Proposed Inyanda - Roodeplaat Wind Energy Facility

Draft Environmental Impact Assessment Report

Report Prepared for

Inyanda Energy Projects (Pty) Ltd

Report Number 478867/2

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srk consulting

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SRK Consulting (South Africa) (Pty) Ltd.
Ground Floor Bay Suites
1a Humewood Rd.
Humerail
Port Elizabeth 6001
South Africa
e-mail: portelizabeth@srk.co.za
website: www.srk.co.za

Tel: +27 (0) 41 509 4800
Fax:+27 (0) 41 509 4850

SRK Project Number 478867

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Compiled by:

Nicola Rump
Principal Environmental Scientist

Tanya Speyers
Environmental Scientist

Email: nrump@srk.co.za

Peer Reviewed by:

Rob Gardiner
Partner,
Principal Environmental Scientist

Authors:

N Rump, R Gardiner & T Speyers

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List of Abbreviations

BID	Background Information Document
BLMC	Biodiversity Land Management Classes
BNR	Baviaanskloof Nature Reserve
CAA	Civil Aviation Authority
CAR	Civil Aviation Regulations
CBA	Critical Biodiversity Areas
CEMP	Construction Environmental Management Programme
CES	Coastal and Environmental Services (now EOH CES)
CFRPA WHS	Cape Floristic Region Protected Areas World Heritage Site
CITES	Convention on International Trade in Endangered Species of Wild Fauna & Flora
CSP	Concentrated Solar Power
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs (National)
DEDEAT	Department of Economic Development, Environmental Affairs and Tourism
DMR	Department of Mineral Resources
DOE	Department of Energy
DSR	Draft Scoping Report
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act
ECBCP	Eastern Cape Biodiversity Conservation Plan
ECPAES	Eastern Cape Protected Areas Expansion Strategy
ECPHRA	Eastern Cape Provincial Heritage Resources Authority
ECPTA	Eastern Cape Parks and Tourism Agency
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMI	Electromagnetic Interference
EMPr	Environmental Management Programme
ERC	Elands River Conservancy
FOBW	Friends of the Baviaanskloof Wilderness Area
FPA	Fire Protection Association
FROG	Friends of Groendal
FSR	Final Scoping Report
GHG	Greenhouse Gas Emissions

GW	Gigawatt
HIA	Heritage Impact Assessment
IAPs	Interested and Affected Parties
IBA	Important Bird Areas of Southern Africa
IDP	Integrated Development Plan
IDZ	Industrial Development Zone
IEP	Integrated Energy Plan
IPP	Independent Power Producer
IRP	Integrated Resources Plan
IUCN	International Union for Conservation of Nature
LTMS	Long Term Mitigation Scenario
LUPO	Land Use Planning Ordinance
MVA	Megavolt ampere
MW	Megawatt
NEMA	National Environmental Management Act
NEMBA	National Environmental Management: Biodiversity Act
NEMPAA	National Environmental Management: Protected Areas Act
NERSA	National Energy Regulator of South Africa
NGO	Non-governmental Organization
NMBM	Nelson Mandela Bay Municipality
NMMU	Nelson Mandela Metropolitan University
NPAES	Protected Areas Expansion Strategy Area
PNCO	Provincial Nature Conservation Ordinance
PPA	Power Purchase Agreement
PPP	Public Participation Process
PV	Photovoltaics
REFIT	Renewable Energy Feed – in Tariff
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
RFP	Request for Proposal
SACAA	South African Civil Aviation Authority
SAHRA	South African Heritage Resource Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency
SANS	South African National Standards
SDF	Spatial development Framework
SEA	Strategic Environmental Assessment
SIBIS	SANBI's Integrated Biodiversity Information System
SKEP	Succulent Karoo Ecosystem Plan
SSC	Species of Special Concern
SRVM	Sundays River Valley Municipality
STEP	Subtropical Thicket Ecosystem Planning Project

ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change
VIA	Visual Impact Assessment
WEF	Wind Energy Facility
WESSA	Wildlife and Environment Society of Southern Africa
WTG	Wind Turbine Generator
+ve	Positive
-ve	Negative

Glossary of Terms

Blades	The part of a wind turbine rotor (consisting of three blades) that catches the wind. Wind blowing over the blades causes them to lift and rotate.
Critical Biodiversity Areas	Areas that are considered irreplaceable or important and necessary in terms of meeting targets for biodiversity pattern and process.
Environment	The external circumstances, conditions and objects that affect the existence and development of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Impact Assessment (EIA)	A study of the environmental consequences of a proposed course of action.
Fundamental Alternatives	Alternatives that are totally different from the proposed project and usually involve a different type of development on the proposed site, or a different location for the proposed development
Geotechnical Study	A study on the physical properties of soil and rock to inform the design of earthworks and foundations
Hub	The hub connects the blades.
Incremental Alternatives	Modifications or variations to the design of a project that provide different options to reduce or minimise environmental impacts
Independent Power Producer	Independent Power Producer is an entity, which is not a public electric utility, but which owns and or operates facilities to generate electric power for sale to a utility, central government buyer and end users.
Indigenous vegetation	Vegetation consisting of indigenous plant species occurring naturally in an area, regardless the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Interested and Affected Party	Any person, group of persons or organisation interested in or affected by an activity, and any Organ of State that may have jurisdiction over any aspect covered by the activity.
Nacelle	The structure on top of the tower attached to the rotor and houses all of the generating components (i.e., the gearbox, low and high speed shafts, generator, controller and brake).
No-go Alternative	The no-go alternative assumes that the proposed development does not go ahead and the site remains in its current state
Plan of Study for EIA	A document which forms part of a Scoping Report and sets out how an Environmental Impact Assessment must be conducted.
Registered Interested and Affected Party (IAP)	An Interested and Affected Party whose name is recorded in the register opened for the application / project.

Renewable Energy Independent Power Producer Procurement Programme	As part of the rollout of renewable energy in South Africa the Department of Energy (DoE) has entered into a bidding process for the procurement of renewable energy from independent power producers. This process is known as the Renewable Energy Independent Power Producer Procurement Programme (REIPPP)
Renewable Energy Feed – in Tariff	The National Energy Regulator of South Africa (NERSA) commissioned the development of a Renewable Energy Feed-in Tariff (REFIT) for South Africa, under its authority to regulate electricity tariffs in the country. The feed-in tariff requires the Renewable Energy Purchasing Agency (REPA), in this case the Single Buyer Office (SBO) of the national electricity utility Eskom, to purchase renewable energy from qualifying generators at pre-determined prices[
Rotor	The hub and the blades (i.e. the noticeably spinning part of the turbine).
Scoping	A procedure to consult with stakeholders to determine issues and concerns and for determining the extent of and approach to an EIA, used to focus the EIA.
Scoping Report	A written report describing the issues identified to date for inclusion in an EIA.
Subtropical Ecosystem Planning Project	The project aims to identify priority areas that would ensure the long-term conservation of the subtropical thicket biome
Succulent Karoo Ecosystem Plan	Provides a framework to guide conservation efforts of the Succulent Karoo biome
Tower	The tower holds the nacelle and the rotor.
Wind Energy	The process by which wind is used to generate mechanical power or electricity. Wind turbines convert the kinetic energy in the wind into mechanical power and a generator can then be used to convert this mechanical power into electricity

Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (South Africa) (Pty) Ltd. (SRK) by Inyanda Energy Projects (Pty) Ltd. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them. Opinions presented in this report apply to the site conditions and features as they existed at the time of SRK's investigations, and those reasonably foreseeable. These opinions do not necessarily apply to conditions and features that may arise after the date of this Report, about which SRK had no prior knowledge nor had the opportunity to evaluate.

1 Background and Introduction

Inyanda Energy Projects (Pty) Ltd proposes to construct a Wind Energy Facility (WEF) of up to187.2 MW installed capacity on a number of properties, referred to collectively in this report as the farm Roodeplaat, situated in the Groot Winterhoek Mountains west of the town of Uitenhage in the Eastern Cape (see Figure 1-3 for site locality).

An Environmental Impact Assessment (EIA) for the project was started by Coastal Environmental Services (CES, and now trading as EOH Coastal Environmental Services) in January 2013, and a Draft Scoping Report was issued for public and stakeholder comment in November 2013, as per the requirements of the NEMA 2010 EIA regulations[1]. At that stage the project applicant was Ingeprop, and an application for environmental authorisation was lodged with the Department of Environmental Affairs (DEA) in January 2013. In October 2014, Inyanda Energy Projects (Pty) Ltd appointed SRK Consulting (South Africa) (Pty) Ltd (SRK) to complete the EIA process commenced by CES, including the finalisation of the scoping report. CES have subsequently provided all relevant documentation, including (but not limited to) public participation material, generated in the EIA process up to the date that SRK was appointed. Newcombe Wind Developments has since assumed the role of applicant, and a revised application form, reflecting this as well as changes to the project description and NEMA listed activities applied for in terms of the 2014 EIA regulations, has been submitted to the DEA and is included in Appendix A.

The first phase of the EIA, the scoping study has been completed and included a Public Participation Process (PPP), aimed at identifying issues and concerns of Interested and Affected Parties (IAPs). The objective of the Scoping Study was to identify those issues and concerns that must be investigated in more detail, and included a Plan of Study for the EIA. This Plan of Study was approved, with additions, by DEA on 9 October 2015 (see Appendix B).

The second phase of the EIA commences with the Draft Environmental Impact Report (this report). The aim of this report is to present the results of investigations of the issues and concerns identified in the Scoping Study, identify and assess the potential impacts of the development and provide recommendations with the objective of minimising negative environmental impacts and maximising benefits.

1.1 Background to the study

Inyanda Energy Projects (PTY) Ltd (referred to hereafter as 'Inyanda Energy'), a renewable energy company, plans to develop a wind energy facility (or 'wind farm' to be named the Inyanda - Roodeplaat WEF) between the towns of Patensie and Kirkwood, within the Sundays River Valley Municipality, Eastern Cape Province, South Africa (Figure 1-1). According to Inyanda Energy, available wind data in South Africa shows this area to have favourable wind conditions sufficient to support a wind farm. This has been confirmed by on site wind monitoring that has been ongoing since June 2012. The proposed project area consists of approximately 12 200 ha located on 22 adjacent property portions illustrated below (Table 1-1 and Figure 1-2).

[1] Government Notice No R.543, published in Government Gazette No 33306 of 2 August 2010 in terms of the National Environmental Management Act No. 107 of 1998

The proposed Inyanda - Roodeplaat WEF will consist of approximately 52 turbines (depending on selected turbine) each capable of generating approximately 3.6 MW. The turbine footprints and associated facility infrastructure (internal access roads, substation, construction compound, batching plant and operations building) will potentially cover an area of approximately 60 ha depending on final layout design should the project proceed. An investigation of the wind regime of the site will decide the model of turbines to be installed. The facility will have a maximum generating output of up to 187.2 MW.

In accordance with the requirements of the NEMA 2010 EIA regulations the proposed project requires a full Scoping and EIA process to be conducted.

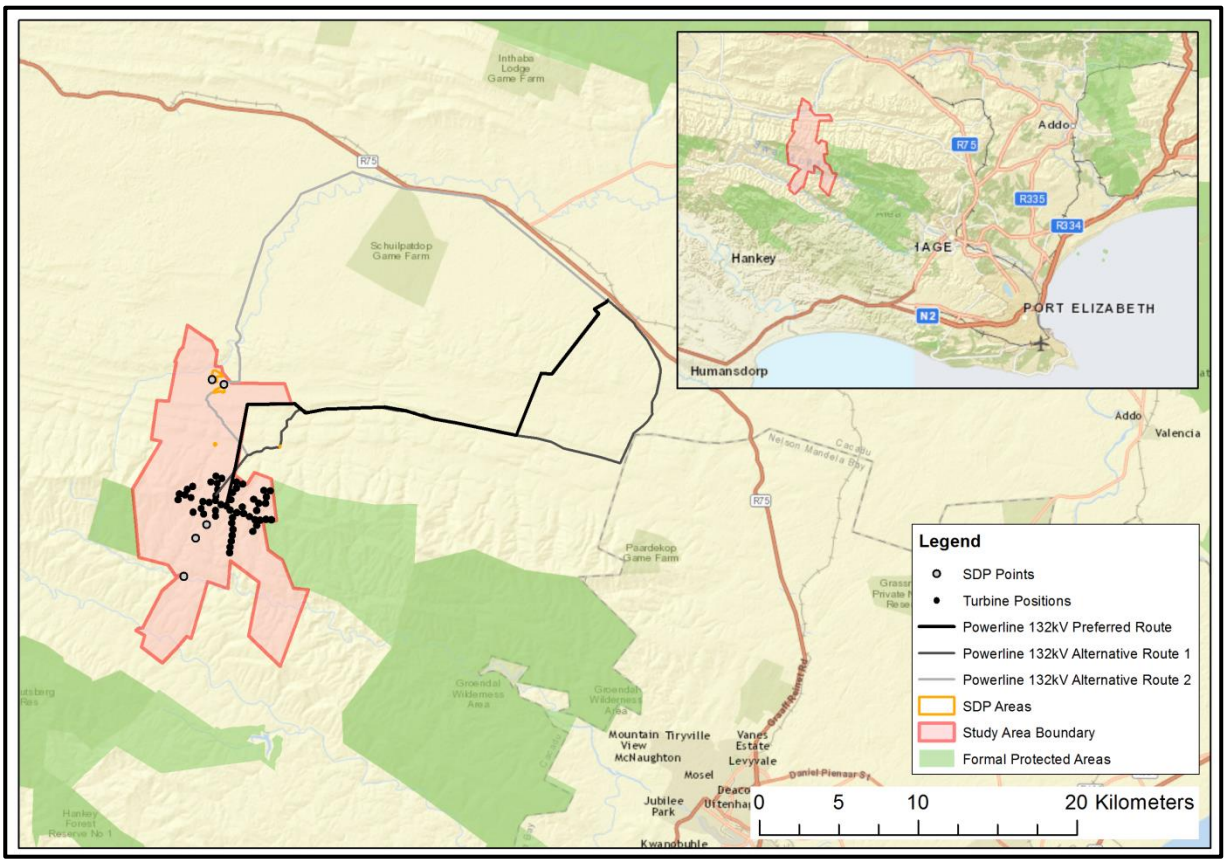


Figure 1-1: Site Locality Plan showing site boundaries

Table 1-1: Farm name and property portions comprising the study area

Farm Number	Property Portion	Size (ha)
170	Portion 3	353
245	Portion 1	779
246	Portion 1 and Remaining Extent	392 and 1014
247	Portion 1	153
248	-	784
277	Portion 1, Remaining Extent	1128 and 859
278	Portion 1, 2, 3, 4 and remaining Extent	482, 290, 289, 289 and 579
279	Portion 3, 4 and remaining Extent	395, 775 and 777
280	Portion 1	99.5
346	Remaining Extent	1186

Farm Number	Property Portion	Size (ha)
347	Portion 3	149.8
348	Portion 1	138
588	Portion 1 and 2	616 and 725

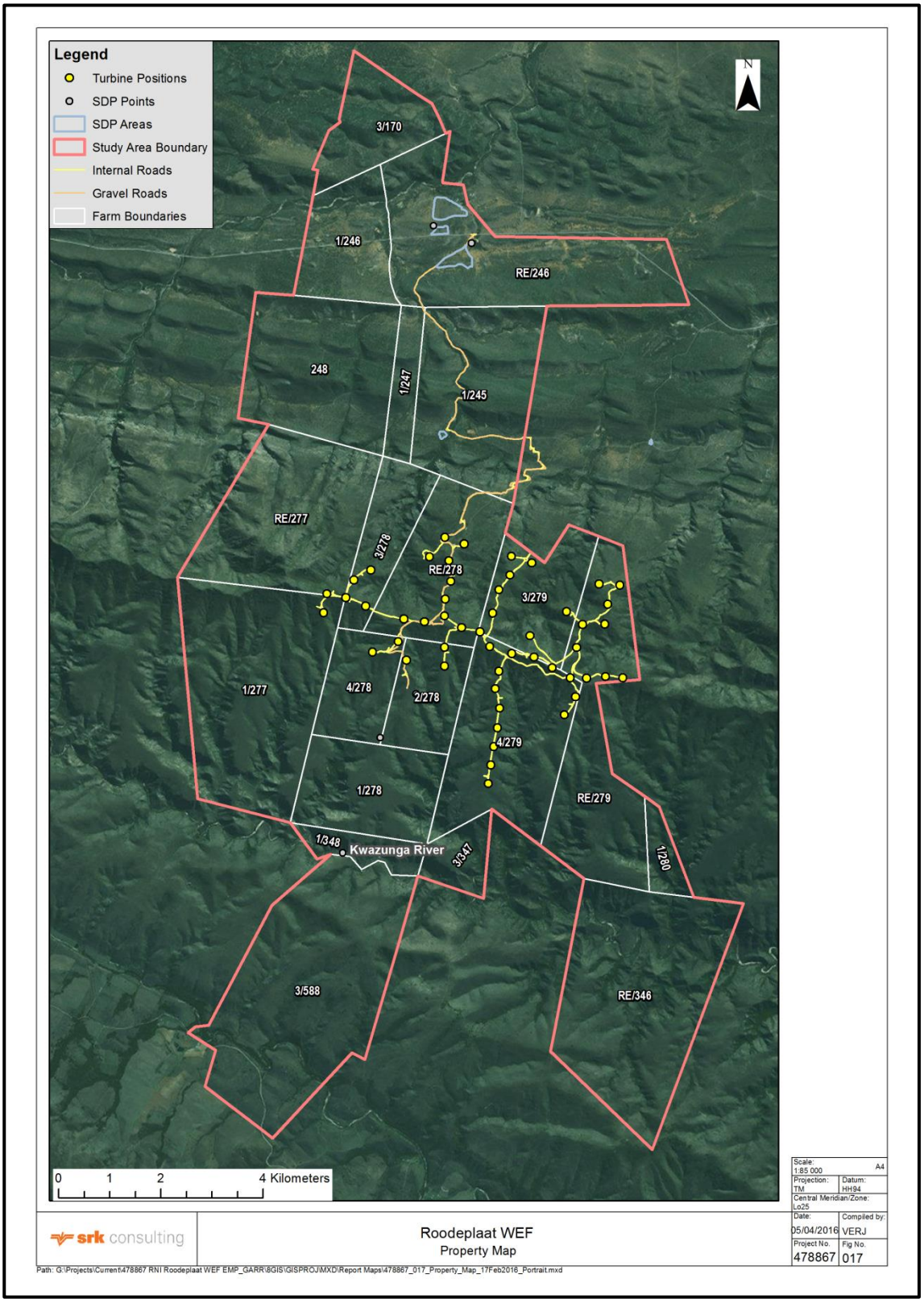


Figure 1-2: Farm numbers and ownership

1.2 The environmental impact assessment process

2010 EIA Regulations

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities that may not commence without an environmental authorisation or existing activities in respect of which an application for environmental authorisation is required. In this context, EIA Regulations contained in four General Notices in terms of NEMA (GN R 543, 544, 545 and 546) came into force on 18 June 2010. GN R 543 lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment process or a Scoping and EIA process is required to obtain environmental authorisation. GN R 544 lists activities that require Basic Assessment, while GN R 545 lists activities that require Scoping and EIA. The regulations for both alternative processes stipulate that:

- Public participation must be undertaken at various stages of the assessment process;
- The assessment must be conducted by an independent Environmental Assessment Practitioner;
- The relevant authorities respond to applications and submissions within stipulated time frames; and
- Decisions taken by the authorities can be appealed by the proponent or any other interested and affected party.

2014 EIA Regulations

The 2014 revision of the EIA regulations came into effect on 8 December 2014. Although the project's application for environmental authorisation was made under the 2010 EIA regulations and therefore remains subject to the procedural requirements thereof, the assessment is also required to take into account all relevant equivalent or additional listed activities in terms of the 2014 EIA regulations.

GN R82 of the EIA Regulations lays out two alternative authorisation processes. Depending on the type of activity that is proposed, either a Basic Assessment (BA) process or a S&EIR process is required to obtain EA. Listing Notice 1(GNR 983) lists activities that require a BA process, while Listing Notice 2 (GNR 984) lists activities that require S&EIR. Listing Notice 3 (GNR 985) lists activities in certain sensitive geographic areas that require a BA process.

The activities triggered by the proposed Inyanda - Roodeplaat WEF are listed in Table 1-2 below.

Table 1-2: Listed activities potentially triggered by the proposed Inyanda - Roodeplaat WEF

2010 Listed Activities	2014 listed Activities	Description of each listed activity as per project description	Reference to impacts assessment
GNR 544 Item 10: (10) The construction 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;	GNR 983 Item 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	A substation will be constructed on site which will collect power generated by the turbines, step up the voltage to 132 kV, and then transfer this power via an overhead power line to Eskom infrastructure (either a substation or a transmission line).	All impacts assessed relate to this activity, either directly or indirectly.
GNR 544 EIA (11) The construction of: (xi) infrastructure or structures covering 50 square metres or more Where such construction occurs within a watercourse or within 32 metres of a watercourse.	GNR 983 Item 12: The development of – (xii)infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs - (a) within a watercourse or; within (c) 32 metres of a watercourse	The project will involve upgrades to roads and stormwater infrastructure at watercourse crossings or within 32 m thereof.	Refer to Sections 5.9, 7.5.1 and 7.4.17.
GNR 544 (18) The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: (i) a watercourse.	GNR 983 Item 19: The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock or more than 5 cubic metres from: (i) a watercourse.	The construction of internal roads between the turbines will not cross any watercourses however the upgrading of the existing gravel roads will require the upgrading of stormwater infrastructure, which will involve excavations of material exceeding $5m^3$. Underground electrical cables may cross drainage lines or watercourses.	Refer to 5.9, 7.5.1 and 7.4.17.
GNR 545 (1) The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more	GNR 984 Item 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 development would have a power output of up to 187.2 MW.	All impacts
GNR 545 (15) Physical alteration of undeveloped, vacant or derelict land for commercial and industrial use where the total area to be transformed is 20 hectares or more.	GNR 984 Item 15: The clearance of an area of 20 hectares or more of indigenous vegetation.	The permanent footprint of the proposed development will be approximately 60 hectares, confirming the applicability of this listed activity.	Refer to Section 5.8

2010 Listed Activities	2014 listed Activities	Description of each listed activity as per project description	Reference to impacts assessment
GNR 546 (2) The construction of reservoirs for bulk water supply with a capacity of more than 250 cubic metres (a) In the Eastern Cape (iii). Outside urban areas in: (aa) National Protected Areas Expansion Strategy Focus Areas (dd) Critical Biodiversity Areas as identified in systematic biodiversity plans	GNR 985 Item 2: The development of reservoirs for bulk water supply with a capacity of 250 cubic metres (b) In the Eastern Cape (iii) outside urban areas in (aa) National Protected Areas Expansion Strategy Focus Areas	Temporary water storage capacity of approximately 300 m³ will be required during the construction phase. This temporary storage is likely to be in multiple plastic tanks (as opposed to a single reservoir). Most of the site is identified as a National Protected Areas Expansion Strategy Focus Area. The majority of the site is identified as a critical biodiversity area in terms of at least one systematic biodiversity plan (the Eastern Cape Biodiversity Conservation Plan).	Refer to Section 5.8
GNR 546 (4) The construction of a road wider than 4 m with a reserve less than 13.5 m. (a) In the Eastern Cape (ii). Outside urban areas in: (bb) National Protected Areas Expansion Strategy Focus Areas (ee) Critical Biodiversity Areas as identified in systematic biodiversity plans (gg) … 5 km from any protected area identified in terms of NEMPAA.	GNR 985 Item 4: The development of a road wider than 4 metres with a reserve less than 13,5 metres (b) In the Eastern Cape (ii)Outside urban areas, in: bb) National Protected Areas Expansion Strategy Focus Areas (ee)critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	Roads will need to be constructed that will link the turbines and other infrastructure components. Most of the site is identified as a National Protected Areas Expansion Strategy Focus Area. The majority of the site is identified as a critical biodiversity area in terms of at least one systematic biodiversity plan (the Eastern Cape Biodiversity Conservation Plan) The site is within 5 km of the Groendal Nature Reserve. Refer to Figure 1-3.	Refer to Section 5.8, 5.12
GNR 546 (10) The construction of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres (a) in the Eastern Cape (ii) outside urban areas, in: (bb) national protected area expansion strategy focus areas	GNR 985 Item 10: The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. (b) in Eastern Cape: ii Outside urban areas in: (bb) National Protected Areas Expansion Strategy focus areas;	During construction the contractor is likely to require a temporary facility for the storage of fuel, probably at the Construction Plant Storage area. Storage of oils (e.g. for electrical transformers), would also be required, and it is likely that the combined storage capacity will be between 30 m³ and 80 m³. Most of the site is identified as a National Protected Areas Expansion Strategy Focus Area.	Refer to Section 5.8, 5.9, 5.13, 5.15

2010 Listed Activities	2014 listed Activities	Description of each listed activity as per project description	Reference to impacts assessment
(ee) … Critical Biodiversity Areas as identified in systematic biodiversity plans	(ee) critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans	The majority of the site is identified as a critical biodiversity area in terms of at least one systematic biodiversity plan (the Eastern Cape Biodiversity Conservation Plan).	
GNR 546 (12) the clearance of an area of 300 square metres or more of vegetation where 75% of the vegetative cover constitutes indigenous vegetation (b) within critical biodiversity areas identified in bioregional plans	GNR 985 item 12: the clearance of an area of 300 square metres or more of indigenous vegetation where 75% of the vegetative cover constitutes indigenous vegetation (ii) within critical biodiversity areas identified in bioregional plans	Clearance of indigenous vegetation will amount to more than 60 ha. A number of bioregional plans identify critical biodiversity areas coinciding with the proposed development footprint.	Refer to Section 5.8
GNR 546 (13) The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (b) national protected area expansion strategy focus areas (c) In the eastern cape (ii) outside an urban area (bb) national protected area expansion strategy focus areas (ff) … 5 km from any protected area identified in terms of NEMPAA.		Temporary and permanent clearing of indigenous vegetation in excess of 60 ha will be required. Parts of the site are identified as National Protected Areas Expansion Strategy Focus Areas Most of the site is identified as a National Protected Areas Expansion Strategy Focus Area. The site is within 5 km of the Groendal Nature Reserve.	Refer to Section 5.8
GNR 546 (14) The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation. (a) In the Eastern Cape (i) All areas outside urban areas.		Temporary and permanent clearing of indigenous vegetation in excess of 60 hectares will be required.	Refer to Section 5.8

2010 Listed Activities	2014 listed Activities	Description of each listed activity as per project description	Reference to impacts assessment
GNR546 (16)The construction of: (iv) infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse. (a) In Eastern Cape: ii. Outside urban areas.	GNR 985 Item 14: The construction of (xii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs (a) within a watercourse; or (c) within 32 metres of a watercourse (ii) Outside urban areas in:	A number of internal roads and stormwater infrastructure (exceeding 10 m^2) will require upgrading, and in many cases these cross or are within 32 m of watercourses.	Refer to section 5.8, 5.9
(bb) National Protected Areas Expansion Strategy Focus Areas	(bb) National Protected Area Expansion Strategy Focus areas	Most of the site is identified as a National Protected Areas Expansion Strategy Focus Area.	
(ff) Critical Biodiversity Areas as identified in systematic biodiversity plans	(ff) Critical biodiversity areas	The majority of the site is identified as a critical biodiversity area in terms of at least one systematic biodiversity plan (the Eastern Cape Biodiversity Conservation Plan).	
(hh) … 5 km from any protected area identified in terms of NEMPAA.		The site is within 5 km of the Groendal Nature Reserve.	
GNR 546 (19) The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. (a) In the Eastern Cape: ii. Outside urban areas in:	GNR 985 Item 18: The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre (b) In the Eastern Cape (ii) Outside urban areas in: Focus areas	Existing farm roads may be widened as part of the development. Existing tracks are generally very narrow and widening thereof is likely to be by more than 4 m to meet the 6 m road width requirement for construction vehicles.	Refer to Section 5.8, 5.12
(bb) National Protected Areas Expansion Strategy Focus Areas	(bb) National Protected Area Expansion Strategy	Most of the site is identified as a National Protected Areas Expansion Strategy Focus Area.	
(ee) Critical Biodiversity Areas as identified in systematic biodiversity plans	(ee) Critical biodiversity areas	The majority of the site is identified as a critical biodiversity area in terms of at least one systematic biodiversity plan (the Eastern Cape Biodiversity Conservation Plan).	
(gg) … 5 km from any protected area identified in terms of NEMPAA.		The site is within 5 km of the Groendal Nature Reserve.	

