if the mitigation measures are undertaken.

It is the reasoned opinion of the author that the proposed development of the Loxton WEF 3 can be approved from a traffic and transportation perspective as there are no constraints or notable impacts that would jeopardise the implementation of the development, subject to the specific requirements which will be considered in the EIA phase.

10.6 Methodology of Assessment of Potential Impacts

The potential impact that the proposed development may have on each environmental receptor could be influenced by a combination of the sensitivity or importance of the receptor and the predicted degree of alteration from the baseline state (either beneficial or adverse).

Environmental sensitivity (or 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).

A 7-step approach for the determination of significance of potential impacts was developed by Arcus to align with the requirements of Appendix 3 of the EIA Regulations, 2014 (as amended). This 7-step approach was adapted from standard ranking metrics such as the Hacking Method, Crawford Method etc. and complies with the method provided in the EIA guideline document (GN 654 of 2010) and considers international EIA Regulatory reporting standards such as the newly amended European Environmental Impact Assessment (EIA) Directive (2014/52/EU).

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

The approach is both objective and scientific based to allow appointed specialists and EAPs to retain independence throughout the assessment process. This methodology is including this scoping report and will be used during the EIA phase reporting (Section 4).

A preliminary assessment of cumulative impacts has been made in the Scoping Phase and will be assessed further in the EIA Phase.

SCOPING PHASE FIGURES

APPENDIX A: EAP CV AND DECLARATION OF INDEPENDENCE