Because the proposed development triggers a number of listed activities from GNR.545, it will require a full Scoping and EIA. This process (Figure 1-4) is regulated by Chapter 3 of Part 3 of the EIA regulations.

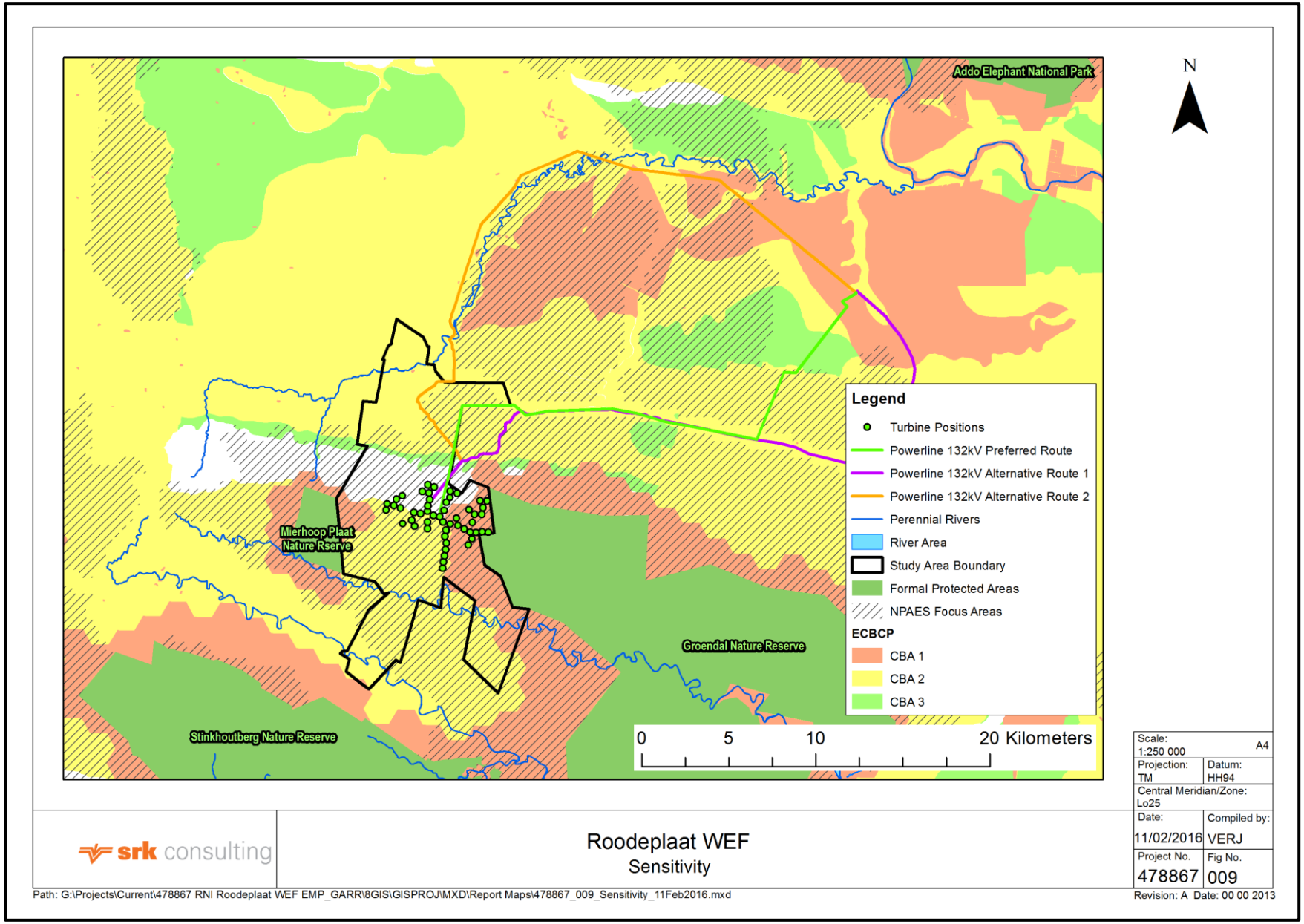


Figure 1-3: Geographic Areas in terms of Listing Notice 3 of the NEMA EIA Regulations boundaries

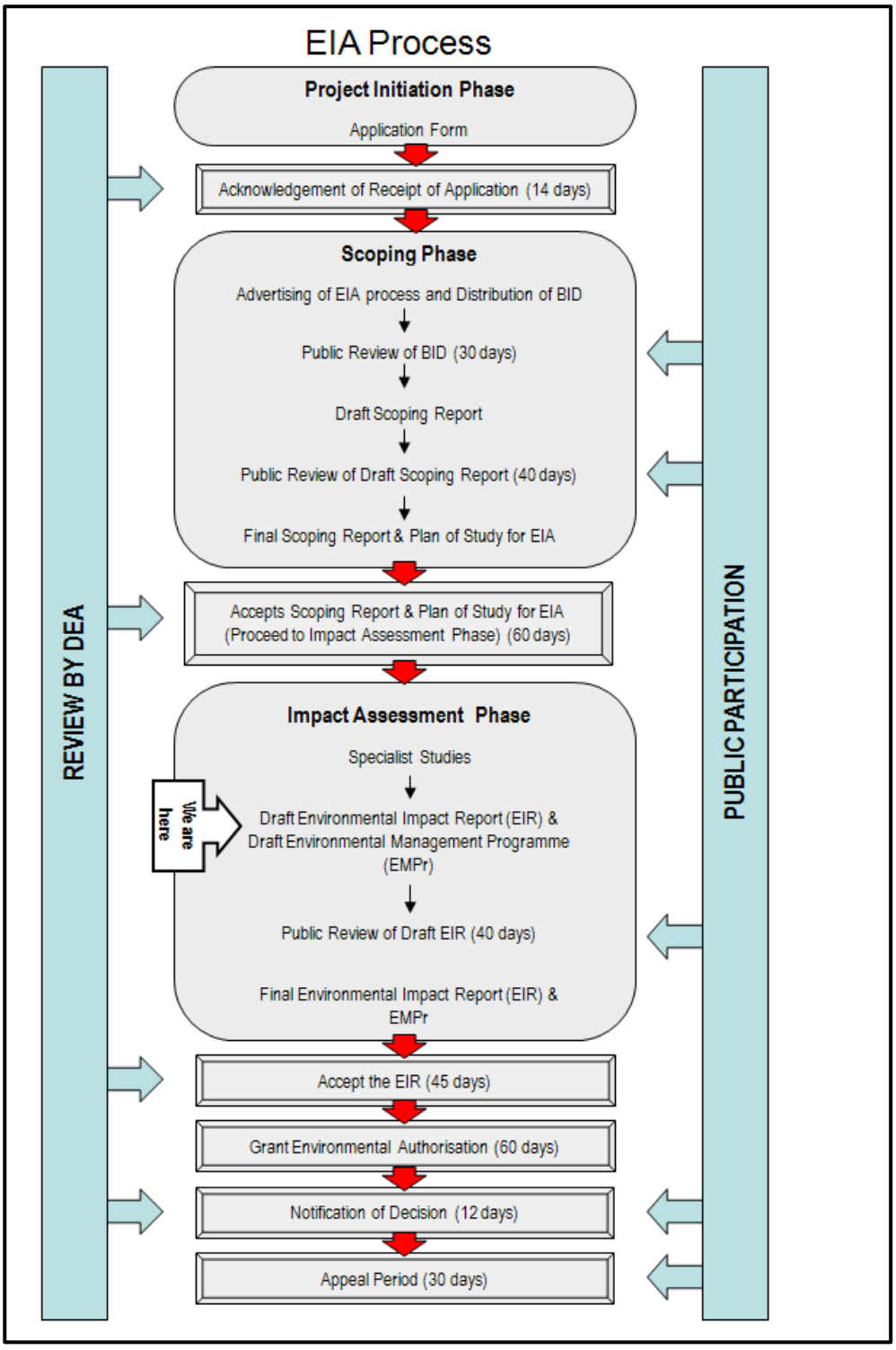


Figure 1-4: The EIA process under the NEMA 2010 EIA regulations

The competent authority that must consider and decide on the application for authorisation in respect of the activities listed in Table 1-2 is the Department of Environmental Affairs (DEA), as the Department has reached agreement with all Provinces that all electricity-related projects, including generation, transmission and distribution, are to be submitted to DEA, irrespective of the nature of the applicant. This decision has been made in terms of Section 24(C)(3) of the National Environmental Management Act (Act No 107 of 1998). The decision is effective for all projects initiated before, and up until, approximately 2015.

In addition to the requirements for an authorisation in terms of the NEMA, there may be additional legislative requirements that need to be considered prior to commencing with the activity, for example: the National Heritage Resources Act (Act No 25 of 1999), the National Water Act (Act No 36 of 1998), Civil Aviation Act (Act No 74 of 1962) as amended, National Environmental Management Biodiversity Act 10 of 2004, National Forests Act 84 of 1998 and the Eastern Cape Nature and Environmental Conservation Ordinance 19 of 1974 to name the most relevant. These are discussed in the following section.

1.3 Relevant legislation

In addition to the EIA regulations referenced in the preceding section, a number of laws are relevant to the proposed development. Typically this is either because they have bearing on the project's need & desirability, or alternatively because define the need for the competent authority (DEA) to obtain input from other licensing / permitting authorities prior to making a decision on whether or not to authorise the proposed development.

This section provides a summary of the key legislation that is relevant to this proposed development.

1.3.1 International

The 1992 United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC is a framework convention which was adopted at the 1992 Rio Earth Summit. South Africa signed the UNFCCC in 1993 and ratified it in August 1997 (Glazwesky, 2005). The stated purpose of the UNFCCC is to, "*achieve….stabilisation of greenhouse gas concentrations in the atmosphere at concentrations at a level that would prevent dangerous anthropogenic interference with the climate system*".

Relevance to the proposed project:

The UNFCCC is relevant in that the proposed project will contribute to a reduction in the production of greenhouse gases by providing an alternative to fossil fuel-derived electricity, and will assist South Africa to begin demonstrating its commitment to meeting international obligations.

The Kyoto Protocol (2002)

The Kyoto Protocol is a protocol to the UNFCCC which was initially adopted for use on 11 December 1997 in Kyoto, Japan, and which entered into force on 16 February 2005 (UNFCCC, 2009). The Kyoto Protocol is the chief instrument for tackling climate change. The major feature of the Protocol is that, "*it sets binding targets for 37 industrialized countries and the European community for reducing greenhouse gas (GHG) emissions. These amount to an average of five per cent against 1990 levels, over the five-year period 2008-2011"* (UNFCCC, 2009). The major distinction between the Protocol and the Convention is that, "*while the Convention encouraged industrialised countries to stabilize GHG emissions, the Protocol commits them to do so".*

Relevance to the proposed project:

The Kyoto Protocol is relevant in that the proposed project will contribute to a reduction in the production of greenhouse gases by providing an alternative to fossil fuel-derived electricity, and will assist South Africa to begin demonstrating its commitment to meeting international obligations.

1.3.2 National

The Constitution Act (108 of 1996)

This is the supreme law of the land. As a result, all laws, including those pertaining to the proposed development, must conform to the Constitution. The Bill of Rights, Chapter 2 of the Constitution, includes an environmental right (Section 24) according to which, everyone has the right:

a To an environment that is not harmful to their health or well-being; and

b To have the environment protected for the benefit of present and future generations, through reasonable legislative and other measures that:

i Prevent pollution and ecological degradation;

ii Promote conservation; and

iii Secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Relevance to the proposed project:

Obligation to ensure that the proposed development will not result in pollution and ecological degradation; and

Obligation to ensure that the proposed development is ecologically sustainable, while demonstrating economic and social development.

The National Environmental Management Act (NEMA) (107 of 1998)

The objective of NEMA is: "To provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state; and to provide for matters connected therewith." A key aspect of NEMA is that it provides a set of environmental management principles that apply throughout the Republic to the actions of all organs of state that may significantly affect the environment. The proposed development must be assessed in terms of possible conflicts or compliance with these principles.

As these principles are utilised as a guideline by the competent authority in ensuring the protection of the environment, the proposed development should, where possible, be in accordance with these principles. Where this is not possible, deviation from these principles would have to be very strongly motivated.

NEMA introduces the duty of care concept, which is based on the policy of strict liability. This duty of care extends to the prevention, control and rehabilitation of significant pollution and environmental degradation. It also dictates a duty of care to address emergency incidents of pollution. A failure to perform this duty of care may lead to criminal prosecution, and may lead to the prosecution of managers or directors of companies for the conduct of the legal persons. Employees who refuse to perform environmentally hazardous work, or whistle blowers, are protected in terms of NEMA. In addition NEMA introduces a new framework for environmental impact assessments, the EIA Regulations (2010 & 2014) discussed previously.

Relevance to the proposed project:

The developer must be mindful of the principles, broad liability and implications associated with NEMA and must eliminate or mitigate any potential impacts.

The developer must be mindful of the principles, broad liability and implications of causing damage to the environment.

The National Environment Management: Biodiversity Act (10 of 2004)

This Act provides for the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act 107 of 1998. In terms of the Biodiversity Act, the developer has a responsibility for:

a *The conservation of endangered ecosystems and restriction of activities according to the categorisation of the area (not just by listed activity as specified in the EIA regulations).*

b *Application of appropriate environmental management tools in order to ensure integrated environmental management of activities thereby ensuring that all developments within the area are in line with ecological sustainable development and protection of biodiversity.*

c *Limit further loss of biodiversity and conserve endangered ecosystems.*

The objectives of this Act are:

a *To provide, within the framework of the National Environmental Management Act, for –*

  i *The management and conservation of biological diversity within the Republic;*

  ii *The use of indigenous biological resources in a sustainable manner.*

The Act's permit system is further regulated in the Act's Threatened or Protected Species Regulations, which were promulgated in February 2007.

Relevance to the proposed project:

The proposed development must conserve endangered ecosystems and protect and promote biodiversity, it must assess the impacts of the proposed development on endangered ecosystems, no protected species may be removed or damaged without a permit, and the proposed site must be cleared of alien vegetation using appropriate means.

The National Forests Act (84 of 1998)

The objective of this Act is to monitor and manage the sustainable use of forests. In terms of Section 12 (1) (d) of this Act and GN No. 1012 (promulgated under the National Forests Act), no person may, except under licence:

Cut, disturb, damage or destroy a protected tree; or

Possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree.

Relevance to the proposed project:

If any protected trees in terms of this Act occur on site, the developer will require a licence from the DAFF to perform any of the above-listed activities.

National Heritage Resources Act (25 of 1999)

The protection of archaeological and paleontological resources is the responsibility of a provincial heritage resources authority and all archaeological objects, paleontological material and meteorites are the property of the State.

In terms of the Act, historically important features such as graves, archaeological artefacts/sites, and fossil beds are protected. Similarly, culturally significant symbols, spaces and landscapes are also afforded protection. In terms of Section 38 of the National Heritage Resources Act, the heritage resources authority can call for a Heritage Impact Assessment (HIA) where certain categories of development are proposed. The Act also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is deemed adequate, a separate HIA is not required.

The Act requires that:

"…any person who intends to undertake a development categorised as (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length……must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development."

Relevance to the proposed project:

An archaeological and paleontological impact assessment must be undertaken during the detailed EIR phase of the proposed project.

No person may alter or demolish any structure or part of a structure, which is older than 60 years or disturb any archaeological or paleontological site or grave older than 60 years without a permit issued by the relevant provincial heritage resources authority.

No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter or deface archaeological or historically significant sites.

National Water Act No. 36 of 1998

The National Water Act 36 of 1998 provides for the promotion of efficient, sustainable and beneficial use of water in the public interest; for the facilitation of social and economic development; for the protection of aquatic and associated ecosystems and their biological diversity; and for the reduction and prevention of pollution and degradation of water resources. The Act also provides for emergency situations where pollution of water resources occurs. Section 21 of the Act describes activities that will require prior permitting before these activities may be implemented, including any changes to the river course and banks, changes to water flows and the discharge of water containing waste.

Relevance to the proposed project:

The development is likely to include activities that are listed under section 21, i.e. the altering of bed or banks of a watercourse, associated with the widening or rehabilitation of bridges on the roads accessing the site. Water Use Licences will be required for those activities.

National Environmental Management: Air Quality Act (39 of 2004)

As with the Atmospheric Pollution Prevention Act 45 of 1965, the objective of the new Air Quality Act is to protect the environment by providing the necessary legislation for the prevention of air pollution. However, in terms of the proposed project it is not expected that any of the Act's provisions will be applicable.

Integrated Energy Plan for the Republic of South Africa, March 2003

The former Department of Minerals and Energy (DME) commissioned the Integrated Energy Plan (IEP) in response to the requirements of the National Energy Policy in order to provide a framework by which specific energy policies, development decisions and energy supply trade-offs could be made on a project-by-project basis. The framework is intended to create a balance between energy demand and resource availability so as to provide low cost electricity for social and economic development, while taking into account health, safety and environmental parameters. In addition to the above, the IEP recognised the following:

- South Africa is likely to be reliant on coal for at least the next 20 years as the predominant source of energy;
- New electricity generation will remain predominantly coal based but with the potential for hydro, natural gas and nuclear capacity;
- Need to diversify energy supply through increased use of natural gas and new and renewable energies;
- The promotion of the use of energy efficiency management and technologies;
- The need to ensure environmental considerations in energy supply, transformation and end use;
- The promotion of universal access to clean and affordable energy, with the emphasis on household energy supply being coordinated with provincial and local integrated development programmed;
- The need to introduce policy, legislation and regulations for the promotion of renewable energy and energy efficiency measures and mandatory provision of energy data, and;
- The need to undertake integrated energy planning on an on-going basis.

Relevance to the proposed project:

The proposed Wind Farm project is in line with the IEP with regards to diversification of energy supply and the promotion of universal access to clean energy.

Electricity Regulation Act (Act No. 4 of 2006)

The Electricity Regulation Act (Act No. 4 of 2006) became operation on 1 August 2006 and the objectives of this Act are to:

- Facilitate universal access to electricity;
- Promote the use of diverse energy sources and energy efficiencies, and;
- Promote competitiveness and customer and end user choice.

Relevance to the proposed project:

The proposed Wind Farm project is in line with the call of the Electricity Regulation Act No. 4 of 2006 as it is has the potential to improve energy security of supply through diversification.

Aviation Act (Act No. 74 of 1962): 13th Amendment of the Civil Aviation Regulations 1997

Section 14 of obstacle limitations and marking outside aerodrome or heliport (CAR Part 139.01.33) under this Act specifically deals with wind turbine generators (wind farms). According to this section, "*A wind turbine generator is a special type of aviation obstruction due to the fact that at least the top third of the generator is continuously variable and offers a peculiar problem in as much marking by night is concerned.* The Act emphasizes that, when wind turbine generators are grouped in numbers of three or more they will be referred to as "wind farms".

Of particular importance to the proposed project are the following:-

Wind farm placement: Due to the potential of wind turbine generators to interfere on radio navigation equipment, no wind farm should be built closer than 35 km from an aerodrome. In addition, much care should be taken to consider visual flight rules, routes, proximity of known recreational flight activity such as hang gliders, en route navigational facilities etc.

Wind farm Markings: Wind turbines shall be painted bright white to provide the maximum daytime conspicuousness. The colours grey, blue and darker shades of white should be avoided altogether. If such colours have been used, the wind turbines shall be supplemented with daytime lighting, as required.

Wind farm Lighting: Wind farm (3 or more units) Lighting: In determining the required lighting of a wind farm, it is important to identify the layout of the wind farm first. This will allow the proper approach to be taken when identifying which turbines need to be lit. Any special consideration to the site's location in proximity to aerodromes or known corridors, as well as any special terrain considerations, must be identified and addressed at this time.

Relevance to the proposed project:

The proposed wind farm project is required to get authorization from the Civil Aviation Authority for the construction of wind turbines.

1.3.3 Other relevant environmental legislation

Other legislation that may be relevant to the proposed Inyanda - Roodeplaat WEF includes:-

- The Conservation of Agricultural Resources Act 43 of 1983 controls and regulates the conservation of agriculture and lists all regulated invasive species;
- The Environment Conservation Act No 73 of 1989 (ECA) Noise Control Regulations, which specifically provide for regulations to be made with regard to the control of noise, vibration and shock, including prevention, acceptable levels, powers of local authorities and related matters and provides for effective protection, control and utilisation of the environment;
- The Mountain Catchment Areas Act 63 of 1970 provides for catchment conservation;
- The National Veld and Forest Fire Act (Act 101 of 1998);
- The Development Facilitation Act 67 of 1995 provides for development and planning;
- The Telecommunication Act (1966) which has certain requirements with regard to potential impacts on signal reception;
- The Physical Planning Act 135 of 1991 provides land use planning;
- The Tourism Act 72 of 1993 provides for the promotion of tourism and regulates the tourism industry;
- The Skills Development Act 97 of 1998 promotes the development of skills;
- Provincial Nature and Environmental Conservation Ordinance (No. 19 of 1974), which lists species of special concern which require permits for removal; and
- The Mineral and Petroleum Resources Development Act (Act 28 of 2002).

In addition to the above, aside from the environmental authorisation, there are other permits, contracts and licenses that will need to be obtained by the project proponent for the proposed project some of which fall outside the scope of the EIA. However, for the purposes of completeness, these include:-

- Local Municipality: Land Rezoning Permit. LUPO Ordinance 15 of 1985
- National Energy Regulator of South Africa (NERSA): Generation License
- Eskom: Connection agreement and Power Purchase Agreement (PPA)

How the above statutory considerations are relevant to the IPP procurement and bidding process are detailed below.

1.3.4 Renewable Energy Independent Power Producer Procurement Programme (REIPPPP)

Under the Department of Energy's current procurement policy for renewable energy, Independent Power Producers (IPPs) have to comply with the requirements as detailed in the Request for

Proposal (RFP) document that was released in August 2011. 3725 MW are to be allocated to renewable energy resources to ensure the continued uninterrupted supply of electricity. This 3725 MW is broadly in accordance with the capacity allocated to renewable energy generation in Integrated Resources Plan (IRP) 2010-2030. The RFP document underpins five rounds of a competitive bidding process.

In what is effectively a substantial vetting process, IPPs are required to meet the minimum requirements set out in six volumes of the RFP document covering legal, technical (of which the EIA process forms a part), financial and economic development criteria. Over and above the necessary environmental authorisation for a project the aspects listed below also require review and the associated application, reporting and permitting processes to be conducted as part of the bid process.

Heritage

In terms of the National Heritage Resources Act (25 of 1999) the protection of archaeological and paleontological resources is the responsibility of a provincial (or national) heritage resources authority. All archaeological objects, paleontological material and meteorites are the property of the State. The project is required to undertake the relevant heritage permitting processes and requirements identified by the provincial heritage authority.

Water

Authorisations are needed in terms of section 21(c) & (i) of the National Water Act (36 of 1998) whenever new roads and/or cables cross watercourses (even dry headwaters), and when upgrades to existing causeways/bridges are required to allow transportation of long/heavy components and equipment: This is defined as a "water use" in terms of the Act.

Activities for the water use licensing application for stream crossings and groundwater abstraction are underway independently of this EIA process. SRK's understanding is that officials from DWS have visited the site and that the general authorisation process for applications will be followed.

Civil Aviation Authority

In terms of the Civil Aviation Act (Act 13 of 2009) prescriptions listed above the project proponent is required to secure the relevant permits and clearances from the Civil Aviation Authority. This is expected to include a mapping exercise that applies the relevant buffer zones around aerodromes, air space, flight paths, and communication/navigation/surveillance assets. The CAA will require submission of a final layout prior to full approval being granted.

As the site is more than 35 km from the Port Elizabeth airport, an assessment of aviation impacts has not been considered during this EIA process. It is assumed that aviation impacts would be adequately mitigated through compliance with the existing civil aviation regulations.

Agriculture

In terms of the Conservation of Agricultural Resources Act (43 of 1983) and the Subdivision of Agricultural Land Act (70 of 1970) all projects that impact on agricultural resources require comment from the national and/or provincial agriculture departments. This will be secured from the national and provincial departments for this project.

1.3.5 Municipal by-laws

Certain activities related to the proposed development may, in addition to National legislation, be subject to control by municipal by-laws. Relevant by-laws will be identified as part of the various specialist studies during the EIA Phase of this EIA process. These are generally applicable to land use consent processes that will have to be entered into if the project receives environmental authorisation and continues to the bid phase.

1.4 Details and expertise of the environmental assessment practitioner

This section presents the details of SRK personnel responsible for finalising the scoping report and taking the EIA process forward.

1.4.1 SRK Consulting

SRK Consulting were appointed in October 2014 to complete the EIA process commenced by CES. SRK's contact details are as follows:

Physical Address: Ground Floor, Bay Suites, 1a Humewood Road, Humerail, Port Elizabeth
Postal Address: PO Box 21842, Port Elizabeth, 6000
Telephone: +27 41 509 4800
Fax: +27 41 509 4850
Website: www.srk.co.za
Email: portelizabeth@srk.co.za

SRK Profile and Expertise of Relevant Environmental Assessment Practitioners (EAP's)

SRK Consulting comprises over 1,500 professional staff worldwide, offering expertise in a wide range of environmental and engineering disciplines. SRK's Port Elizabeth environmental department has a distinguished track record of managing large environmental projects and has been practicing in the Eastern Cape since 2001. SRK has rigorous quality assurance standards and is ISO 9001 certified.

Project Manager, Environmental Assessment Practitioner: Nicola Rump, MSc, EAPSA

Nicola Rump is a Principal Environmental Scientist and has been involved in environmental management for the past 8 years working on South African and international projects including EIAs and ISO 14001 auditing for a variety of activities. Her experience includes Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Environmental Auditing and Stakeholder Engagement.

Environmental Assessment Practitioner: Tanya Speyers, BSc Hons

Tanya Speyers is an environmental scientist and has been involved in environmental management for the past 3 years. Her experience includes Basic Assessments, Environmental Impact Assessments, Environmental Management Plans, Water Use License Applications and Environmental Auditing.

Project Director and Internal Reviewer: Rob Gardiner, MSc, MBA, Pr Sci Nat

Rob Gardiner is the Principal Environmental Scientist and head of SRK's Environmental Department in Port Elizabeth. He has more than 19 years environmental consulting experience covering a broad range of projects, including Environmental Impact Assessments (EIA), Environmental Management Systems (EMS), Environmental Management Programmes (EMPr), and environmental auditing. His experience in the development, manufacturing, mining and public sectors has been gained in projects within South Africa, Lesotho, Botswana, Angola, Zimbabwe, Suriname and Argentina.

Box 1: Environmental Assessment Practitioner expertise

1.5 Statement of SRK Independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK's fee for conducting this EIA process is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report(s) or the EIA process.

As required by the legislation, SRK has completed and submitted a declaration of interest, as part of the EIA application form. A copy of this is included in Appendix A of this report and the qualifications and experience of the individual practitioners responsible for this project are detailed above.

1.6 Objectives of the EIA

The principal objectives of the Impact Assessment Phase in accordance with the regulatory requirements are to:

- Describe the nature of the proposed project;
- Identify and assess environmental impacts associated with the proposed development;
- Formulate mitigation measures to minimise impacts and enhance benefits;
- Describe important biophysical and socio-economic characteristics of the affected environment;

- Undertake a public participation process that provides opportunities for all Interested and Affected Parties (IAPs) to be involved;

- Identify feasible alternatives; and

- Produce a Final Environmental Impact Report (FEIR), including a Draft Environmental Management Programme (EMPr), that will provide all the necessary information for DEA to decide whether (and under what conditions) to authorise the proposed development.

1.7 Assumptions and limitations

As noted in the Final Scoping Report, this report is based on currently available information and, as a result, the following limitations and assumptions are implicit in it:

- That, due to the cost of preparing detailed designs and plans, such detailed design/ planning information would only be developed in the event of environmental authorisation being granted. As such, it is anticipated that, as is typically the case in an EIA process, the EIA will assess broad land uses.

- Additional permitting or licensing requirements (including but not limited to Water Use Licenses, licensing of borrow pits, vegetation destruction permits) are outside the scope of this EIA process. It is assumed that the legal requirements in this regard will be followed and that the relevant permissions will be in place prior to commencement of construction.

- That the EAP has been provided with all information relevant and pertinent to this application.

- Notwithstanding these assumptions, it is our view that this Draft Environmental Impact Report provides an accurate assessment of the proposed development and the significance of potential environmental impacts.

Assumptions and limitations listed by each of the specialists in their studies are listed below.

1.7.1 Agricultural

- Data on the spatial distribution of soil types is dependent on the resolution of sampling points; and

- The assessment rating of impacts is not an absolute measure. It is based on the subjective considerations and experience of the specialist, but is done with due regard and as accurately as possible without these constraints.

1.7.2 Archaeology

- The study of the upgrading of gravel access roads outside the project site and borrow pits is not within the scope of the archaeological impact assessment;

- The archaeological investigation was limited to the areas proposed for the wind turbines, the three power line alternatives, the access roads, and the areas proposed for the turbine site laydown area, staff accommodation, plant storage and concrete batching area, and the control office and camp site; and

- Owing to the extensive distances that the three power line routes cover and time constraints, a comprehensive survey and archaeological investigation of the power line routes could not be conducted also owing to time constraints.

1.7.3 Avifauna

Steve Percival has noted the following limitations relating to his study:

- With any ornithological survey it cannot be guaranteed to detect all target species/individuals and surveys cannot be fully representative of all conditions (e.g. severely reduced visibility, including in fog/mist and at night). It is assumed that avifauna surveys are representative of flight activity throughout daylight hours (there was no a priori ecological reason to suppose that it would be any higher), and no suggestion that the site was likely to be important for any nocturnal species that could be vulnerable to the development; and

- The present updated avifauna survey data currently available covers the period August 2015 – January 2016, and therefore does not yet cover the full year. Assumptions have therefore needed to be made on flight activity outside this period, but this has been possible by reference back to the 2013-14 survey data (reported by Jon Smallie).

1.7.4 Ecological

CES study:

- Species of conservation concern are difficult to find and difficult to identify, thus species described in this report do not comprise an exhaustive list. It is almost certain that additional species of conservation concern will be found during the construction and operational phases of the development.

- Sampling could only be carried out at one stage in the annual or seasonal cycle. Some plant species may therefore have gone undetected.

LD Biodiversity study:

- This assessment forms an update of the existing ecological work on the site, rather than an exhaustive study;

- Species of Conservation Concern are present on site, a full list of these species can only be generated through an assessment specifically designed to do so;

- Impacts are assessed based on the current (52) turbine layout, any changes to this layout will result in a need for an update to this assessment; and

- Power line impacts are assessed based on desktop information.

1.7.5 Hydrology

- For the purposes of this report it is assumed that any existing roads and tracks within the facility will be upgraded, which the new roads and associated transmission lines can avoid or span the observed water courses.

- Furthermore, no new structures including laydown / temporary works areas are located outside any of the watercourse and their buffers (32m).

- A further assumption is that water will be sourced from a licensed resource and not abstracted from any water courses, particularly if dust suppression is required.

- In order to obtain a comprehensive understanding of the dynamics of both the flora and fauna of both the terrestrial and aquatic communities within a study site, as well as the status of endemic, rare or threatened species in any area, assessments should always consider investigations at different time scales (across seasons/years) and through replication. However, due to time constraints these long-term studies are not feasible and are mostly based on instantaneous sampling; and

- Due to the scope of the work presented in this report, a detailed investigation of all, or part of, the proposed site was not possible and are not perceived as part of the Terms of Reference at a screening level. It should be emphasised that information, as presented in this document, only has reference to the study area as indicated on the accompanying maps. Therefore, this information cannot be applied to any other area without detailed investigation.

1.7.6 Noise

- The turbine positions were supplied by the developer and are accepted as an accurate layout for the purposes of the environmental impact assessment; and

- It must be noted that there are no legislated limits for protected natural areas such as the Groendal Nature Reserve. Ideally, in such areas one does not want to experience any anthropogenic noise pollution.

1.7.7 Palaeontology

- Although the Nardouw and Skurweberg Formations are considered unlikely to be sensitive in this regard, the Baviaanskloof Formation may be, though it was not possible to adequately assess it at this point due to it being weathered and buried beneath scree;

- Where the powerline routes cut northwards across farmland to join the northern route, it was not possible to directly asses the route as access details were not available to the palaeontologist and farm gates were locked; and

- Two possible powerline routes have been suggested by which the southern route could cut northwards across to the substation, adjacent to the R75. It was not possible to fully assess either of these routes as access to fenced game farm areas was not obtained. Due to lack of access to these last two route components, an alternate transect across the plain was explored along the Krompoort road in order to assess the nature of Kirkwood Formation strata crossing the plain.

1.7.8 Socio-economic

- It is recognised that responses to standardised questions are based on subjective opinions that are difficult to quantify. Despite this shortcoming, it will however still be important to

gauge the perceptions of selected identified interested and affected parties as they represent local community, business and government interests;

- Given the relatively new nature of this form of energy production, there is very limited historical data on factors such as its impact on tourist visits, land prices and business value in a context similar to that of the proposed Inyanda - Roodeplaat WEF;

- The evaluation undertaken using the impact rating method will in many cases be based on subjective criteria that are difficult to quantify at a high percent confidence interval. Emphasis is thus to be drawn away from the numerical value of the significance rating and more to the issues discussed (extent, duration, magnitude and probability). Although these are often subjective matters (given the absence of historical data on which to base econometric modelling for extrapolation of trends).While no absolute value can be ascertained to the impacts identified in the socio-economic report, it is still important to identify these potential impacts and highlight some of the critical issues that will apply in the specific case of the proposed Inyanda - Roodeplaat WEF;

- Only the money spent in the South African economy will be used to calculate the economic impacts on the South African economy;

- The CAPEX and OPEX figures used in the modelling were based on information supplied by Newcombe Wind Developments; and

- The Social Accounting Matrix (SAM) model is based on the following assumptions:

    - Production activities in the economy are grouped in homogeneous sectors.

    - The mutual interdependence of sectors is expressed in meaningful input functions.

    - Each sector's inputs are only a function of the specific sector's production.

    - The production by different sectors is equal to the sum of the separate sectors' of production.

    - The technical coefficients remain constant for the period over which forecast the projections is made.

    - There will be no major change in technology.

    - The model quantifies direct and indirect economic impacts for a specific amount of time. Therefore, the estimates that are derived do not refer to gradual impacts over time.

1.7.9 Visual

- Spatial data used for visibility analysis originate from various sources and scales. Inaccuracy and errors are therefore inevitable. Where relevant these have been highlighted in the Visual Impact Assessment. Every effort was made to minimize their effect;

- Calculation of the viewsheds does not take into account the potential screening effect of vegetation and buildings. Natural vegetation in the region will provide little screening opportunities for the proposed development, although most farmsteads are surrounded by

high exotic trees which may limit views of the WEF. Neighbouring buildings in urban/built-up areas may also limit views from these areas. Viewsheds do not take these aspects into account;

- The accuracy of presenting a wind farm as a photomontage is limited to permutations of several variables including DEM resolution and derivation methodology, ability of 3D software to accurately model the landscape, as well as photomontage processing; and

- Mitigation measures in this report will assume that construction activities are managed and performed in such a way as to minimise its impact on the receiving environment.

1.7.10 Bats

- Distribution maps of South African bat species still require further refinement such that the bat species proposed to occur on the site (that were not detected) are assumed accurate. If a species has a distribution marginal to the site it was assumed to occur in the area. The literature based table of species probability of occurrence may include a higher number of bat species than actually present;

- The migratory paths of bats are largely unknown, thus limiting the ability to determine if the wind farm will have a large scale effect on migratory species. Attempts to overcome this limitation, however, have been made during this long-term sensitivity assessment;

- The satellite imagery partly used to develop the sensitivity map may be slightly imprecise due to land changes occurring since the imagery was taken;

- Species identification with the use of bat detection and echolocation is less accurate when compared to morphological identification, nevertheless it is a very certain and accurate indication of bat activity and their presence with no harmful effects on bats being surveyed;

- It is not possible to determine actual individual bat numbers from acoustic bat activity data, whether gathered with transects or the passive monitoring systems. However, bat passes per night are internationally used and recognized as a comparative unit for indicating levels of bat activity in an area as well as a measure of relative abundance;

- Spatial distribution of bats over the study area cannot be accurately determined by means of transects, although the passive systems can provide comparative data for different areas of the site. Transects may still possibly uncover high activity in areas where it is not necessarily expected and thereby increase insight into the site;

- Exact foraging distances from bat roosts or exact commuting pathways cannot be determined by the current methodology. Radio telemetry tracking of tagged bats is required to provide such information if needed; and

- Costly radar technology is required to provide more quantitative data on actual bat numbers as well as spatial distribution of multiple bats.

1.8 Structure of this report

This report is divided into nine chapters:

Chapter 1 Background and Introduction

Introduces the Scoping Study, and the legal context, for the proposed Inyanda - Roodeplaat WEF.

Chapter 2 Description of Development Proposal

Describes the various components of, and the motivation for, the proposed Inyanda - Roodeplaat WEF.

Chapter 3 Description of the Affected Environment

Provides an overview of the bio-physical and socio-economic characteristics of the site and the surrounding area that may be affected by the proposed development. This is description compiled largely from published information, but in some cases includes site specific data obtained as part of this project.

Chapter 4 Public Participation

Describes the Public Participation Process (PPP) followed thus far and the issues & concerns that have been raised by Interested and Affected Parties (IAPs).

Chapter 5 Assessment of Environmental Impacts

Identifies and rates environmental impacts associated with the proposed project and recommends mitigation measures.

Chapter 6 Findings, Evaluation and Recommendations

Provides a plan of what studies are proposed in order to address the identified potential impacts in the EIA phase.

Chapter 7 Draft Environmental Management Programme

Stipulates the environmental management guidelines that should be implemented in the planning, design, pre-construction, construction and operation stages of the proposed development.

Chapter 8 The Way Forward

Describes the next step in the EIA process.

Chapter 9 References

Cites any texts referred to during preparation of this report.

Appendices

Supporting information is presented in various appendices.

2 Description of Development Proposal

This chapter identifies the location and size of the site of the proposed Inyanda - Roodeplaat WEF, and provides a description of its various infrastructure components and arrangements on the site.

2.1 Motivation for the development proposal

2.1.1 Electricity supply

According to the project proponent, the establishment of the proposed WEF will contribute to strengthening the existing electricity grid for the area and will aid the government in achieving its goal of a 30% share of all new power generation being derived from Independent Power Producers (IPPs). In addition to the above-mentioned potential benefits, the proposed project site was selected due to:

- Wind resources suitable for the installation of a large wind energy facility;
- The proposed project site has localised wind potentially intensified by a funnelling effect caused by surrounding topographical features;
- The site is accessible from gravel roads off the R75 which will assist in the transportation of wind turbine components to the site;
- The surrounding area is not densely populated; and
- There is potential and a desire within the Sundays River Valley Local Municipality to engage with new technologies and industries.

Upgrading of the local electricity supply infrastructure may be required depending on the actual maximum installed capacity of the WEF. Previous reports (CES, 2014) recorded that the Sundays River Valley Municipality had identified the supply of electricity as a priority issue an unspecified version its Integrated Development Plan based on the weaknesses specific to electricity supply below:

- Scattered households impede electrification;
- Some of the areas are inaccessible;
- Limited substations, many areas far from the grid;
- Load shedding by Eskom;
- Electricity increases will affect affordability; and
- Over-subsidising of consumers.

Specific measures to address these weaknesses are currently not proposed and it is assumed that such measures would form part of a local economic development strategy to be defined during the bidding process, should this route be taken.

2.1.2 Climate change

Most of South Africa's energy comes from non-renewable sources like coal, petroleum, natural gas, propane, and uranium; however the proponents of renewable energy sources like biomass, geothermal energy, hydropower, solar energy, and wind energy is a major factor that the South African sector need to consider. It is estimated that approximately only 1% of the country's electricity is currently generated from renewable energy sources. The energy sector in South Africa alone emits approximately 380,988.41 Green House Gases (GHGs) (Eastern Cape Climate Change Conference, 2011, as reported in CES, 2014). South Africa's total emissions was estimated to be 461 million tons CO_2 equivalent in the year 2000. Approximately 83% of these emissions were associated with energy supply and consumption, 7% from industrial processes, 8% from agriculture,

and 2% from waste. Eskom currently generates 95% of the electricity used in South Africa with an approximate 40.87 GW net maximum installed capacity.

By the year 2020 an additional 20 GW generation capacity would be required and up to 40 GW by 2030 to sustain the energy demands in the country. National energy policy has called for a change in the energy mix to reduce the dependency of the economy on fossil fuels and facilitate the uptake of renewable energy resources. This is in accordance with the prescriptions of the United Nations Convention on Climate Change 1994 (UNFCCC) and its associated Kyoto protocol of 1997, South Africa has put in place a long term mitigation scenario (LTMS) by which the country aims to develop a plan of action which is economically viable and internationally aligned to the world effort on climate change. During this period (2003-2050) South Africa will aim to take action to mitigate GHG emissions by 30% to 40% by the year 2050. This is a reduction of between 9000 tons and 17 500 tons of CO_2 by 2050. In January 2010, South Africa pledged to the UNFCCC, a 34% and 42% reduction against business as usual emissions growth trajectory by the year 2020 and 2025 respectively.

Due to concerns such as climate change, and the on-going exploitation of non-renewable resources, there is increasing international pressure on countries to increase their share of renewable energy generation. The South African Government (White Paper on Renewable Energy, 2003) has recognised the country's high level of untapped renewable energy potential and the equally high level of current fossil-fired power generation, and has placed targets for renewable energy (biomass, wind, solar and small hydro) in order to begin to redress the balance..

The establishment of the proposed Inyanda - Roodeplaat WEF will assist in strengthening the existing electricity grid for the area and contribute to government achieving its goal of a 30% share of all new power generation being derived from Independent Power Producers (IPP).

2.1.3 Social and economic development

Inyanda Energy intends to promote local economic growth and development through direct and indirect employment, as well as the identification and implementation of social development schemes during the projects operational phase. A local community trust or organisation is intended to directly benefit from the project.

In the event that the project goes through the REIPPPP bidding process, one of the key criteria in awarding a license in terms of that bidding process is expected to be the local economic development plan that would be proposed by the applicant at that time. There is a possibility that the project would not go through the REIPPPP bidding process, in which case the requirements for a local economic development investment strategy are likely to be less rigorous.

2.1.4 Conservation potential

The proposed wind energy facility is located within an area designated as a National Protected Areas Expansion Strategy Area (NPAES). The project study area forms a contiguous corridor linking two currently unconnected sections of the adjacent Groendal Nature Reserve (Figure 1-3). Although historically utilised for agricultural and livestock production purposes, these land portions have mostly been purchased by Mr Ronnie Watson (one of Inyanda Energy's associates), who is gradually converting these portions to game farming land uses.

Mr Watson is investigating the potential of entering into a stewardship agreement, as an offset to the impacts of a wind farm, with Eastern Cape Parks and Tourism Agency (ECPTA) for all 12,200

hectares of these portions which would provide a level of formal protection of this land for conservation purposes. Discussions regarding a stewardship agreement have been held between the relevant parks and conservation bodies at national and provincial level and representatives of the landowner outside of this EIA process. Indications from ECPTA during the scoping phase of the EIA process were that they are not supportive of the project in general. Should ECPTA consider the proposal viable it would be viewed as a biodiversity offset in the final version of this EIA reporting process.

SRK's understanding is that the landowner's willingness to enter into a stewardship agreement with ECPTA for the portions of land in the study area is contingent on the development of a wind energy facility and as such a stewardship agreement with the ECPTA is a motivation for the development proposal.

2.2 Detailed description of the proposed project

The wind energy facility which will be spread over 22 property portions in the project area (See Table 1-1 and title deeds included under Appendix C). These land portions are planned to host up to 52 turbines dependent on turbine supplier, each with a nominal power output of up to 3.6 MW per turbine. The maximum total potential output of the wind farm would therefore be approximately 187.2 MW, which will serve to further support the regional and national power balance.

The size of the wind turbines will depend on further technical assessments but will typically consist of three blades each approximately 63 m in length therefore creating rotor diameters of up to 130 m, mounted atop a 85 m high steel (or hybrid steel/concrete) tower, i.e. the height of the wind turbine generator would be approximately 150 m from ground level to the tip of the rotor. Other infrastructure components associated with the proposed wind energy facility are inter alia:

- Concrete or rock adaptor foundations to support the wind turbine towers;
- Internal access roads to each turbine - approximately 6 meters wide (Figure 2-9);
- Underground cables connecting the wind turbines to the on-site substation. It has been confirmed that all internal power lines will be underground, and located within footprint of the internal roads, as depicted in a typical cross section (Figure 2-9);
- 132 kV electrical substation;
- Possible upgrading of existing roads for the transportation of the turbines to the wind energy facility;
- Buildings to house the control instrumentation, as well as a store room for the maintenance equipment; and
- Construction compound, on-site staff accommodation, and a concrete batching plant.

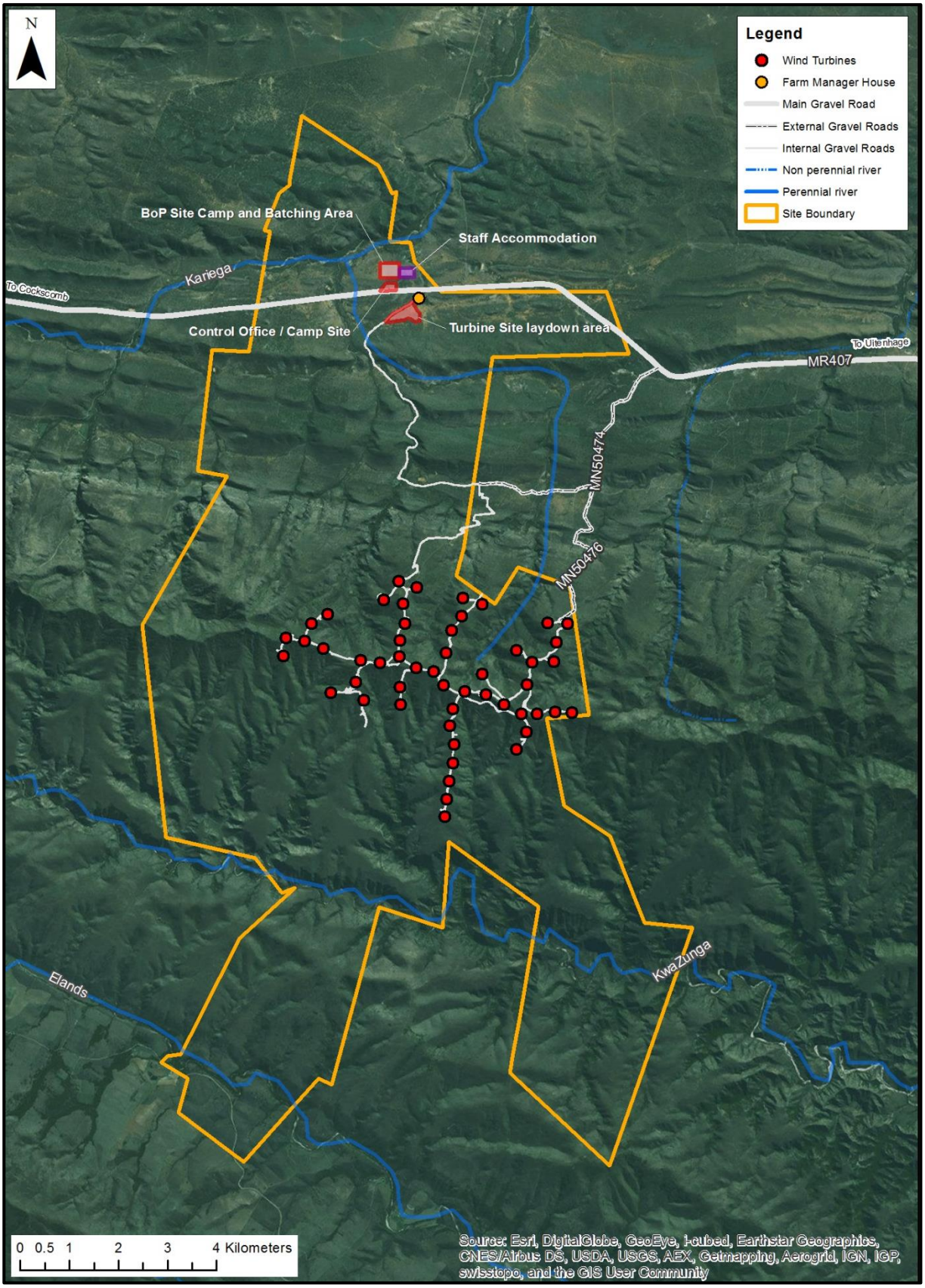


Figure 2-1: Site Layout Plan (Larger versions of the site development plan are provided in Appendix F)

The arrangement of the various elements of the project is described in Section 2.2.3.

Table 2-1: Technical details of the proposed facility

Component	Description/dimensions
Number of Turbines	46 to 52
Hub Height	85 m
Blade Length	63 m
Rotor Diameter	130 m
Area occupied by inverter/transformer stations/substations	Substation: 0.3ha
Capacity of on-site substation	132 kV
Area occupied by both permanent and construction laydown areas	Construction – 23.99ha Operation – approximately 8ha
Area occupied by buildings	Existing buildings: 4ha
Length of internal roads	24.45km to be constructed
Width of internal roads	6m
Proximity to grid connection	Preferred Route: 35.14km Alternative 1: 41.37 Alternative 2: 45.52
Height of fencing	N/A
Type of fencing	The WEF will not be fenced

2.2.1 Production of electricity from wind

A typical wind turbine consists of (refer to Figure 2-2):

- A rotor, with 3 blades, which interact with wind and convert the energy into rotational motion;
- A nacelle which houses the equipment at the top of the tower;
- A tower, to support the nacelle and rotor;
- Electronic equipment i.e. controls, transformers, electrical cables and switchgear, ground support equipment, and interconnection equipment; and
- Turbine step-up transformer which would be adjacent to the turbine.

The amount of energy which the wind transfers to the rotor depends on the density of the air (the heavier the air, the more energy received by the turbine), the rotor area (the bigger the rotor diameter, the more energy received by the turbine), and the wind speed (the faster the wind, the more energy received by the turbine). Provided in the sections that follow, is a detailed discussion on the various components of the proposed project.

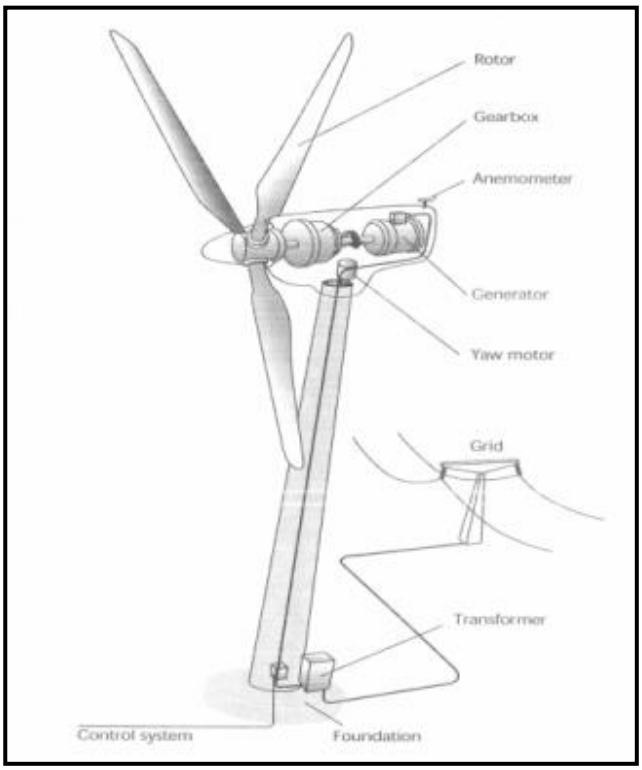


Figure 2-2: Illustration of the main components of a typical wind turbine (CES, 2014)

2.2.2 Stages of wind farm development

Typically, the development of a wind farm is divided into four phases namely:-

- Pre-feasibility
- Feasibility
- Wind Measurement
- Implementation

Each of the above-mentioned phases is described in detail in sections below.

Pre-feasibility

During the pre-feasibility phase, the proponent conducts surveys to ensure that obvious issues surrounding the project should not impact on the progress and the final acceptance of the project. This includes visits to local authorities, civil aviation authorities, identifying local communities, wind resource evaluation from existing data, grid connectivity, environmental impact assessment, logistical and project phasing requirements.

Feasibility

During the feasibility phase the proponent will firm up and carry out thorough investigations to establish the actual costs, and economic viability of the project by designing the financial model with financial institutions, verifying wind resources by onsite measurement, ensuring grid connection is economical and feasible in the timeframes of the project and identifying possible off-takers for the electricity. Once the feasibility studies are complete the proponent will identify which parts of the project will be constructed first. Then, in an organised fashion the project will be expanded according to the availability of grid capacity and turbines.

Wind Measurement

It is necessary to erect a wind measurement mast to gather wind speed data and correlate these measurements with other meteorological data in order to produce a final wind model of the proposed project site. A measurement campaign of at least 12 months in duration is necessary to ensure verifiable data is obtained. The project proponent already erected two masts (a 60 m and 80 m mast) in the project study area in June 2012 (Figure 2-3) and has commenced with the data capturing campaign. This data will advise on the economics of the project and finalise the positions of the wind turbines. The masts are marked as per the requirements of the Civil Aviation Authority.

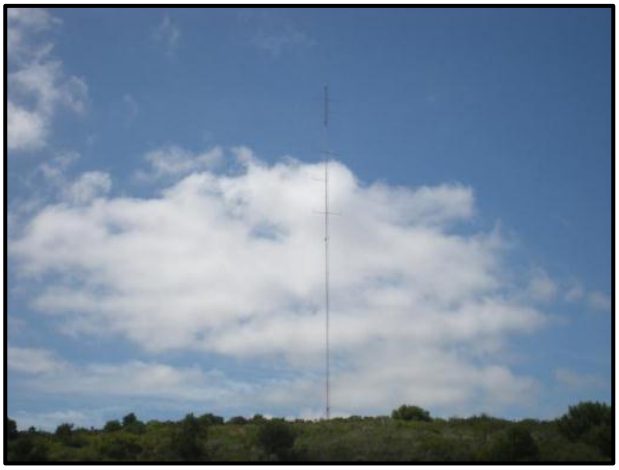


Figure 2-3: An example of a meteorological mast (CES, 2014)

Implementation

The construction of a wind farm is divided into three phases namely:-

- Civil works
- Erection/commissioning
- Operational

Each of the above-mentioned phases is described below.

Civil works

Geotechnical studies and foundation works

A geotechnical study of the area is always undertaken for safety purposes, usually after the environmental authorisation has been secured. This comprises drilling, penetration and pressure assessments. For the purpose of the foundations, approximately 500 m³ of spoil substrate would need to be excavated for each turbine of the dimensions described above. These excavations are then filled with steel-reinforced concrete (Figure 2-4). The foundations can vary according to the quality of the soil. The main dimensions for the foundation of a typical 3 MW, 100 m high, wind turbine are shown in Figure 2-5 with underground foundation, tower base, above ground foundation, and ground level.

Figure 2-4: Concrete pouring of a turbine foundation – note the tower base collar in the foreground (CES, 2014)

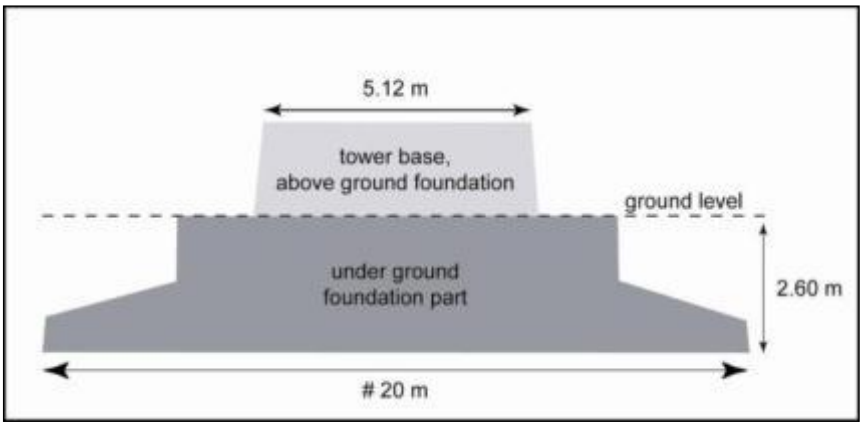


Figure 2-5: The main dimensions for the foundation of a 3MW/100m high wind turbine (CES, 2014)

Electrical cabling and substation

Electrical and communication cables will be entrenched (approximately 1 m deep) and be routed adjacent to the access roads to the on-site 132 kV substation. The substation location and description is provided in Section 2.2.3.

Erection/commissioning

Turbine erection

The process for erection is around 3 days per turbine if the weather conditions permit and utilises heavy lift cranes in the assembly process (Figure 2-6). Two methods are commonly used to attach the hub and blades to the nacelle. The blades can be mounted to the hub on the ground and then lifted to the nacelle attachment as one assemblage i.e. as the rotor. Due the space limitations on this site, the proposed method for this project is for the hub to be lifted first and mounted on the nacelle, after which the rotor blades are lifted individually and mounted on the hub.

Figure 2-6: Assembly and erection of the tower sections using cranes (CES, 2014)

Electrical connection

Each turbine is often fitted with its own transformer that steps up the voltage usually to 22 kV or 33 kV. The entire wind farm is then connected to the "point of interconnection" which is the electrical boundary between the wind farm and the municipal or national grid. Most of these works will typically be carried out by and in agreement with the transmission or distribution company (line upgrade, connection to the sub-station, burial of the cables etc.) Eskom, the local Municipality, or an independent system operator as the case may be, although installation of the substation and burying 22 kV or 33 kV cables will typically be undertaken by the project owner. The electricity will be fed into the national ESKOM grid.

The interconnection of the wind farm to the Eskom Distribution electrical grid will require the construction of a 132 kV substation on the project site to step up the 22 kV or 33 kV turbine supply. Various route alignment alternatives for the power lines are under consideration and are further discussed under Section 2.3.2.

Operational phase

During the period when the turbines are operational, on-site human activity drops to a minimum, and includes routine maintenance requiring only light vehicles to access the site. Only major breakdowns would necessitate the use of cranes and trucks.

Timing estimation

Based on existing publications, the development, construction and implementation of a wind farm of these approximate dimensions would require about 18-24 months, depending on the delivery times of the main equipment. Described below is a typical schedule:

- Platforms/Roads/cables laydown = 35 weeks;
- Turbines foundations = 10 weeks for each foundation (including 8 weeks to let the foundation concrete dry – these activities are conducted simultaneously for multiple turbine foundations);
- Civil works for the substation = 16 weeks;
- Wind turbines/electrical substation erection = 2 turbines/week (in good low wind weather conditions);
- Substation erection = 8 weeks; and
- Commissioning and electrical connection = 20 weeks.

Refurbishment and rehabilitation of the site after operation

Current wind turbines are designed to last for over 25 years and this is the figure that has been used to plan the life span of a modern wind farm. Should the re-powering of the wind farm be financially, environmental and socially viable, the life span can be extended by another 20-25 years. Should the wind farm be decommissioned, Inyanda Energy undertakes to dismantle all wind turbines and foundations in line with all relevant legislation.

2.2.3 Preliminary site development plan

Figure 2-1 is the preliminary layout that has been developed and assessed in this EIA process. Various (but not all) elements of the site development plan are highlighted below.

On-site staff accommodation

Temporary accommodation for approximately 200 construction personnel will be required at the peak of construction. Provision is made in the site development plan, as depicted in Figure 2-1, for staff accommodation in the vicinity of the existing staff quarters and workshops. . These facilities will all be contained in the footprint shown. The total amount of water required for staff accommodation (inclusive of on and off-site travelling or living) has been calculated to be 14 579 KL. It is anticipated that water will be provided from new boreholes (approximately 26.9 kL/day at the peak of construction) to be drilled on site. Ablutions will be connected to a conservancy tank into which all sewage generated will be directed. The tank will need to be periodically emptied and will be handled by an appropriate sub-contractor. All solid waste associated with on-site accommodation (during construction) will need to be removed from site for recycling or disposal at a registered landfill. This will be organised by the contractor during construction. During operation minimal amounts of waste will be generated and this will be removed by an appointed contractor.

Cement batching plant

A cement batching plant is proposed as part of the construction camp area. The total volume of cement that is required for the project is expected to be at least 25,300 m³ and would require on-site bulk storage of aggregate, cement and sand, all of which would be imported to the site from commercial sources, i.e. no mining or crushing of materials is proposed. It is anticipated that the water demand for concrete production would be approximately 5,060 kL (14.4 kL /day) over a 16 month period and would be supplied by new borehole(s) in vicinity of the batching plant.

Details of the batching plant are not known at this stage, but will all be contained within the footprint area allocated for the construction camp site (approximately 4 ha). It is anticipated that at the peak of construction, the batching plant will operate 24 hours a day.

Storage of hazardous chemicals

Apart from the storage of cement powder associated with the batching plant, it is anticipated that temporary storage facilities for various hydrocarbons would be required during construction including Liquid Petroleum gas, petrol, diesel, and transformer oils.

It is estimated that several bulk containers for fuel storage will be needed during the construction stage, with a combined storage capacity which will exceed the 30 kL (30m³) threshold of Activity 10, Listing Notice 3 (see Section Table 1-2) but not exceeding 80m³. This may include ready to use horizontal mounted containers, as well as surplus containers stored for prompt refill purposes.

The refuel of construction plant will happen directly at the fuel storage areas from the horizontal mounted bulk fuel containers, e.g. for concrete delivery trucks or gravel tipper trucks before entering the construction site. It will however not be practical for all construction plant, especially the slow moving plant such as bull dozers, excavators, graders and mobile cranes etc. to move to the fuel storage areas for every refuel action required. Therefore, such plant will have to be refueled at the working sites (typically at every turbine site), with the use of a diesel bowser pulled on a trailer, carting fuel to the area of work. Steel drip trays will be compulsory when refueling at the working areas has to be done.

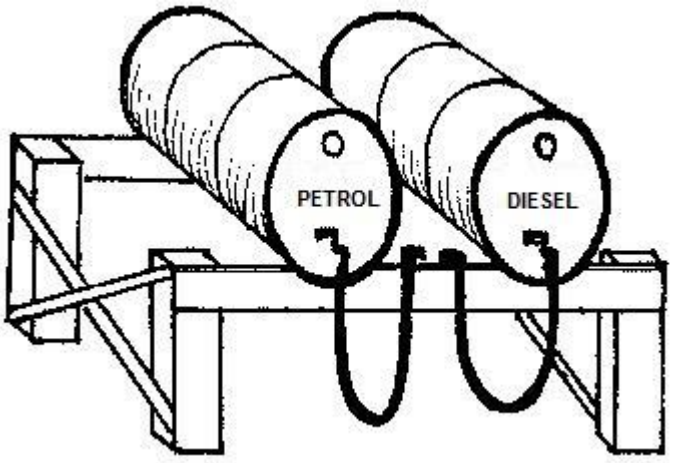


Figure 2-7: Typical installation of elevated horizontal fuel tank storage (Source: Africoast)

The location of the primary bulk fuel storage facility would most likely be established near the Construction Site and Plant Storage area, where plant can be re-fuelled as necessary, or from where fuel bowsers can be filled and despatched to fill plant on site. Storage areas will be on impervious concrete floors with secondary containment. Drainage from such areas (e.g. to accommodate rain water) will be to a water-tight sump and/or oil trap from where it can be removed off-site for disposal.

All construction camps, lay down areas, batching plants or areas with any fuel stores should be more than 50 m from any demarcated water courses. No permanent hydrocarbon storage facilities are proposed and temporary facilities will be completely be removed on completion of construction.

Transformer oil will be brought to site for the filling of transformers after they have been installed and prior to operation. This is a once off operation, with a typical 56/80 MVA 33 kV/132 kV transformer requiring approximately 26,000 litres of oil. Transformers themselves will be installed on concrete floors, surrounded with a low impervious wall. Oil will be brought to site by tanker at the time that it is needed and as such there will be no need to store this oil on the site. Transformer oil which will be required for maintenance purposes will not be stored on site but will be transported to site as necessary. Transformers under normal operating conditions would only be re-filled after a 10 year period.

Upgrading of existing gravel roads

Sourcing material

Additional material (apart of the storm water box culvert structures) will be required during the upgrading work to the gravel roads, to install the new storm water culverts and to raise the final road levels.

Dump rock material (typically 300mm rock size) will have to be imported from commercial suppliers. It is estimated that approximately 20m³ to 40m³ of material will be required at each steam crossing. Detail site surveys and final designs must still be done to calculate the exact volumes of material required at each stream crossing.

Gravel material for side fill and pavement layers (typical G5 and G3 quality material) will have to be sourced, to make up for the expected shortfall of material at the upgrading work at each stream crossing. It is estimated that between 60m³ up to 150m³ of gravel material will be required at each steam crossing. Detail site surveys and final designs must still be done to calculate the exact volumes of material required at each stream crossing. It will be the most economical and preferred option to source this shortfall of gravel material from the existing nearby small Borrow Pit, located on the neighbouring Farm Wildepaardehoek RE/245, at co-ordinates: 33°33'51.17"S and 25° 6'18.82"E. Additional excavation and crushing will be required at this borrow pit. The current footprint of the borrow pit is approximately 3100m² and will have to be enlarged for additional excavation activities.

It is estimated that sufficient gravel material, as will be required for the importation to upgrade the stream crossings, will be available at this Borrow Pit. There are currently no other existing Borrow Pit near these three access roads, and it is not foreseen to that a new borrow pit will need to be opened up for the relative small volumes of material required for this purpose

Storage of material

The affected footprint areas at each water course upgrading work area, will primarily be limited to the existing gravel road profile – typically 10m in length (5m both sides of the water course). However, the existing gravel roads are narrow and will have to be widened to 6m wide. Therefore, topsoil material will be stripped on the sides of the roads (from the affected footprint areas) at each water course, typically to a depth of 200mm, where the affected footprints will be wider than the existing road profile. This topsoil material will be stockpiled and re-used for site rehabilitation with the same natural material, on completion of the upgrading work.

It is anticipated to stockpile the removed topsoil material nearby each water course crossing working area, at an open or flat grassed area, but at a minimum, further than 32m away from the water course, to prevent direct wash-aways and sedimentation spillage into the water course, in case there might be heavy rain fall during the upgrading work period.

It is estimated that the volumes of topsoil to be removed will be between 4m³ to 10m³ of natural material at each water course crossing. Thus, based on a maximum stockpile height of 2m (in order to wet and maintain the topsoil material during the stockpile periods), the affected storage footprints will range from 2m² to 5m² areas. All stockpiles must be protected from erosion, stored on flat areas where storm water run-off will be minimised, and be surrounded by bunds, to prevent downstream sedimentation.

It is not foreseen that any other materials will have to be stored on site, during the storm water culvert upgrade work.

Disposing of material

The existing storm water pipes or box culvert structures will have to be removed and replaced. These concrete sections (if they cannot be re-used elsewhere on site in the larger scope of the Wind Farm Development), will be removed off-site to a Municipal Solid Waste dump site, e.g. near

Kirkwood or Uitenhage. All broken concrete pieces from the existing headwalls or old infill concrete material etc. will also be removed off-site to the same Municipal dump sites.

It is not anticipated the any other material which will be excavated at the water courses, to upgrade the existing storm water structures, will have to be disposed of off-site. All material to be excavated will be natural sand, gravel or rock material and depending on the quality of material, it will be re-used for side fill material or pavement layer works, in order to minimize the shortfall material which might be needed from the borrow pit.

Lay down area for turbine components

A temporary combined laydown area of approximately 15 ha is provided for in the site development plan. Due to space constraints on the platforms, it is proposed that turbine components are temporarily stored at the laydown area on arrival from Ngqura Harbour, and then transported individually to the platform on demand. It is anticipated that the laydown area will require earthworks to level the site, and gravel layerworks to achieve a suitable hardstanding. In general it is expected that the site will be constructed of compacted earth.

Turbine Platforms

A permanent platform is required at each turbine foundation site to ensure safe and stable access by heavy machinery and equipment (bulldozers, trucks, cranes etc.) during the construction phase. The standard layout proposed for this project is shown in Figure 2-8.

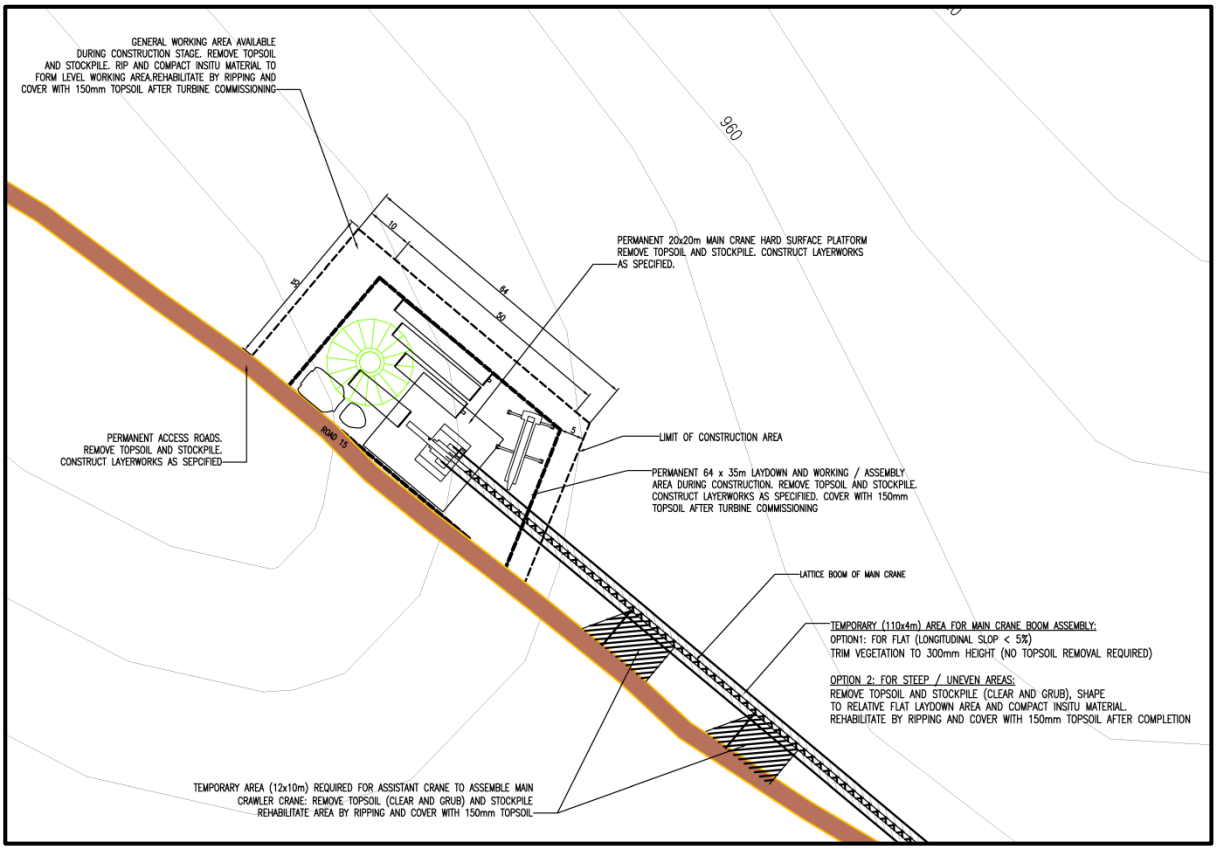


Figure 2-8: Sketch of wind turbine generator platform layout (see Appendix F for larger drawing) (Source: Africoast)

Due to the topography of the site, the platform area for each turbine, excluding the working space and access road that will run adjacent to the platform, will be limited to 60 m x 30 m. The overall

footprint of each platform would be greater than the level 60 m x 30 m area, due to the cut and fill profiles. It is proposed to crush the excavated material on each platform for use as layer works backfill on that platform. A mobile crushing plant must therefore be accommodated on the platform, together with mechanical plant for excavation, backfilling and compaction.

During the construction phase this footprint is likely to be extended to accommodate topsoil stockpiles, and crushed material prior to backfilling. Temporary platforms for laydown areas may also be required (as depicted in Figure 2-8). The use of the cut material on the platform site may reduce the footprint associated with excess fill (i.e. reduce the amount of spoil material).

To limit the overall footprint, the electrical earth mat required for each WTG would be installed under the hardstand platform.

The project engineers have confirmed that the 60 m x 30 m platform area is sufficient to accommodate the activities required for the erection of each wind turbine generator, recognising that the limited working area may pose logistical and time challenges during construction.

Internal Roads

Turbine platforms will be connected by internal access roads that must meet the following requirements:

- Generally 6 m in width. Road side stormwater drainage will be limited to 1 m wide trapezoidal channels, approximately 300 mm deep, as per the typical road cross section drawing;
- After excavation (cut & fill) of bulk material, road pavement layerworks will be limited to 350 mm thickness;
- Generally slopes must be limited to 12.5% gradient. However in this instance several sections will have longitudinal gradients in excess of 25% (e.g. 1:4). In these instances circumstances, concrete strips will be constructed to limit rutting and erosion of road surface, especially at gradients where excessive natural loose gravel exist.
- Minimum horizontal turning radii for tyres and payloads (estimated to be 40 m and 50 m respectively).

A typical cross section specific to this project is included in Figure 2-9 and Appendix F. the water demand for the earthworks associated with the road construction or upgrades is estimated at 22,000 kL (1,900kL/day), and will be supplied via 15 kL water trucks (refer to Appendix I2 for details).

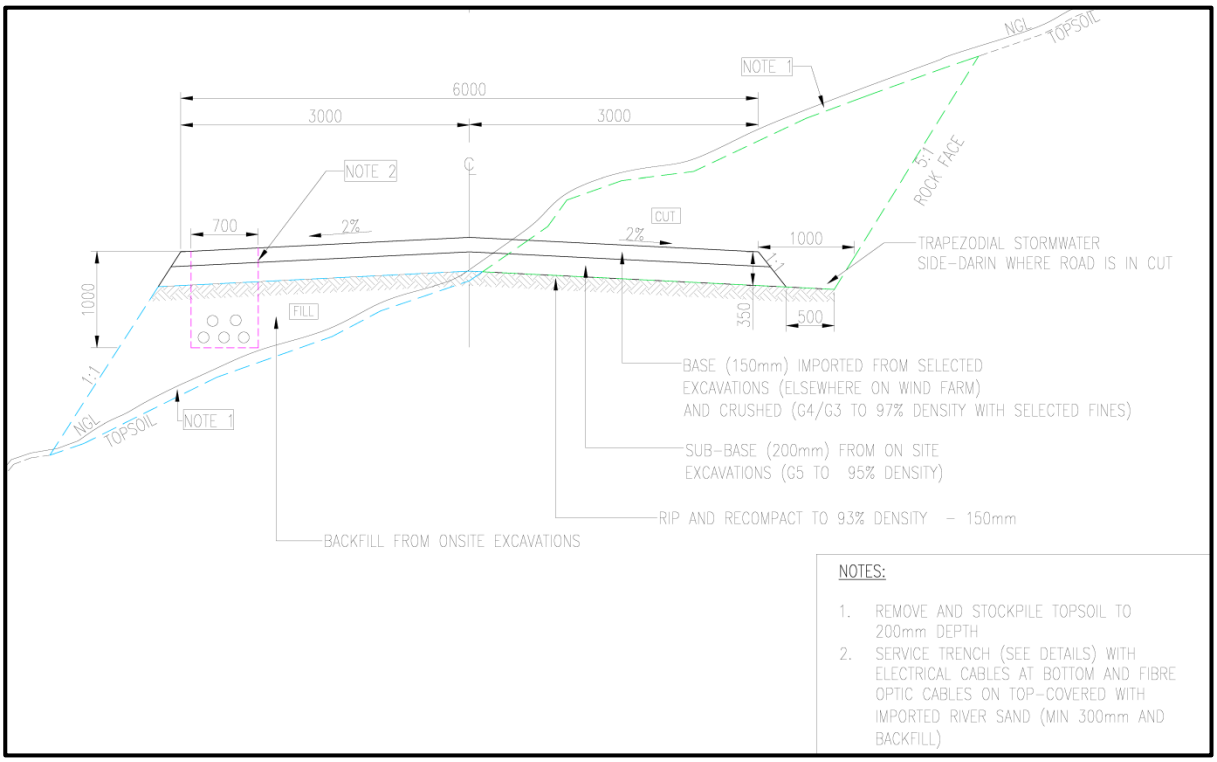


Figure 2-9: Typical road cross section for internal roads (see larger drawing n Appendix F) (Source: Africoast)

Substation

The location for the substation is depicted in Figure 2-10. The sub-station is located near the centre of the WEF for technical (electrical) reasons. A more focussed view of the substation is depicted in Figure 2-10.

The 132 kV substation will comprise a fenced area of about 80 m x 40 m. The platform will be split into various levels (terraces) for the transformers, substation building, etc. to limit the cut and fill outside of this platform to less than 10 m horizontal distance. As with the wind WTG platforms, the electrical earth mat will be installed within this footprint.

Electricity supply

The estimated electricity requirements for construction are 2,000kWh per month for the electrical components and up to 50 000kWh per month for the cement batching plant. This will be supplied via an existing 11kV line, which will connect to the site camp area.

Water supply for construction

The estimated total water demand for construction is approximately 65,000 kL (200 kL/day). It is anticipated that this will be abstracted from boreholes and temporarily stored in a number of plastic water storage tanks (total storage capacity of approximately 300 m³) in the construction camp area. The water will be supplied via 15 kL water trucks to the various construction areas (refer to Appendix I2 for details).

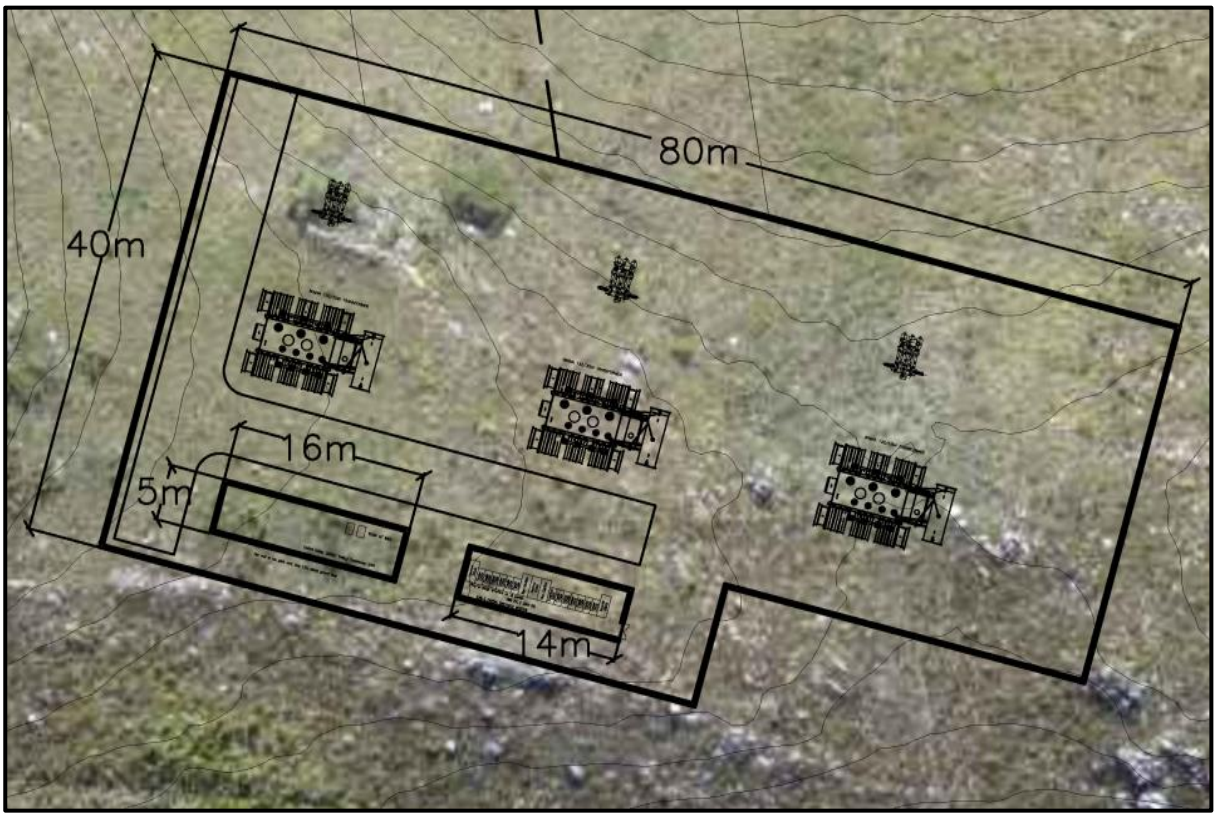


Figure 2-10: Electrical substation preliminary design (see Appendix F for larger drawing) (Source: Africoast)

Access to the site

The site is accessible along a number of provincial minor gravel roads that lead off the R75 and existing roads in the project area. Various access routes are shown in Figure 2-11. The two entrance points off MR407 will require existing farm fences to be moved and re-erected and the turning radii will be enlarged to 45m.

Provincial minor roads MN50475, MN50476 and MN50474 are all narrow gravel roads with several sharp horizontal curves and gradients. The roads cross approximately 20 non-perennial water courses via low level concrete drifts or small culvert structures. The roads are insufficient for the transport of the large wind turbine components and will therefore have to be upgraded to suitable 6m wide roads, together with some horizontal and vertical re-alignments, to suit the minimum turbine transport requirements. The upgrading work will include widening roads to 6 m, flattening vertical gradients and upgrading stream crossings to accommodate a 1:10 year flood.

The entrance to the office buildings will be upgraded with access control. The existing gravel path to the control buildings is to be upgraded based on the same alignment and will require limited road widening.

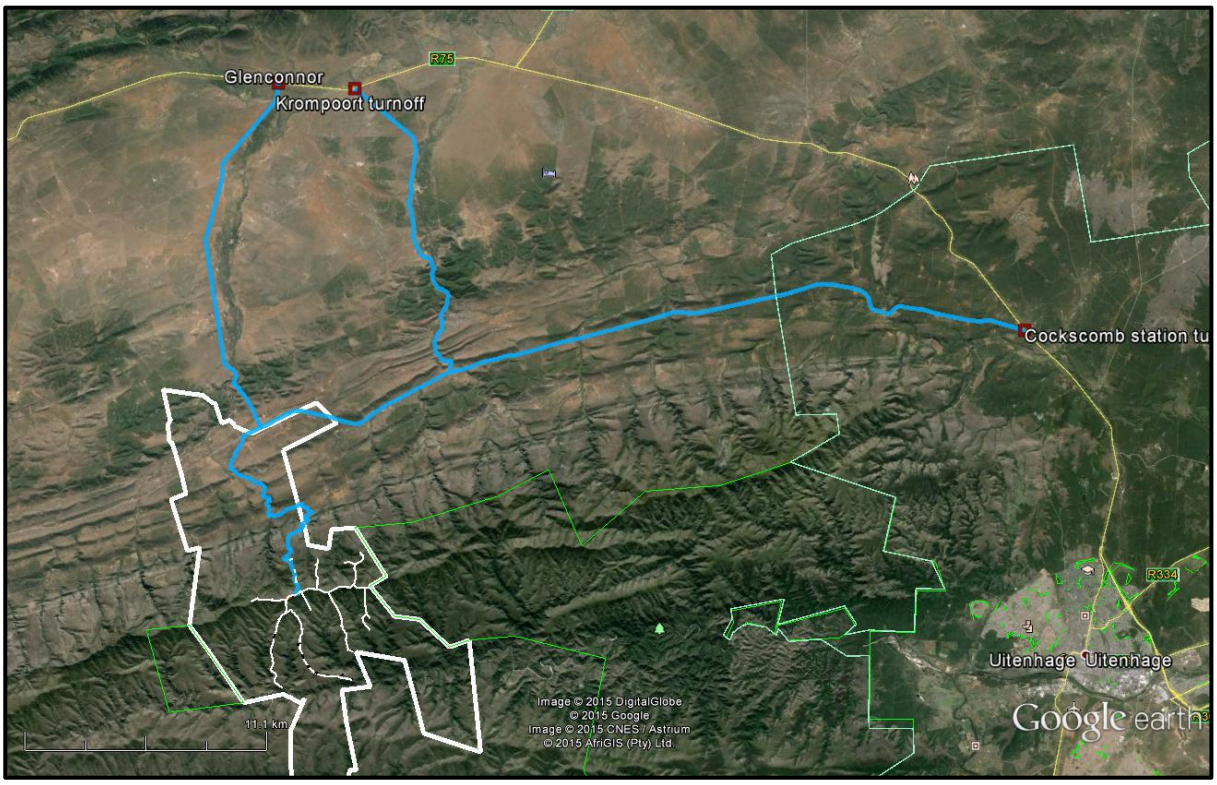


Figure 2-11: Site access routes

2.3 Project Alternatives

One of the objectives of an EIA is to investigate alternatives to the proposed project. There are two types of alternatives - Fundamental Alternatives and Incremental Alternatives.

Alternatives should include consideration of all possible means by which the purpose and need of the proposed activity could be accomplished in the specific instance taking account of the interest of the applicant in the activity. The no-go alternative must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed.

The determination of whether site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

"alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- the type of activity to be undertaken;
- the property on which or location where it is proposed to undertake the activity;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.

All alternatives mentioned in this Final Scoping Report are aimed at all reasonable and feasible alternatives that have been identified up until this point.

The technology and design alternatives are considered and implemented throughout the EIA phase as important information comes to light.

2.3.1 Fundamental alternatives

Fundamental alternatives are developments that are totally different from the proposed project and usually involve a different type of development on the proposed site, or a different location for the proposed development.

A different type of development

The current zoning for the property portions is agriculture. The current development proposed is the production of renewable energy. Non-renewable production of energy is unfavourable in terms of the Kyoto Protocol and therefore not an option. Alternative types of developments were explored by CES in their scoping report, as presented in the table and discussion below (Table 2-2)

Table 2-2: Alternative types of development

Alternative level	Alternatives	Advantages	Disadvantages	Reason-able and feasible	Further assess-ment
Type of technology This refers to the fundamental technology options, such as energy generation from wind vs. coal fired power plant, and the environmental risks and impacts associated with such options.	Alternative energy technology 1 – Wind turbines (Preferred alternative)	• Clean and renewable energy • Mitigate climate change • Does not requires large areas of land	• Visually intrusive	YES	YES
	Alternative energy technology 2 – Solar PV	• Clean and renewable energy • Mitigate climate change	• Visually intrusive • Requires large area of land	YES	NO
	Alternative energy technology 3 – Concentrated Solar Power (CSP)	• Clean and renewable energy • Mitigate climate change	• Visually intrusive • Requires large area of land • Water probably a limiting factor • Reflectivity of mirrors probably a significant issue	NO	NO
	Alternative energy technology 4 – Coal fired power plant	• None identified	• Air pollution from coal dust and smoke stack emissions (SO_2) • Contribution to climate change • Ground contamination from coal dust	NO	NO

Alternative level	Alternatives	Advantages	Disadvantages	Reason-able and feasible	Further assess-ment
	Alternative energy technology 5 – biomass	• Clean and renewable energy • Mitigate climate change	• Expensive source of energy	NO	NO
	Alternative energy technology – nuclear power	• Greater electricity generation with little raw material required	• Raw material highly radioactive	NO	NO

The above discussion of fundamental technology alternatives for electricity generation is generic in nature and is not relevant *per se* to the proposed development, e.g. the motivation for site selection is based on the good wind resource. There are, in addition, many economic and/or technical reasons why some of the fundamental technology alternatives listed above are not feasible, including:

- Distance from coal reserves makes coal generation uneconomical;
- General topography of the area make sites unsuitable for most large infrastructure projects;
- Nuclear power in this location is unlikely to be feasible due to the absence of cooling water.

Nevertheless, Table 2-2 confirms that, with the exception of solar PV (which typically requires a flat site), alternative technologies for electricity generation on this site are not feasible. As such, the scope of this EIA process does not include an assessment of fundamental technology alternatives.

A different location

High wind levels occur in specific areas across South Africa. A limited number of those areas are available for development. The main determinants in selecting the proposed location were:-

- Wind speed;
- Proximity to a grid connection point, and;
- Available land.

Preliminary investigations have identified that the proposed project site meets these criteria and so different locations for the current project will not be considered. The wind resource and connectivity to the grid are the critical factors to the overall feasibility of the project.

Based on the above, the scope of this EIA process does not include an assessment of site alternatives.

Land use alternatives

The development of a wind farm is not a mutually exclusive land use. A number of activities can be carried out in close proximity to the turbines without adverse effect. There are, however, activities that must be excluded from the immediate vicinity and possibly even the surrounding areas. Table 2-3 is a simple matrix (as determined by CES) indicating some of the land use activities that may, or cannot, be complementary to wind farm development.

Table 2-3: Matrix indicating land uses contemplated to occur in conjunction with development of a wind farm

Land use	Same land		Surrounding land	
	Yes	No	Yes	No
Farming				
Livestock	*		*	
Crops	*		*	
Game	*		*	
Eco-tourism (perception-dependent)	*	*	*	
Settlement		*	*	
Light Industry (Industry-dependent)	*	*	*	
Aerodromes		*		*
Conservation	*		*	

No-Go alternative

The no development option assumes the site remains in its current state, i.e. agricultural land. The no-go alternative will be used as a baseline throughout the assessment process against which potential impacts will be compared in an objective manner and will be fully assessed in the EIR.

The no-go alternative in this instance is that the farms within the study area would be fenced to enable stocking with endemic game species that would easily broach the current perimeter without fencing – such species include Burchell's zebra and cape eland. This may improve the commercial prospects of the farms, specifically in terms of game farming, hunting and/or game viewing, although there is currently no proposal to pursue such commercial activities. Therefore, the no-go alternative would see the current land use continuing, albeit it in a slightly modified way with the introduction of fencing (which is not precluded in the event that the wind farm is developed), and probably in the absence of a stewardship agreement with the ECPTA.

2.3.2 Incremental alternatives

Incremental alternatives are modifications or variations to the design of a project that provide different options to reduce or minimise environmental impacts. There are several incremental alternatives that can be considered, including:

- The design or layout of the activity;
- The technology to be used in the activity; and
- The operational aspects of the activity.

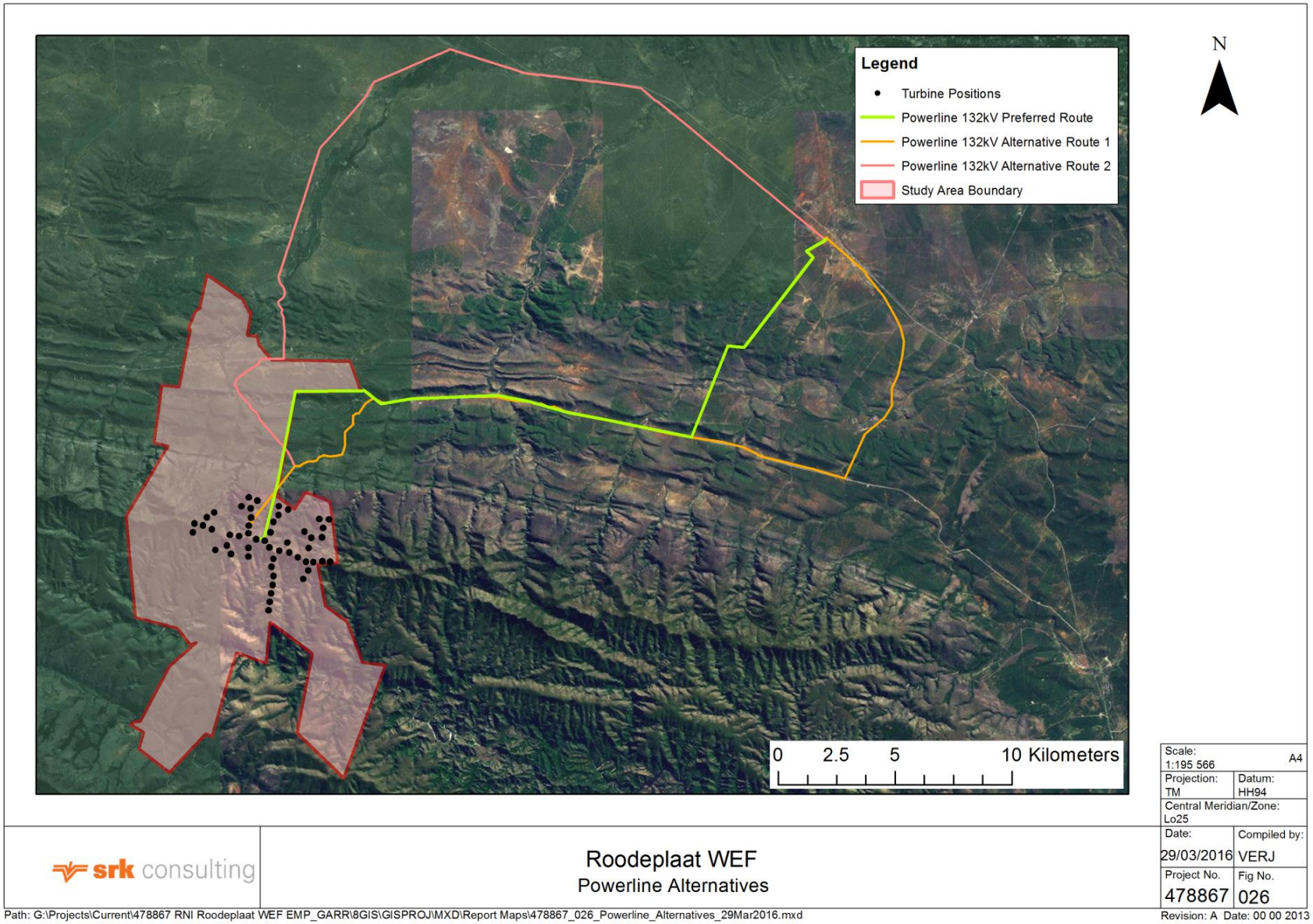


Figure 2-12: Alternative 132 kV power line route alignments to the Skilpad substation (turbine layout indicative only)

Layout Alternatives

The current layout of the proposed wind farm is illustrated in Figure 2-1, and includes 52 wind turbines. Numerous changes in the layout as a result of environmental information generated during the course of the scoping study have been incorporated in the site development plan, as summarised in Figure 2-1. Further changes, fundamentally entailing increasing the power generation capacity of the wind turbines used, and thereby decreasing the number of turbines required, may also be considered. An amended layout showing a reduced number of turbines is now available, and some of the specialists have commented on this layout. However, due to time constraints this DEIR has not detailed this layout alternative. The current assessment is therefore based on the 52 turbine layout, with certain specialists having made reference to a reduced turbine layout in their reports. Initial indications are that this layout could potentially reduce the significance of certain negative impacts, and this assessment should be seen as a worse-case scenario to what is likely to be the final layout plan.

Powerline Route Alignment Alternatives:

Route alignment alternatives have been assessed for the construction of a new 132 kV overhead power line and substation from the proposed site to the existing Skilpad substation to the north east of the site. From the proposed substation three alternative routes have been proposed for the power line (see Figure 2-12). Both the 132 kV power line and substation will be constructed by the Developer and handed over to Eskom for operation.

The preferred route alignment from an engineering and cost perspective is indicated in green in Figure 2-12. The line runs from the wind towers northwards until it reaches the municipal road MR407 after which it runs parallel to the road for approximately 14 km. The powerline then runs north eastwards across farmland to the Skilpad substation. This route will be less costly as it runs a shorter distance of around 35 km as opposed to over 40 km for route options 1 & 2.

Route option 1 starts at turbine 23 and follows the same route as option 2 until it crosses an existing gravel road, at which point the line heads in an easterly direction and joins the MR407, following the road for approximately 20 km. The powerline then runs north/north-west traversing farmland until it meets the Skilpad substation. The total length of this route option is 42 km.

Route option 2 begins at turbine 23 and runs north east until it crosses an existing gravel road on site. Thereafter the powerline runs north-west across farmland and joins the MN 50474. The powerline then runs along this road, crossing the MR407 and continuing north-west/west following the road until it joins the Skilpad station. The route is the longest of the three alternatives and measures approximately 46 km in total.

Comment regarding route preference from an environmental perspective (including input from relevant specialists) is included in Section 6.1.1.

3 Description of the Affected Environment

This chapter provides a description of the natural and socio-economic environments that could potentially be impacted by the proposed Inyanda - Roodeplaat WEF.

Descriptions of the flora are based on a survey of the relevant literature to determine what could be expected to be found on or near the site. A socio-economic profile of the Sundays River Valley - the area that will be most directly affected by the construction and operation of the proposed wind energy project is presented in Section 3.8 of this chapter. The profile includes basic demographic data on the municipal area.

3.1 Geology and Landform

The Eastern Cape Province contains a wide variety of landscapes, from the stark Karoo (the semi-desert region of the central interior) to mountain ranges and gentle hills rolling down to the sea. The climate and topography gives rise to the great diversity of vegetation types and habitats found in the region.

The mountainous area on the northern border forms part of the Great Escarpment. Another part of the escarpment lies just north of Bisho, Somerset East and Graaff-Reinet. In the south of the province, the Cape Fold Mountains start between East London and Port Elizabeth and continue westward into the Western Cape. As is the situation in KwaZulu-Natal, the Eastern Cape is characterised by a large number of short, deeply incised rivers flowing parallel to each other.

Figure 3-1: Photographs illustrating the general topography of the area (CES, 2014)

3.1.1 Topography

The site is an area of steep hills arranged on an east-west axis, with slopes facing north and south. The elevation ranges between 280 and 1400 meters above sea level with steep hills and high summits. The site is transected by three rivers which flow in an easterly direction across the site. Furthest south is the Elands River. In approximately the centre of the site is the Kwazungu River. Furthest north is the Kariega River. The rivers are fed by numerous streams draining off the surrounding slopes. Refer to Figure 3-2 for a slope analysis of the site (indicating slope suitability categories as listed by DEA in their acceptance letter of the FSR).

3.1.2 Geology

The dominant geological feature in these biomes is the east-west trending Cape Fold Belt. These mountain ranges consist mostly of the folded strata of the Cape Supergroup. The study area is found to be underlain by the Table Mountain and Bokkeveld Groups, these being groups within the Cape Supergroup sequence of rocks (Kunz et al., 2007).The coarse textured rocks of the Table Mountain Group, typically found in sharply folded mountain systems, combined with steep slopes and a high percentage of quartz sand gives rise to coarse, unstructured soils that are shallow and nutrient poor.

The wind turbine footprint area is situated over strata of the Ordovician to earliest Devonian Table Mountain Group (Cape Supergroup), whereas the proposed electrical pylon routes traverse strata representative of the entire early to mid-Devonian Bokkeveld Group (Cape Supergroup), as well as the unconformably implaced volcanics and terrestrially deposited units of the Cretaceous Algoa Group (Gess 2015).

3.2 Climate

The Eastern Cape Province of South Africa has a complex climate due to its location at the confluence of several climatic regimes, namely temperate and subtropical. As a result there are wide variations in temperature, rainfall and wind patterns, mainly as a result of movements of air masses, altitude, mountain orientation and the proximity of the Indian Ocean.

The climatic data described here has been obtained from Buckle (1989) describing the nearby Baviaanskloof Nature Reserve, and as such is relevant to the project site. Rainfall is distributed equally over the year with the highest rainfall generally occurring in March and November. The average annual rainfall is 451 mm with the southern slopes being wetter (average annual rainfall: 461 mm) than the northern slopes (435 mm) (Buckle, 1989). Thunderstorms are frequent. Temperatures as high as 44°C are not uncommon, occurring as a result of warm winds from the high plateau.

In low lying areas, the average maximum temperature recorded is 32°C in January and 18°C in July. The average minimum temperature is 15°C in January and 5°C in July. Frost is experienced in winter. In summer the prevailing wind direction is south to south-east. In winter the prevailing wind direction is northwest (Buckle, 1989).

A summary of on-site wind measurements is shown in Figure 3-3. As is typically the case with elevated locations, the site represents a good wind resource. The data show wind direction is predominantly from the south west during most seasons, with the prevailing wind direction in the winter months from the north east.

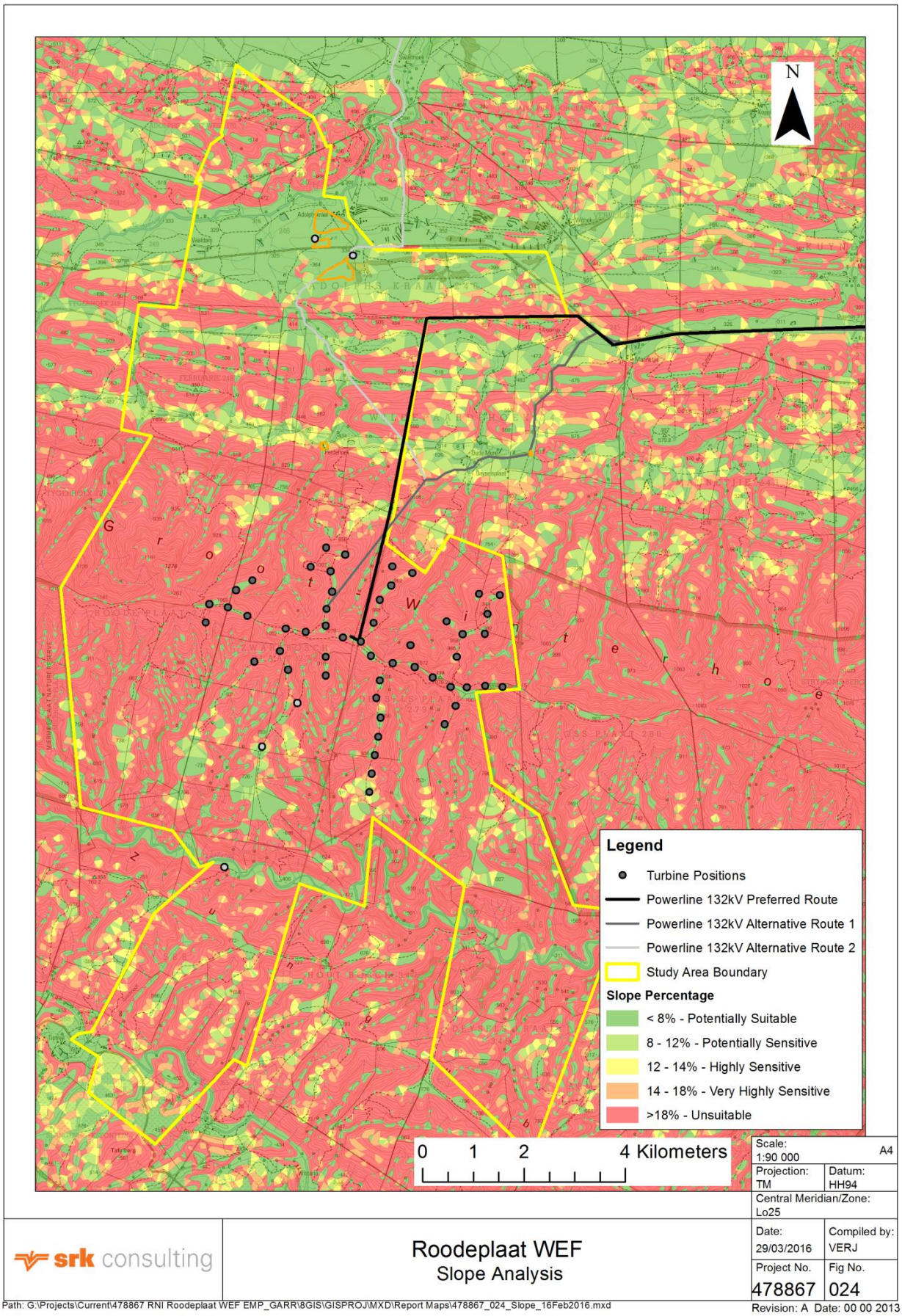


Figure 3-2: Slope analysis of Roodeplaat site

3.3 Hydrology

The proposed project is located within the headwaters as well as catchment divide between the KwaZungu and Kariega / Holbrak rivers, adjacent to the Groendal Wilderness area.

The hydrology of the area was characterised mostly by ephemeral flows within the several small tributaries / drainage lines observed associated with the mainstem rivers listed above. The instream areas are moderately steep to steep within the survey area and incised with no floodplain areas. Wide riparian zones are thus not prevalent in these types of systems.

Overall with the exception of existing impacts such as erosion and present road crossings, these systems are largely in a natural state. This is further supported by the National Freshwater Ecosystems Priority Atlas (NFEPA - Nel et al., 2011) and Eastern Cape Biodiversity Conservation Plan (ECBCP) as well as the Addo Elephant National Park Municipality Biodiversity Conservation Plan. All of these projects have identified the study area subquaternary catchments (SQ 8629, 8753 and 8801) as important freshwater conservation areas due to the possible presence of rare endemic fish.

The NFEPA project earmarked sub-quaternaries or, based either on the presence of important biota (e.g. rare or endemic fish species) or conversely the degree of riverine degradation, i.e. the greater the catchment degradation the lower the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas or FEPAs. The survey area falls within two of these FEPAs, as the lower catchments contain rare or endemic fish namely the Eastern Cape Redfin (*Pseudobarbus afer*), while the remainder of the study area is located within an Upstream FEPA. The presence of the Eastern Cape Redfin, observed in small rock pools, confirms the importance of the study area catchments in protecting this and other aquatic species during long dry periods. The ECBCP also indicates that the study area falls within an Aquatic CBA 1 (important headwater area).

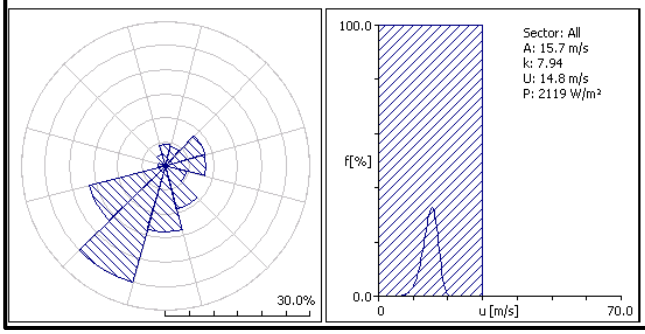
The overall condition or Present Ecological State (PES) of the site was assessed using an updated DWS method (2014), and was found to be in a near natural state, i.e. PES= B for the project area. The Environmental Importance and Sensitivity or EIS is a measure of the conservation value. Based on the impacts and current state of the tributaries associated with the proposed project areas the EIS would still be classified as high due to the confirmed presence of the endangered Redfin (*Pseudobarbus afer*).

No alluvial systems (i.e. rivers that function by means of sediment transport) or wetlands were observed in the study area, nor are any indicated on the National Wetland Inventory database.

3.4 Current Land use

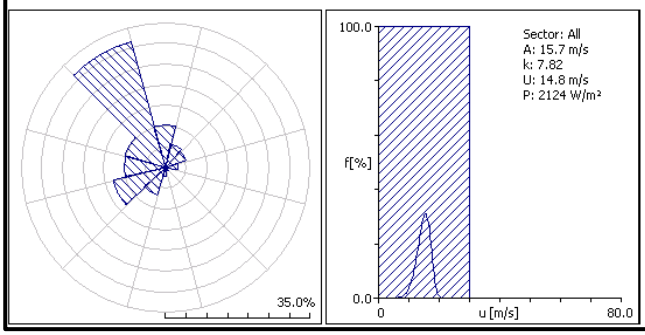
The majority of study area is currently used as a private lodge and game farm by the landowner. The owner has removed livestock from his property. Consequently, the vegetation is in fairly good condition and as a result antelope species have begun to recolonize the area.

-	Unit	Measured	Weibull-fit	Discrepancy
Mean wind speed	m/s	7.89	14.81	87.80%
Mean power density	W/m²	546.94	2118.51	287.34%



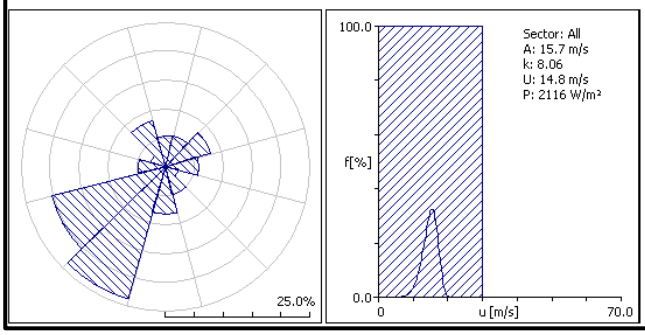
Mid October to Mid February

-	Unit	Measured	Weibull-fit	Discrepancy
Mean wind speed	m/s	9.77	14.81	51.68%
Mean power density	W/m²	1089.85	2124.03	94.89%



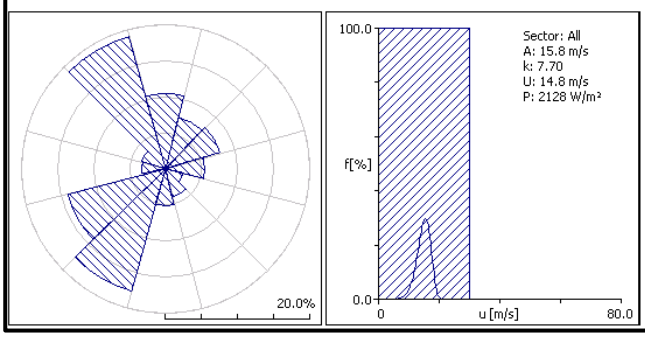
May to July

-	Unit	Measured	Weibull-fit	Discrepancy
Mean wind speed	m/s	8.51	14.81	74.07%
Mean power density	W/m²	650.98	2115.78	225.01%



August to Mid October

-	Unit	Measured	Weibull-fit	Discrepancy
Mean wind speed	m/s	8.26	14.81	79.41%
Mean power density	W/m²	659.10	2128.19	222.89%



Mid February to April

Figure 3-3: Seasonal wind data from the 60 m on-site mast

3.5 Vegetation of the study area

Note that a preliminary terrestrial ecological assessment was performed by CES in anticipation of the EIA phase but was not included in the final scoping report as it is based on an earlier version of the site development plan. An updated study was conducted by LD Biodiversity Consulting, taking into account the changes in the layout. Copies of both study reports are included under the Supplementary Volume of Specialist Studies, Appendix F. The descriptions provided below are summarised from the above-mentioned specialist reports.

3.5.1 Regional Vegetation Context

Mucina and Rutherford

Mucina and Rutherford (2006) have developed the National Vegetation map as part of a South African National Biodiversity Institute (SANBI) funded project: *"It was compiled in order to provide floristically based vegetation units of South Africa, Lesotho and Swaziland at a greater level of detail than had been available before."* The map was developed using a wealth of data from several contributors and has allowed for the best national vegetation map to date, the last being that of Acocks developed over 50 years ago. This is a Regional scale mapping tool presented at 1:250 000 and supplies a general idea of vegetation types in the area which forms the base of finer scale bioregional plans such as STEP.

The map and accompanying book describe each vegetation type in detail, along with the most important species including endemic species and those that are biogeographically important. This is the most comprehensive data for vegetation types in South Africa.

Mucina and Rutherford (2006) define the following vegetation types that occur within the 500 m buffer zone (Figure 3-4) and from which source these descriptions are derived:

Sundays Thicket

This vegetation type occurs in the Eastern Cape Province and is characterised by undulating plains and low mountains and foothills covered with tall dense thicket. The Sundays Thicket is composed of a mosaic of predominantly spinescent species that include trees, shrubs and succulents. It is classified as 'Least Threatened' with a conservation target of 19%. 6% has been transformed by cultivation and urban development. This vegetation type occurs in the northern section of the project site.

Albany Alluvial Vegetation

Albany Alluvial Vegetation occurs in the Eastern Cape between East London and Cape St. Francis. Thornveld and riverine thicket are the two major vegetation types that occur in Albany Alluvial vegetation type. It is classified as 'Endangered' with a conservation target of 31%. Only 6% has been statutorily conserved. A small section of this vegetation type occurs in the northern section of the project site.

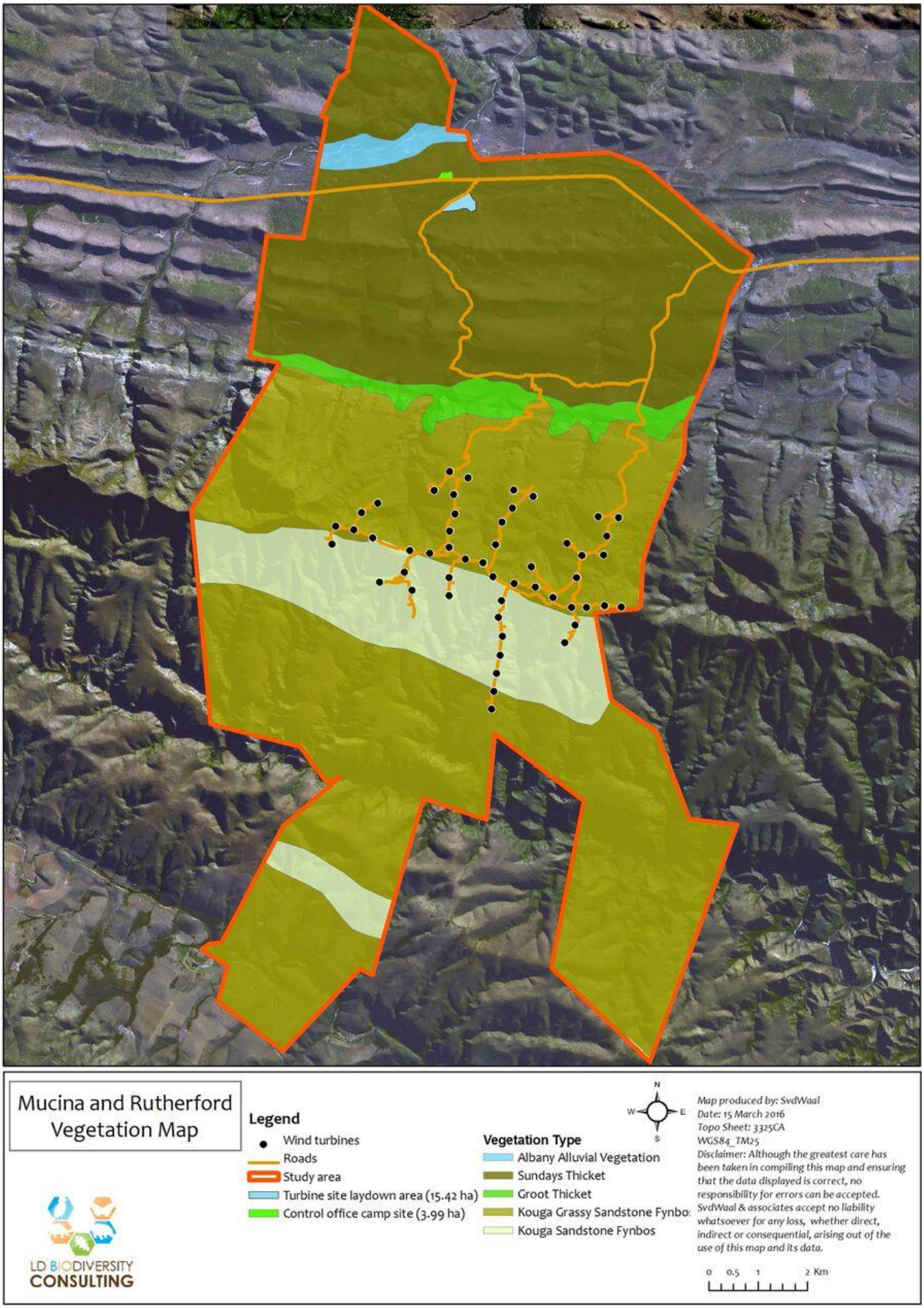


Figure 3-4: Mucina and Rutherford vegetation map of the study area (Source: de Wet 2016)

Kouga Grassy Sandstone Fynbos

This vegetation type occurs between Uniondale and Uitenhage in the Western and Eastern Cape Provinces respectively. It is characterised by low shrubland with sparse, emergent tall shrubs and an understorey dominated by grasses or grassland with scattered ericoid shrubs. It is classified as 'Least Threatened' with a conservation target of 23%. Approximately 20% is conserved and 9% has been transformed. This is one of the dominant vegetation types in the project area occurring from the middle of the project site and down to the south. This vegetation type will be impacted by the wind energy facility.

Kouga Sandstone Fynbos

The Kouga Sandstone Fynbos occurs in the Western and Eastern Cape along moderately steep to gentle slopes. The high altitude slopes support communities dominated by low fynbos and the intermediate slopes support three strata with *Proteaceae* shrubs forming the dominant tall shrub stratum. This vegetation type is classified as 'Least Threatened' with a conservation target of 23%. About 40% is statutorily conserved. A narrow band of this vegetation type traverses the project site through the middle. This vegetation type will also be impacted by the wind energy facility.

Groot Thicket

This vegetation type occurs in the Eastern Cape Province along moderate to steep slopes on the ridges of the mountain ranges dominated by a low succulent thicket, usually fairly dense and closed. It is classified as 'Least Threatened' with a conservation target of 19%. Approximately 11% is currently statutorily conserved. This vegetation type occurs as a narrow band, separating the Sundays Thicket from the Kouga Grassy Sandstone Fynbos. A small section of this vegetation type may be affected by the wind energy facility.

Subtropical Ecosystem Planning (STEP) Project

The Subtropical Ecosystem Planning (STEP) Project aims to identify priority areas that would ensure the long-term conservation of the subtropical thicket biome and to ensure that the conservation of this biome is considered in the policies and practices of the private and public sector that are responsible for land-use planning and the management of natural resources in the region (Pierce *et al.* 2005). STEP (Figure 3-5) identifies four vegetation types in this region. Pierce and Mader (2006) define the following vegetation types from which source these descriptions are derived:

Baviaans Spekboom Thicket

Baviaans Spekboom Thicket is a type of valley thicket dominated by *Portulacaria afra* and *Pappea capensis* and typified by the abundance of *Aloe speciosa*. This vegetation type is listed as 'Vulnerable' by STEP. This vegetation type occurs as a thin band that traverses the northern section of the study area and separates the Sundays Spekboomveld from the Cockscomb Mountain Fynbos Thicket. A small section of this vegetation type may be impacted by the wind energy facility.

Cockscomb Mountain Fynbos Thicket

The Cockscomb Mountain Fynbos Thicket is a mosaic of different vegetation types growing in the Elandsberg and Groot Winterhoek Mountains. The lower south facing slopes are characterised as being grassy while the proteas and conebushes are common at higher altitudes and in the wetter south-eastern parts. The lower north-facing slopes are generally sparse. This vegetation type is

listed as 'Currently Not Vulnerable'. This is the dominant vegetation type that occurs within the study site and will be impacted on by the wind energy facility.

Zuurberg Forest Thicket

The Zuurberg Forest Thicket is characterised as being tall and dense with species typical of the Sundays Thicket but including patches of temperate forest, with species such as *Afrocarpus falcatus* and *Ekebergia capensis,* occurring on the wetter slopes. This vegetation type is listed as 'Currently Not Vulnerable'. A small section of this vegetation type occurs towards the south east section of the study site. This vegetation will remain unaffected by the turbines.

Sundays Spekboomveld

This vegetation type is dominated by *Pappea capensis* and *Portulacaria afra* while *Euphorbia coerulescens* and *Crassula ovata* are abundant succulent plants that characterise this vegetation type. This spekboomveld is distinguished from adjacent noorsveld by the relatively high cover of *Portulacaria afra, Pappea capensis* and *Schotia afra.* This vegetation type is listed as 'Endangered'. This vegetation type occurs in the northern section of the project site and is unlikely to be affected by the wind energy facility.

Sundays Doringveld

Sundays Doringveld is characterised by a mosaic of thicket clumps and a Nama-karoo matrix. Thicket clumps often have a low species diversity with species that are typical of the Sundays Valley Thicket. Dominant species in the Nama-karoo matrix comprise of *Acacia karoo, Lycium sp.* and *Cynodon dactylon* and include a suite of succulents, some of which are rare endemics such as *Haworthia sordida.* This vegetation type is listed as 'Vulnerable'. A small section of this vegetation type occurs in the northern section of the study site. This vegetation is unlikely to be affected by the wind energy facility.

Kromme Fynbos/Renosterveld Mosaic

The Kromme Fynbos/Renosterveld Mosaic forms part of the fynbos biome and comprises a mosaic of grassland, grassy fynbos and renosterveld that is dominated by *Elytropappus rhinocerotis, Cliffortia linearifolia* and *Themeda triandra.* This vegetation type is listed as 'Vulnerable' by STEP. This vegetation type occurs along the southern boundary of the study site. It is unaffected by the wind energy facility but may be affected by potential access roads.

Succulent Karoo Ecosystem Plan (SKEP)

The Succulent Karoo biome extends from the south-west through to the north west of South Africa and up into Namibia (Driver *et al.*; 2003). It is classified as one of the 25 internationally recognised biodiversity hotspots and is the world's only arid hotspot. It is remarkably diverse with 6,356 plant species, 40% of which are endemic and 17% of which are listed on the Red Data list. Despite this rich diversity and high level of endemism, only 3.5% of the biome is formally conserved. As a result the biome's diversity is under pressure from human impacts, especially mining, agriculture, overgrazing and climate change. The goal of the Succulent Karoo Ecosystem Plan (SKEP) is therefore to provide a framework to guide conservation efforts of this unique biome (Driver *et. al.*; 2003).

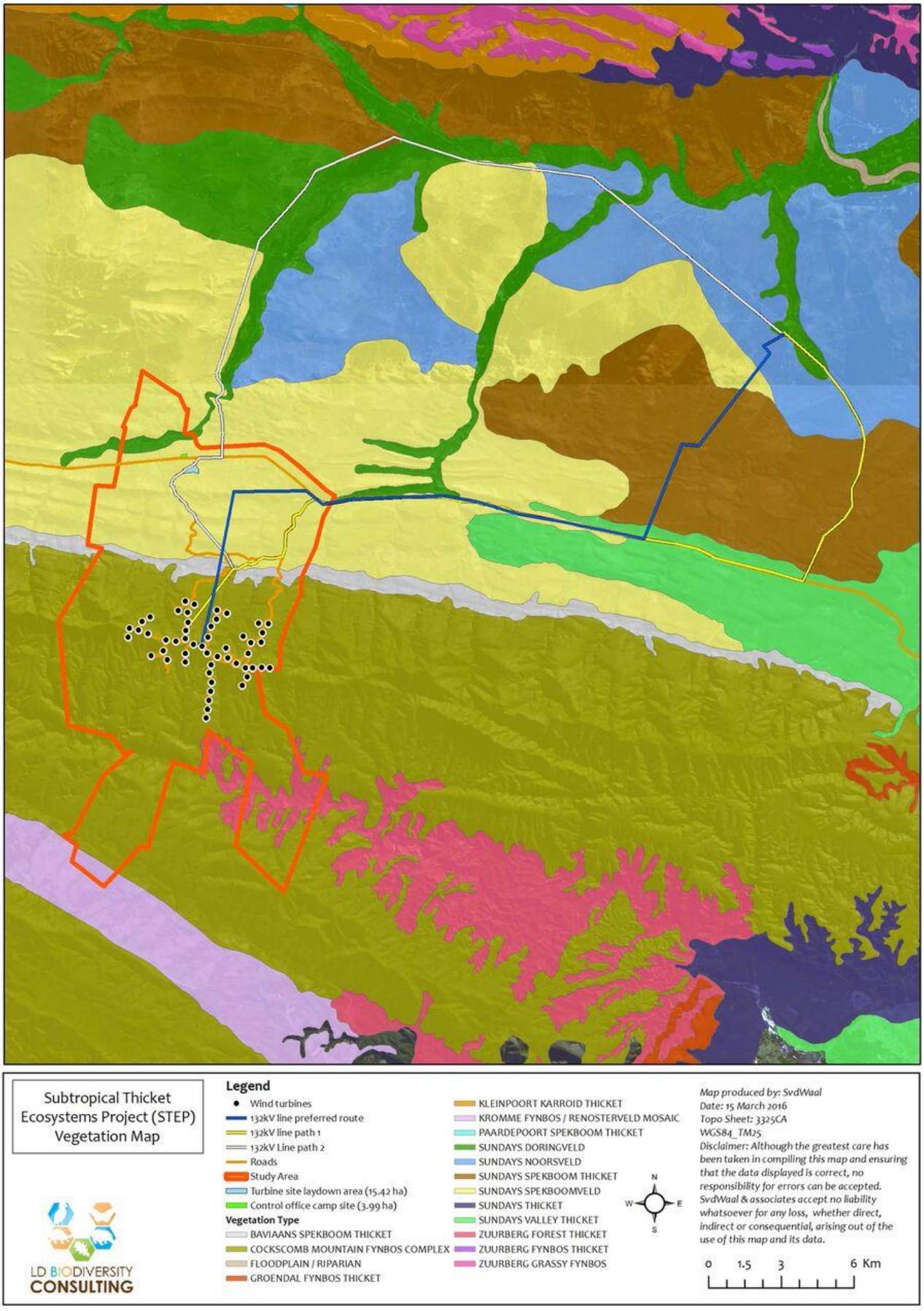


Figure 3-5: STEP vegetation map of the study area (Source: de Wet 2016)

Three of the six vegetation types described by SKEP are found in the project area (Figure 3-6):

- Quartz and Gravel patch Succulent Karoo;
- Thicket; and
- Fynbos

3.5.2 Local Vegetation Context

Baviaanskloof Mega-Reserve

The Baviaanskloof region is situated in the western region of the Eastern Cape Province, extending from Uitenhage near Port Elizabeth to Willowmore on the Western Cape boundary. The Baviaanskloof region is one of three priority areas in the Cape Floristic Region (CFR) that have been identified by the Cape Action for People and the Environment (C.A.P.E) as suitable for the establishment of so-called mega-reserves, a conservation landscape of > 400 000 ha in extent. The project is a partnership between the Eastern Cape Parks board and the Wilderness foundation. The mega-reserves are a strategy for achieving landscape level conservation. The following vegetation units are identified as forming part of the mega-reserve, as shown in Figure 3-7:

- Elandsberg sour grassland
- Kouga mesic fynbos
- Elandsberg grassy fynbos
- Elands spekboom thicket
- Elandsberg mesic fynbos
- Perdehoek arid thicket
- Baviaanskloof Sandolienveld
- Groot doringveld

Species of Special Concern (SSC) that have been recorded from the site are shown in Table 3-2 as per Zide and Lubke (2014). Blanket protected families and genera (PNCO) occurring on site include all Aloe species, all Amaryllidaceae species, all Encephalartos species, all Ericaceae, all Iridaceae, all Haworthia species, all Mesembryanthemaceae species, all Proteaceae species. The site is rich with many of these groups, all of which will require permits to remove or destroy.

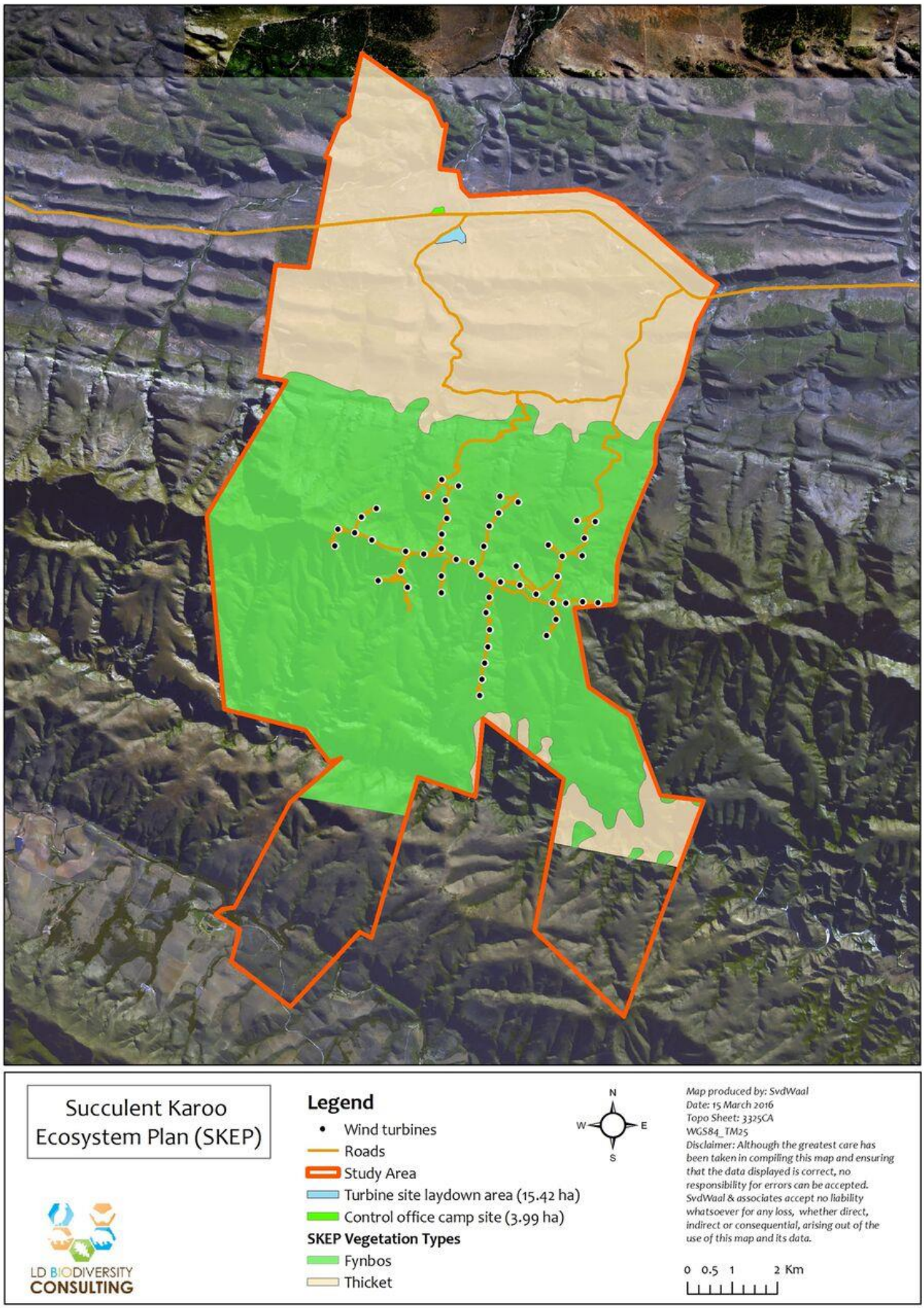


Figure 3-6: SKEP vegetation map of the study area (Source: de Wet 2016)

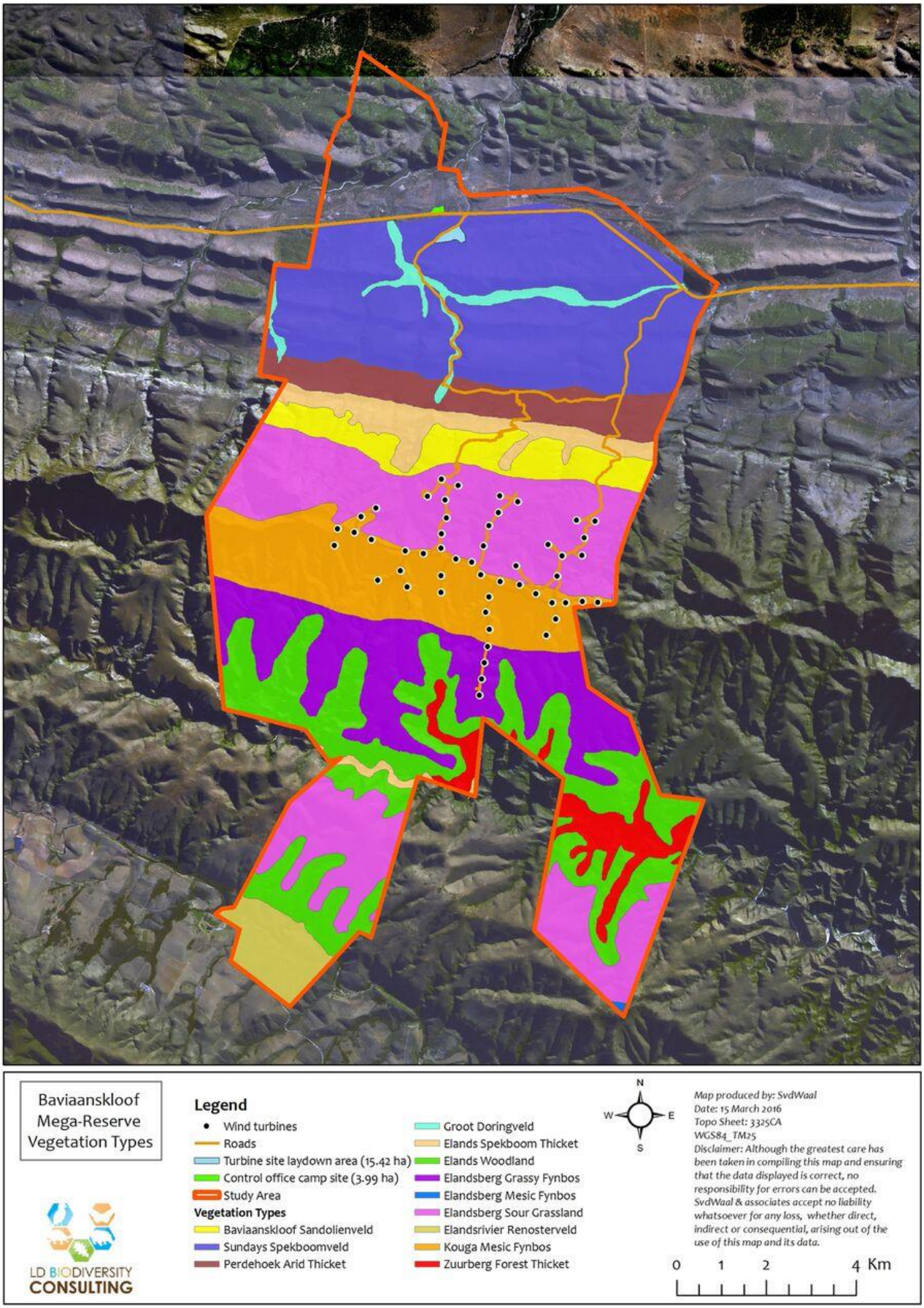


Figure 3-7: Baviaanskloof mega reserve vegetation types for the site (Source: de Wet 2016)

3.5.3 Floristics

The vegetation of the Eastern Cape is complex and is transitional between the Cape and subtropical floras, and many taxa of diverse phytogeographical affinities reach the limits of their distribution in this region. The region is best described as a tension zone where four major biomes converge and overlap (Lubke et al. 1988). The dominant vegetation is Succulent Thicket (Spekboomveld or Valley Bushveld), a dense spiny vegetation type unique to this region. While species in the canopy are of subtropical affinities, and generally widespread species, the succulents and geophytes that comprise the understory are of karroid affinities and are often localised endemics.

The study area falls within the Cape Floristic Kingdom which covers nearly 90 000 km² and stretches from the Cederberg in the north-west, down to the Western Cape coast and into the Eastern Cape. The Cape Floristic Kingdom is a biodiversity hotspot with over 9 600 recorded plant species, 70% of which are endemic to the area.

Species endemic to the area are described by Mucina and Rutherford (2006). In addition to the endemic taxa, there are also a number of species expected to be found in the study area, some of which are listed as protected by various conservation bodies. The list is not complete as many species and taxa require additional study. The taxa with many data deficient species include specifically the *Mesembryanthemaceae* family, as well as members of the *Amaryllidaceae* (Amaryllids), *Iridaceae* (Irises), *Orchidaceae* (Orchids) and *Apocynaceae* (Lianas), as well as members of the genus Aloe.

Potential Species of Special Concern (SSC) include all those plants listed in terms of the IUCN, CITES and both national and provincial legislation that may occur in the area of study. The list of potential SSC includes an estimated 450 species which are listed individually by the IUCN red data list (2012), the South African National Biodiversity Institute (SANBI) and the Forests Act. Table 3-1 is a summary of the number of potential SSC that could occur in the area under each conservation body. Species of special concern recorded on site previously are listed in (Table 3-2). A full list of species of special concern is provided in the ecological specialist (Appendix F of the supplementary volume of specialist studies).

Table 3-1: A summary of the number of plant species that occur on the various conservation bodies lists

Conservation Body/ relevant legislation	Conservation Status	Number of Species
IUCN	Vulnerable	1
	Near Threatened	1
	Data Deficient	1
SA Red Data List	Critically Endangered	4
	Endangered	8
	Vulnerable	13
	Near Threatened	12
	Rare	12
	Declining	6
	Data Deficient	10
NEMBA	Protected	1
CITES	Appendix II	21
PNCO	Schedule 3	1

Conservation Body/ relevant legislation	Conservation Status	Number of Species
	Schedule 4	138
Protected Trees		5

Table 3-2: SSC recorded on the study site (Zide & Lubke 2014)

Scientific name	IUCN	SA Red data list	CITES appendix	NEMBA protection status	PNCO Schedule
Agathosma gonaquensis		CR			
Encephalartos longifolius	NT	NT	II	Protected	3
Kniphofia triangularis		R			
Loxostylis alata		D			
Pelargonium reniforme		NT			
Aloe ferox			II		3
Bobartia orientalis					4
Carpobrotus edulis					4
Diascia capsularis					4
Erica cerinthoides					4
Erica cf chamissonis					4
Erica cf copiosa					4
Erica imbricate					4
Geissorhiza heterostyla					4
Kniphofia triangularis					4
Lampranthus spectabilis					4
Leucadendron salignum					4
Leucospermum cuneiforme					4
Protea foliosa					4
Protea lanuginosa subs. Intermedia					4
Protea mundii					4
Protea nerifolia					4
Protea nitida					4

3.6 Animal species

The descriptions provided below are summarised from the following specialist reports, copies of which are included in the Supplementary Volume of Specialist Studies:

- Terrestrial ecological specialist reports by CES and LD Biodiversity (Appendix F);
- Hydrological specialist report by Scherman, Colloty and Associates (Appendix G);
- Avifauna specialist reports by Wildskies and Ecology Consulting (Appendix D); and
- Bat specialist report by Animalia Consulting (Appendix E).

3.6.1 Amphibians, Reptiles and Fish

Amphibians and reptiles are well represented in sub-Saharan Africa. However, distribution patterns in southern Africa are uneven both in terms of species distribution and in population numbers (du

Preez and Carruthers, 2009). Climate, centres of origin and range restrictions are the three main factors that determine species distribution.

The eastern coast of South Africa has the highest amphibian diversity and endemicity while reptile diversity is generally highest in the north eastern extremes of South Africa and declines to the south and west (Alexander and Marais, 2010).

Reptiles

South Africa has 350 species of reptiles, comprising 213 lizards, 9 worm lizards, 105 snakes, 13 terrestrial tortoises, 5 freshwater terrapins, 2 breeding species of sea turtle and 1 crocodile (Branch, 1998). Of those 350 reptile species, the Eastern Cape is home to 133 which include 21 snakes, 27 lizards and eight chelonians (tortoises and turtles).

The majority of these are found in Mesic Succulent Thicket and riverine habitats. Consultation of the Animal Demography Unit historical records indicates that 15 species of reptiles are likely to occur in the project site. One of these (*Bradypodion taeniabronchum* – Elandsberg Dwarf Chameleon) is classified as Critically Endangered IUCN Red Data List.

Groendal Dwarf Chameleon (Bradypodion sp. "sp4")

The status of the cryptic Groendal dwarf chameleon is still unresolved and has been proposed to be a separated undescribed species. It is closely related to the Elandsberg chameleon (*Bradypodion taeniabronchum*) from the Elandsberg mountain range, but morphologically it is similar to the Baviaanskloof dwarf chameleon and the beardless dwarf chameleon (Tolley & Burger 2004). As yet these three species are undescribed and thus not assessed against IUCN standards. Morphology and landscaping techniques are needed to define these species (K. Tolley pers. comm.).

The whole of the project site, except for the northern sections, have suitable habitat for this species and it is highly likely to occur within the project site.

Baviaanskloof Flat Gecko (Afroedura sp. "Kouga")

Recently a new species of Flat Gecko was discovered from Cockscomb area, less than 25 km west from project site. It is highly likely this species will occur on the project site, but will be restricted to larger north facing rocky outcrops, and is thus very unlikely to be affected by the construction of the wind farm. Additional surveys would be needed to determine the presence of this species on the project site.

Amphibians

Amphibians are important in wetland systems, particularly where fish are excluded or of minor importance. In these habitats, frogs are dominant predators of invertebrates, many of which are disease vectors. Reports of declining amphibian populations continue to increase globally, even in pristine protected areas (Phillips 1994). These declines are not simple cyclic events; for example, frogs have been identified as bio-indicator species that reflect the wellbeing of aquatic ecosystems (Poynton and Broadley 1991). Frog abundance and diversity is a poignant reflection of the general health and well-being of aquatic ecosystems.

According to historical records, 12 species of frog have been documented in the Quarter Degree Squares that the project area falls in. No amphibian species of conservation concern have been

confirmed to occur in the area. The specialist has however recommended that a comprehensive amphibian survey be done for the site to confirm this.

Hewitt's Ghost Frog (Heleophryne hewitti)

Hewitt's ghost frog is an endangered species only known from two confirmed locations, the Elandsberg Mountains and Cockscomb Mountains. Three more localities (Enkeldoorn-, Diep- and Wittiver) in the Baviaanskloof World Heritage Site discovered by Richard Boycott in the mid-80's may be assigned to this species. Subsequent surveys (Burger, Clark & Smith in 1995; Burger & Tolley in 2006) confirmed the presence of this species at only one of the sites (Enkeldoorn), but at very low numbers. Recent target surveys conducted by Port Elizabeth Museum and ECPTA of both Enkeldoorn and Diepriver site failed in finding this species and it may be an indication that these populations may be extinct due to climate change. It is thought that this frog could also occur in Groendal Nature Reserve (UNEP 2006, Burger 1994) but no confirmed records of this exist (Conradie et al. 2012).

During the initial CES survey, it was noted that although the streams had running water at the time of the site visit in late May 2014, they seem not to be perennial enough to hold a viable population. These species are restricted to perennial streams and the tadpoles have an extended larval period of 18+ months and can't tolerate dry conditions. No populations of the ghost frog were found within the site. In addition, no suitable habitat for the frog species was located within the Area of Influence. However, despite this, it may still be present on the site. Additional surveys of the remaining potentially suitable habitat on the project site would be required to confirm the presence of the species.

Fish

The lower catchments on site contain rare or endemic fish namely the Eastern Cape Redfin (*Pseudobarbus afer*) The presence of the Endangered Eastern Cape Redfin, was observed during the hydrological assessment, in small rock pools, confirming the importance of the study area catchments in protecting this and other aquatic species during long dry periods. According to the IUCN (2007) no information is available on recent population reductions, except that available habitat is decreasing due to invasion by alien fishes. Droughts may also cause major fluctuations in the number of mature individuals, since only juvenile fish have been sampled in most areas that have experienced droughts in recent times. Parasite loads also increase dramatically when fish are isolated in stagnant pools. Area of occupancy (AOO) is less than 10 km² and there may be fewer than 10 populations remaining.

Threatened Species

The only Red List species of reptile that may occur on the project site is the Elandsberg chameleon (*Bradypodion taeniabronchum*). The taxonomy between this species and the Groendal dwarf chameleon is still unresolved and may represent an undescribed species. If it is a separated species it will also be regarded as rare and listed by IUCN. They are restricted to montane fynbos (especially *restios*).

CITES listed Species

Ten reptile species of special concern (Elandsberg Dwarf Chameleon – *Bradypodion taeniabronchum*, Eastern Cape Dwarf Chameleon – *Bradypodion ventrale*, Cape Girdle Lizard – *Cordylus cordylus*, Karoo Girdle Lizard - *Karusasaurus polyzonus*, Rock Monitor – *Varanus*

albigularis, Water Monitor – *Varanus niloticus*, Leopard Tortoise – *Stigmochelys pardalis*, Angulate Tortoise – *Chersina angulata*, Parrot-beaked Dwarf Tortoise – *Homopus areolatus*, and Tented Tortoise – *Psammobates tentorius*) are listed on Appendix II of CITES. CITES protects the international trade of species.

Table 3-3: Summary of reptile and amphibian SSC potentially found on site

Scientific name	Common name	Recorded on site	Habitat present
Heleophryne hewitii[2]	Hewitt's Ghost Frog	No	Yes
Brachypodion sp. "sp.4"	Groendal Dwarf Chameleon[3]	No	Yes
Afroedura sp. "Kouga"	Baviaanskloof Flaat Gecko[4]	No	Yes
Bradypodion taeniabronchum	Elandsberg chameleon[5]	No	Yes
Bradypodion ventrale	Eastern Cape Dwarf Chameleon	No	Yes
Chersina angulata	Angulate Tortoise	Yes	Yes
Cordylus cordylus	Cape Girdle Lizard	No	Yes
Homopus areolatus	Parrot-beaked Dwarf Tortoise	No	Yes
Karusasaurus polyzonus	Karoo Girdle Lizard	No	Yes
Psammobates tentorius	Tented Tortoise	No	Yes
Stigmochelys pardalis	Leopard Tortoise	No	Yes
Varanus albigularis	Rock Monitor	No	Yes
Varanus niloticus	Water Monitor	No	Yes

3.6.2 Birds

The conservation importance of the bird populations seen during the 2013-14 and 2015-16 baseline surveys is summarised in Table 3-4. This Table includes all the species noted during the surveys that have low or greater sensitivity (i.e. all of those that are red-data listed for South Africa or globally, or area South African endemics/near endemics).

Five species were classed as very high sensitivity, through their listing as 'Endangered' on either the South African and/or IUCN global red lists; Ludwig's Bustard, Yellow-Billed Stork, Hottentot Buttonquail, Martial Eagle and Black Harrier.

Five species were classed as high sensitivity, through their listing as 'Vulnerable' or 'Near Threatened' on either the South African or IUCN global red lists; Blue Crane, Kori Bustard, Southern Black Korhaan, Black Stork, Secretary bird, Verreaux's Eagle, Knysna Woodpecker, Lanner Falcon and Cape Rockjumper.

[2] An Endangered species known from two locations, with only one location confirmed recently. Expected to occur in the WEF region but no confirmation of occurrence.

[3] Part of a complex of three species as yet unresolved. Morphology and landscaping techniques are required to properly define these three species.

[4] A new species recently described, with little information available.

[5] Forming part of the complex of unresolved species also containing the Groendal dwarf chameleon.

A further five species were classed as medium sensitivity (South Africa endemic species), and a further 21 as low sensitivity (near endemics).

Table 3-4: Conservation evaluation of the bird populations in the Inyanda Roodeplaat survey area, 2013-14 and 2015-16 (Source: Percival, 2016)

Species	Scientific name	Red Data Status South Africa	Red Data Status Global	Endemic sp	Conservation Importance
Grey-winged Francolin	*Scleroptila afra*	LC	LC	SLS	Low
Blue Crane	*Anthropoides paradiseus*	NT	VU		High
Ludwig's Bustard	*Neotis ludwigii*	EN	EN		Very high
Kori Bustard	*Ardeotis kori*	NT	NT		High
Southern Black Korhaan	*Afrotis afra*	VU	VU	*	High
Knysna Turaco	*Tauraco corythaix*	LC	LC	SLS	Low
Yellow-billed Stork	*Mycteria ibis*	EN	LC		Very high
Black Stork	*Ciconia nigra*	VU	LC		High
Hottentot Buttonquail	*Turnix hottentottus*	EN	EN	*	Very high
Secretary bird	*Sagittarius serpentarius*	VU	VU		High
Martial Eagle	*Polemaetus bellicosus*	EN	VU		Very high
Verreaux's Eagle	*Aquila verreauxii*	VU	LC		High
Black Harrier	*Circus maurus*	EN	VU	(*)	Very high
Jackal Buzzard	*Buteo rufofuscus*	LC	LC	(*)	Low
Forest Buzzard	*Buteo trizonatus*	LC	LC	SLS	Low
Ground Woodpecker	*Geocolaptes olivaceus*	LC	LC	SLS	Low
Knysna Woodpecker	*Campethera notata*	NT	NT	*	High
Lanner Falcon	*Falco biarmicus*	VU	LC		High
Southern Tchagra	*Tchagra tchagra*	LC	LC	(*)	Low
Grey Tit	*Parus afer*	LC	LC	(*)	Low
South African Cliff Swallow	*Petrochelidon spilodera*	LC	LC	BSLS	Low
Cape Clapper Lark	*Mirafra apiata*	LC	LC	(*)	Low
Karoo Prinia	*Prinia maculosa*	LC	LC	(*)	Low
Cape Bulbul	*Pycnonotus capensis*	LC	LC	*	Medium
Victorin's Warbler	*Cryptillas victorini*	LC	LC	*	Medium
Cape Grassbird	*Sphenoeacus afer*	LC	LC	(*)	Low
Cape White-eye	*Zosterops virens*	LC	LC	(*)	Low
Pied Starling	*Lamprotornis bicolor*	LC	LC	SLS	Low
Cape Rockjumper	*Chaetops frenatus*	NT	LC	*	High
Cape Rock Thrush	*Monticola rupestris*	LC	LC	SLS	Low
Sentinel Rock Thrush	*Monticola explorator*	LC	LC	SLS	Low
Fiscal Flycatcher	*Sigelus silens*	LC	LC	(*)	Low
Fairy Flycatcher	*Stenostira scita*	LC	LC	(*)	Low

Species	Scientific name	Red Data Status South Africa	Red Data Status Global	Endemic sp	Conservation Importance
Orange-breasted Sunbird	*Anthobaphes violacea*	LC	LC	*	Medium
Southern Double-collared Sunbird	*Cinnyris chalybeus*	LC	LC	(*)	Low
Greater Double-collared Sunbird	*Cinnyris afer*	LC	LC	SLS	Low
Cape Sugarbird	*Promerops cafer*	LC	LC	*	Medium
Cape Weaver	*Ploceus capensis*	LC	LC	(*)	Low
Swee Waxbill	*Coccopygia melanotis*	LC	LC	(*)	Low
Cape Siskin	*Crithagra totta*	LC	LC	*	Medium

*Note: Red Data Stats: CR = Critically Endangered; EN = Endangered; VU = Vulnerable; NT = Near Threatened; LC = Least Concern, South African endemics: * = endemic; SLS = endemic to South Africa, Lesotho and Swaziland; (*) = near endemic (i.e. ~70% or more of population in RSA); BSLS = breeding South Africa, Lesotho and Swaziland endemic*

African Crowned Eagle was included in the target bird species list for the 2013-14 pre-construction monitoring (see Smallie, June & November 2014). Although the southern slopes of the Groot Winterhoek mountains were identified as suitable habitat for crowned eagle, Steve Percival in his 2015 report indicated that they would be unlikely to make use of the open habitat of the WEF site.

A crowned eagle were observed in and around the site by Andrew Jenkins during his 2014 survey, who reported that while the species was not resident in any of the forest patches that were included in the survey, more suitable habitat is available on either side of the site, which may hold a breeding pair.

Denham's Bustards were identified as a target species of special concern (with regard to the powerlines) in both the 2014-15 and 2015-16 monitoring surveys, however no records of this species on the site were reported.

The Important Bird Areas of Southern Africa (IBA) directory was compiled in 1998 and identified within South Africa 122 IBAs containing 59 threatened and 64 near-threatened bird species. All these IBAs were objectively determined using established and globally accepted criteria. An IBA is selected on the presence of the following bird species in a geographic area:

- Bird species of global or regional conservation concern;
- Assemblages of restricted-range bird species;
- Assemblages of biome-restricted bird species; and
- Concentrations of numbers of congregatory bird species.

The rationale behind the IBA Programme is that in order to conserve species of conservation concern you need to conserve the habitat that the species occupies and uses. The development does not fall within an IBA however, IBAs identified nearby include: Kouga-Baviaans Complex and Maitland Gamtoos Coast (Figure 3-8).

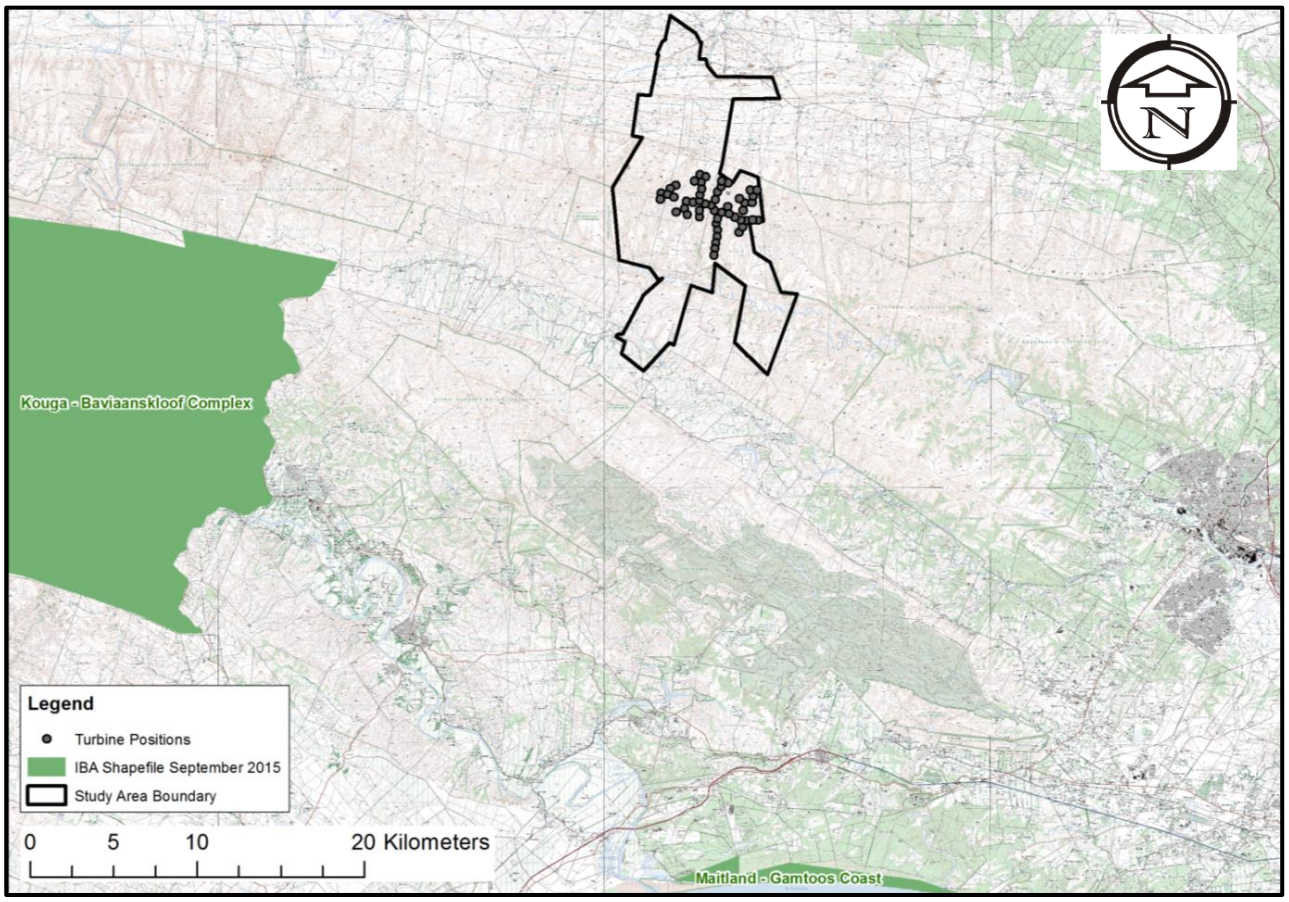


Figure 3-8: Important Bird Areas relative to the Study Area as per BGIS)

3.6.3 Mammals

Large game makes up less than 15% of the mammal species in South Africa and a much smaller percentage in numbers and biomass. In developed and farming areas, this percentage is greatly reduced, with the vast majority of mammals present being small or medium-sized.

The conservation status of South African mammals has recently been re-assessed and a number of species have been downgraded, for example, the African wild cat, Aardvark, Blue duiker, and Honey badger are no longer considered threatened.

According to NEMBA, three protected mammal species and one vulnerable species have distributions that coincide with the project area (Table 3-5). Based on habitat availability it is likely that all four of these species are likely to occur on site (Stuart and Stuart, 2007).

The species list was run through the IUCN data base. Two species with distributions that occur in the project area are listed as Near Threatened (Leopard and Schreibers Long-fingered bat) and one species (the White tailed mouse) is listed as 'Endangered'.

Table 3-5: Mammals of conservation concern likely to be found within the project site (Zide & Lubke 2014)

Scientific Name	Common Name	IUCN	NEMBA
Atelerix frontalis	South African hedgehog	-	Protected
Miniopterus schreibersii	Schreibers Long-fingered bat	NT	
Mystromys albicaudatus	White-tailed mouse	EN	

Scientific Name	Common Name	IUCN	NEMBA
Panthera pardus	Leopard	NT	Vulnerable
Mellivora capensis	Honey Badger	-	Protected
Vulpes chama	Cape Fox	LC	Protected

EN = Endangered, VU = Vulnerable, NT = Near-threatened, LC = Least Concern

Of conservation importance in the Baviaanskloof Mega Reserve is the presence of leopard populations. Internationally this species is classified as Near Threatened. In South Africa this species is listed by NEM:BA (2004) as vulnerable meaning that it faces *"a high risk of extinction in the wild in the medium-term future, although they are not critically endangered".*

The Centre for African Conservation Ecology estimate that there are between 10-17 individuals living in the Baviaanskloof Mega Reserve and that one of the major threats to this population is its vulnerability to becoming genetically isolated. Recent studies on leopard populations in the south eastern and western region of South Africa suggest that at least 21 individuals occur in the Cape Fold Mountains with nearly half of these originating between Addo Elephant National Park in the east and Uniondale in the west (Jeanine McManus pers. comm.; 2013).

The data collected from this study raises concerns that further habitat fragmentation in this area will result in further isolating these populations, especially since leopards are territorial animals with large home ranges (30,000 ha for males and 15,000 for females).

Bats

Three bat species recorded on site commonly occur in the area due to their probability of occurrence and widespread distribution. These species are of importance based on their likelihood of being impacted by the proposed WEF, which is determined based on a combination of abundance and behaviour. In addition, three species of conservation concern (one of which is included in the group of commonly occurring species) are also likely to occur within the site.

The three commonly occurring bat species were detected during transects, namely *Neoromicia capensis, Miniopterus natalensis* and *Tadarida aegyptiaca*. Species such as these are of a larger value to the local ecosystems as they provide a greater contribution to most ecological services than the rarer species due to their higher numbers.

Seasonal variations in bat abundance on the site were also recorded. *Miniopterus natalensis* is the only migratory species detected on site, however the results are indicative of the site not being within a migratory route.

Table 3-6: Bats of conservation concern and those likely to be found within the project site (source: Marais, 2016)

Scientific Name	Common Name	Probability of occurrence (%)	Conservation status
Rhinolophus capensis	Cape horseshoe bat	20 - 30	Near threatened
Rhinolophus swinnyi	Swinny's horseshoe bat	10-20	Near Threatened
Miniopterus natalensis	Natal long-fingered bat	90 - 100	Near Threatened
Tadarida aegyptiaca	Egyptian free-tailed bat	90 - 100	Least concern
Neoromicia capensis	Cape serotine	90 - 100	Least Concern

3.7 Conservation and Spatial Planning Tools

Several conservation planning tools are available for the area. These tools allow for the determination of any sensitive and important areas from a vegetation and faunal point of view at the early stage of a development. They allow for the fine-tuning of plans and turbine layouts with a view to reducing potential environmental impacts at the planning stage of the development. The instruments under discussion are outlined in Table 3-7 below.

Table 3-7: Conservation and planning tools considered for the proposed Inyanda - Roodeplaat WEF

Tool	Motivation	Relevancy	Implications
National			
Protected Areas	Protected areas are areas that are already conserved. Areas in close proximity to the proposed development may be affected by the development and thus must be taken into account.	Relevant. The study site falls between three portions of the Groendal Nature Reserve (Figure 3-9).	Since the study area is less than 5 km protected area the activity will trigger activities on Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010. Identified activities that will be triggered are reproduced in Table 1-2. An ecological assessment will be conducted during the EIA phase.
National Protected Areas Expansion Strategy (NPAES, 2008)	The objective of the NPAES is to form an overarching strategic framework for a protected area network that "*conserves a comprehensive, representative and adequate sample of biodiversity and maintains key ecological processes across the landscape and seascape*". The areas earmarked by this study should be protected.	Relevant. The study site falls within the Baviaans-Addo PAES area (Figure 3-9).	Since this development occurs in areas designated as part of the Protected Areas Expansion Strategy it will trigger activities on Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010. Identified activities that will be triggered are reproduced in Table 1-2. NPAES and their relevance are discussed in further detail in the ecological specialist study.
Eastern Cape Protected Areas Expansion Strategy (ECPAES, 2012)	The ECPAES aims to fulfil the requirement of the NPAES that ECPTA develops its own protected area expansion implementation plan based on the protected area targets and focus areas in the NPAES. The ECPAES includes a priority areas map and an implementation action plan.	Relevant. The study site falls within the Baviaans-Addo PAES area (Figure 3-9).	Since this development occurs in areas designated as part of the Protected Areas Expansion Strategy it will trigger activities on Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010. Identified activities that will be triggered are reproduced in Table 1-2. PAES and their relevance are discussed in further detail in the ecological specialist study.

Tool	Motivation	Relevancy	Implications
National Wetlands Inventory	Wetlands are very important aspects of the ecosystem as they are process areas. Not only do they form habitat for both flora and fauna, they also perform vital ecosystem functions. It is for this reason that wetlands are always rated with a high sensitivity and should be conserved.	Relevant. The cables and access roads are likely to cross at least one water course.	Listing Notice 1 of GNR 544 EIA regulations dated 18 June 2010 and Listing Notice 3 of R546 EIA Regulations dated 18 June 2010 will be triggered by this development. The project will involve the construction of roads and underground electrical cables which are likely to cross drainage lines. This will be discussed in further detail during the EIA phase.
National List of Ecosystems that are Threatened and in need of Protection. (NEMBA, Act 10 of 2004)	The National Environmental Management: Biodiversity Act provides a list of threatened terrestrial ecosystems. This has been established as little attention has historically been paid to the protection of ecosystems outside of protected areas. The purpose of listing threatened ecosystems is primarily to reduce the rate of ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems.	Irrelevant. No threatened ecosystems occur within the project site (Figure 3-9).	N/A
National Freshwater Ecosystems Priority Areas project	The National Freshwater Ecosystems Priority Areas project has earmarked sub-quaternaries or, based either on the presence of important biota (e.g. rare or endemic fish species) or conversely the degree of riverine degradation, i.e. the greater the catchment degradation the lower the priority to conserve the catchment. The important catchments areas are then classified as Freshwater Ecosystems Priority Areas or FEPAs.	The survey area falls within two of these FEPAs, as the lower catchments contain rare or endemic fish namely the Eastern Cape Redfin (Pseudobarbus afer). While the remainder of the study area (Figure 2), is located within an Upstream FEPA, i.e. supports the downstream FEPA with known value.	A hydrology study is required.
Important Bird Areas (IBA)	Important Bird Areas are globally recognized areas essential for the protection of bird species. In order to be classified as an IBA, an area must contain globally threatened species, restricted range species, biome restricted species or congregations of species.	Relevant. The study site occurs less than 10 km from an important bird area (Figure 3-8).	An avifaunal specialist study will be required during the EIA phase of the project.

Tool	Motivation	Relevancy	Implications
Provincial			
STEP	The Subtropical Thicket Ecosystem Planning Project maps vegetation and assigns each of these a conservation criterion. It is very important in determining sensitivity.	Relevant. The northern portion of the project site falls into the STEP category ENDANGERED and VULNERABLE. A small section of the southern portion of the project site is classified as VULNERABLE. The rest of the area is classified as CURRENTLY NOT VULNERABLE (Figure 3-5).	Ecosystems are classified as Endangered when their original extent has been severely reduced, and whose health, functioning and existence is endangered. This is considered to be Class II land which can withstand minimal loss of natural area through disturbance or development Ecosystems are classified as Vulnerable if they cover much of their original extent but where further disturbance or destruction could harm their health and functioning. This is considered to be Class III land which can withstand limited loss of area through disturbance or development. See Section 3.5 for further details describing the vegetation of the study area. This will be further assessed during the EIA phase.
SKEP	The Succulent Karoo Ecosystem Programme (SKEP) aims to provide a framework to guide conservation efforts of the Succulent Karoo biome.	Three of the six vegetation types described by SKEP are found in the project area • Quartz and Gravel patch Succulent Karoo; • Thicket; and • Fynbos.	An Ecological study is required.
The Eastern Cape Biodiversity Conservation Plan (ECBCP)	The Eastern Cape Biodiversity Conservation Plan (ECBCP) is responsible for mapping areas that are priorities for conservation in the province, as well as assigning land use categories to the existing land depending on the state that it is in (Berliner et al. 2007). Critical Biodiversity Areas (CBAs) are defined as "terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning".	Relevant. The proposed project site occurs in areas classified as Critical Biodiversity Areas (CBA) 1 and 2.	Since this development occurs in areas classified as CBA's it will trigger activities on Listing notice 3 of GNR 546 EIA regulations dated 18 June 2010. Identified activities that will be triggered are reproduced in Table 1-2. CBA's and their relevance to the project will be further discussed during the EIA phase.

Tool	Motivation	Relevancy	Implications
Biodiversity Sector Plan for the Sundays River Valley Municipality (2012)	An information source for land use planning. The SRVM biodiversity sector plan is more accurate than broader scale plans e.g. ECBCP and STEP	Relevant. The proposed site falls into the planning domain of the SRVM Biodiversity Sector Plan	The Sundays River Valley Critical Biodiversity Areas (CBA) Map is a refined version of the CBA's in the ECBCP and has greater spatial accuracy
Baviaanskloof Mega-Reserve Biodiversity Assessment	These tools provided information on the vegetation of the areas, as well as providing sensitivity information.	Relevant. The proposed site falls into the planning domain of the mega-reserve	The Baviaanskloof Mega-reserve CBA map has the finest scale of vegetation mapping for this area and is the most spatially accurate.

3.7.1 Protected Areas

According to the National Environmental Management: Protected Areas (Act No 57 of 2003) the declaration of protected areas is:

- "to protect ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes in a system of protected area;
- to preserve the ecological integrity of these areas;
- to conserve biodiversity in these areas;
- to protect areas representative of all ecosystems, habitats and species naturally occurring in South Africa;
- to protect South Africa's threatened or rare species;
- to protect an area which is vulnerable or ecologically sensitive;
- to assist in ensuring the sustained supply of environmental goods and services
- to provide for the sustainable use of natural or biological resources;
- to create or augment destinations for nature based tourism;
- to manage the inter-relationship between natural environment biodiversity, human settlement and economic development;
- generally to contribute to human, social, cultural, spiritual and economic development;
- to rehabilitate and restore degraded ecosystems and promote the recovery of endangered and vulnerable species"

3.7.2 Protected Areas Expansion strategy

A National Spatial Biodiversity Assessment was conducted in 2004 revealing a lack of protection for a representative sample of the country's biodiversity and ecological process areas. The Protected Areas Expansion Strategy allows for increased conservation of these aspects of the country in order to meet national biodiversity targets. The strategy outlines two methods of expanding the current National Protected Areas:

For public land, the declaration of available, under-utilised and strategic parcels of public land in concordance with the relevant legal requirements for disposal of such land; and

For private land, entering into contractual agreements with affected landowners. An area is considered important for expansion if it contributes to meeting biodiversity thresholds, maintaining ecological processes or climate change resilience. Forty-two focus areas for land-based protected area expansion have been identified and are composed of large, intact and fragmented areas suitable for the creation or expansion of large protected areas.

The landowner of the project area land portions has indicated his willingness to engage with the relevant planning authorities Eastern Cape Parks and Tourism Agency (ECPTA) as to the viability of

utilising these land portions as a connectivity corridor between two Groendal Nature Reserve portions.

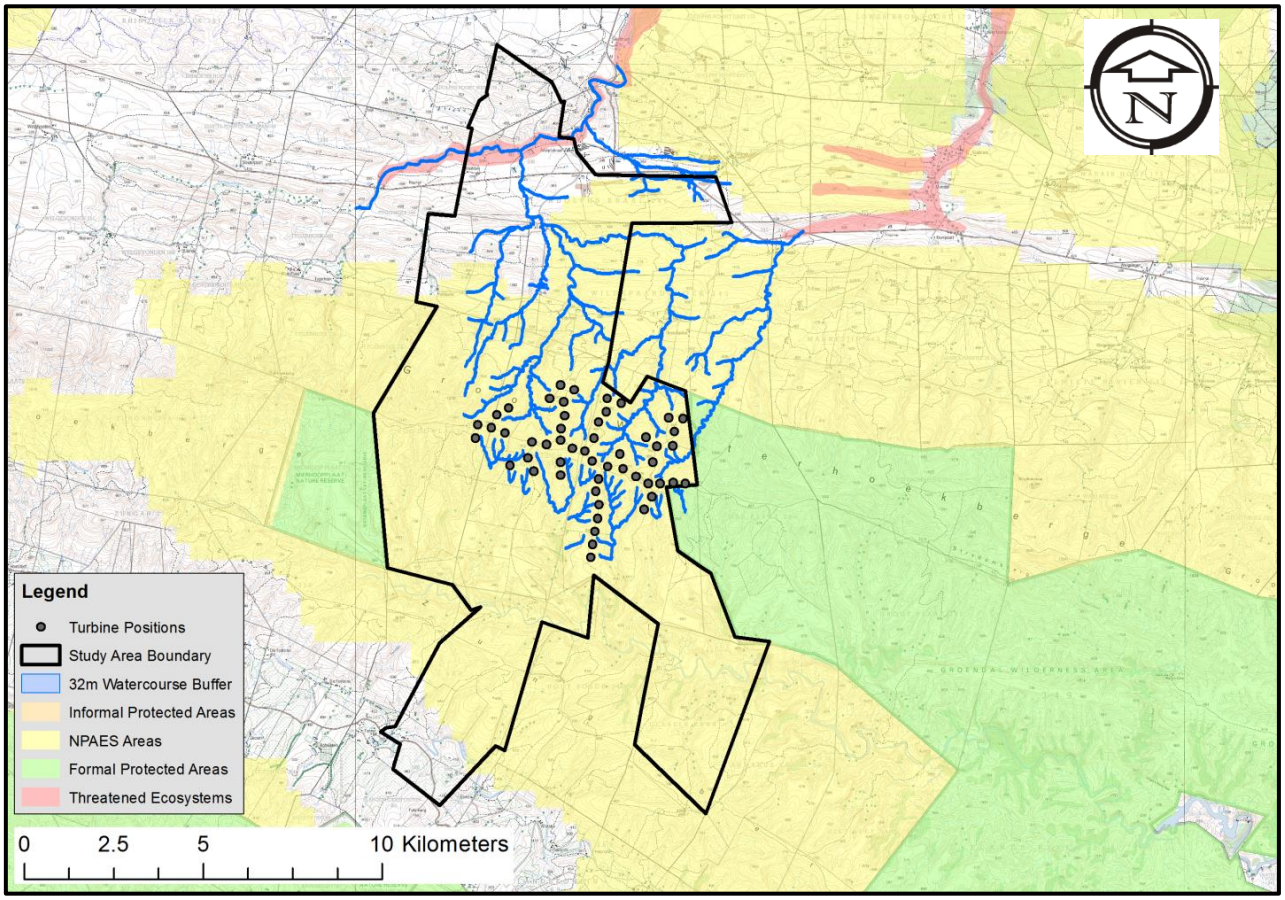


Figure 3-9: Protected Areas and Expansion Strategy Areas that occur within and near the project study area

3.7.3 Subtropical Thicket Ecosystem Planning (STEP) Project

STEP was developed originally in 2003 in order to provide conservation and planning tools for the STEP region (Pierce and Mader 2006). The STEP region is the region containing the Subtropical Thicket Biome and its constituents, as well as those biomes closely related to it. The STEP region includes 6 Biomes and forms a Bioregional Programme.

A Bioregional Programme is defined by Pierce and Mader (2006 pg 27) as: *"Bioregional programmes are initiatives that aim to secure the conservation of priority biodiversity within a specific biome or bioregion, involving a variety of stakeholders*". The aims include (pg 28):

- Promote the conservation of biodiversity both within and outside protected areas;
- Promote the sustainable use of natural resources and the development of sustainable livelihoods based on principles of sustainable land-use management- a "*biodiversity economy*";
- Strengthen partnerships, institutions and governance and continue to involve communities throughout the lifespan of the programme; and
- Support implementation of projects and guide them to ensure that funds achieve maximum conservation benefit.

Several of these bioregional plans have been developed that occur within the borders of the Eastern Cape, and these may overlap in areas (Pierce and Mader, 2006). The STEP mapping and related information is specifically designed to be incorporated into planning and spatial development

frameworks. It indicates areas for priority conservation, and what kind of development is appropriate for each landscape class. It is important to note that it cannot be used for fine scale planning.

Each vegetation type is assigned an ecosystem status, which indicates if it is sufficiently conserved, how much of its original extent is still covered, and how healthy and functioning they may be (Pierce and Mader, 2006).

The project aims to guide the necessary but destructive development away from areas of endangered biodiversity and promote sustainable land use. In terms of STEP, a feature that has much more extant habitat than is needed to meet its target, is considered Currently Not Vulnerable OR Least Threatened (Table 3-8).

STEP provides management recommendations for each of the classes given to vegetation types. As the study area contains vegetation types listed as Least Threatened (Currently Not Vulnerable), and Vulnerable by STEP, recommendations for these classes are provided below and summarised in Table 3-8.

Currently Not Vulnerable (Class IV)

A vegetation type that has much more extant habitat than is needed to meet its conservation target, is considered Currently Not Vulnerable, or Least Threatened. For Currently Not Vulnerable vegetation, STEP recommends three Land use management procedures, these include:

1. Proposed disturbance or developments should preferably take place on portions which have already undergone disturbance or impacts rather than on portions that are undisturbed or unspoilt by impacts.

2. In response to an application for a non-listed activity which will have severe or large-scale disturbance on a relatively undisturbed site (unspoilt by impacts), the Municipality should first seek the opinion of the local conservation authority.

3. For a proposed “listed activity”, EIA authorisation is required by law.

Table 3-8: Summary of the STEP Project conservation priorities, classifications and general rules (Pierce, 2003)

Conservation priority	Classification	Brief Description	General Rule
IV	Currently not vulnerable area	Ecosystems which cover most of their original extent and which are mostly intact, healthy and functioning	Depending on other factors, this land can withstand loss of natural area through disturbance or development
III	Vulnerable area	Ecosystems which cover much of their original extent but where further disturbance or destruction could harm their health and functioning	This land can withstand limited loss of area through disturbance or development
II	Endangered area	Ecosystems whose original extent has been severely reduced, and whose health, functioning and existence is endangered	This land can withstand minimal loss of natural area through disturbance or development

Conservation priority	Classification	Brief Description	General Rule
I - Highest Priority	Critically endangered area	Ecosystems whose original extent has been so reduced that they are under threat of collapse or disappearance. Included here are special ecosystems such as wetlands and natural forests	This Class I land can NOT withstand loss of natural area through disturbance or development. Any further impacts on these areas must be avoided. Only biodiversity-friendly activities must be permitted.
High Priority	Network Area	A system of natural pathways e.g. for plants and animals, which if safeguarded, will ensure not only their existence, but also their future survival.	Land in Network can only withstand minimal loss of natural area through disturbance and developments
Highest Priority	Process Area	Area where selected natural processes function e.g. river courses, including their streams and riverbanks, interfaces between solid thicket and other vegetation types and sand corridors	Process area can NOT withstand loss of natural area through disturbance and developments
	Municipal reserve, nature reserve, national parks	Protected areas managed for nature conservation by local authorities, province or SA National Parks	No loss of natural areas and no further impacts allowed
Dependant on degree on existing impacts	Impacted Area	Areas severely disturbed or destroyed by human activities, including cultivation, urban development and rural settlements, mines and quarries, forestry plantations and severe overgrazing in solid thicket.	Ability for this land to endure further disturbance of loss of natural area will depend on the land's classification before impacts, and the position, type and severity of the impacts

From a Spatial planning (forward planning – Spatial Development Framework (SDF)) point of view, for Currently Not Vulnerable vegetation, STEP presents two restrictions and gives examples of opportunities. The two spatial planning restrictions are as follows:

1. Proposed disturbance or developments should preferably take place on portions which have already undergone disturbance or impacts rather than on portions that are undisturbed.

2. In general, Class IV land can withstand loss due to disturbance of natural areas through human activities and developments.

Opportunities depend on constraints (such as avoidance of spoiling scenery or wilderness, or infra-structure limitations) Class IV land can withstand loss of, or disturbance to, natural areas. Within the constraints, this class may be suitable for a wide range of activities (e.g. extensive urban development, cultivation, tourist accommodation, ecotourism and game faming).

Vulnerable (III)

Vulnerable ecosystems are those where further disturbance or destruction could harm their health and functioning. For Vulnerable vegetation, STEP recommends four Land use management procedures, these include:

1. As a rule, developments with limited area or impacts should be allowed on Class III land.

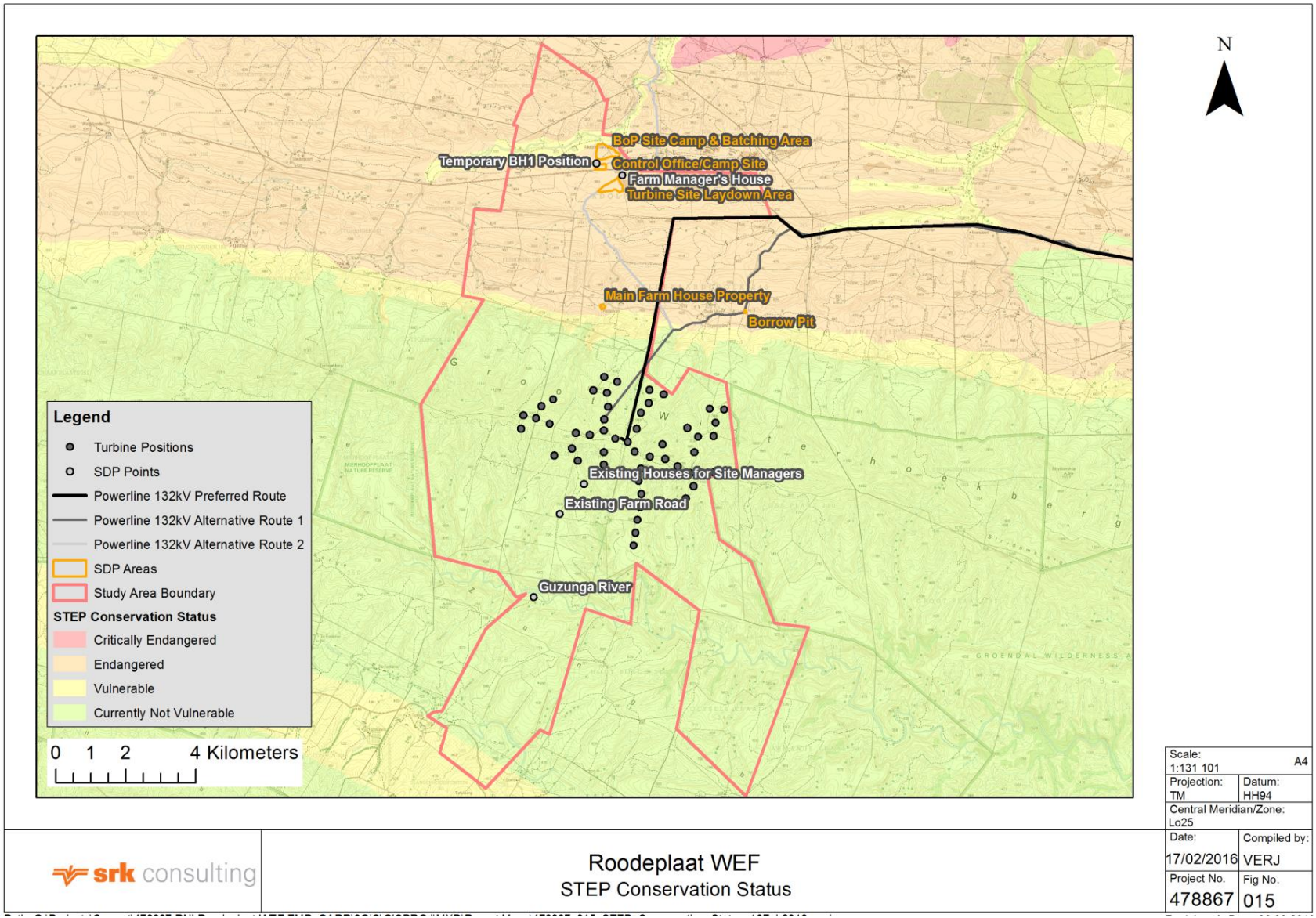


Figure 3-10: STEP Conservation Status map

2. In response to an application for a non-listed activity which will have severe or large-scale disturbance on a relatively undisturbed site (unspoilt by impacts), the Municipality should first seek the opinion of the local conservation authority.

3. Proposed disturbance or developments should preferably take place on sites which have undergone disturbance or impacts rather than on sites that are undisturbed.

4. For a proposed "listed activity", EIA authorisation is required by law.

From a Spatial planning (forward planning – Spatial Development Frameworks (SDF)) point of view, for Vulnerable vegetation, STEP presents three restrictions and gives examples of opportunities. The three spatial planning restrictions are as follows:

1. In general, Class III land can withstand only limited loss of natural area or limited disturbance through human activities and developments.

2. Proposed disturbance or developments should preferably take place on sites which have undergone disturbance or impacts rather than on sites that are undisturbed.

3. In general, Class IV land should be developed in preference to Class III land.

Depending on constraints (such as avoidance of spoiling scenery or wilderness, or infra-structure limitations), Class III land can withstand a limited loss of, or disturbance to, natural areas. Within the constraints, this class may be suitable for a moderate range of activities that are either compatible with the natural environment (e.g. sustainable stock-farming, ecotourism, game farming and wilderness) or of limited extent (e.g. small-scale housing or urban development, small-scale cultivation).

3.7.4 The Eastern Cape Biodiversity Conservation Plan

The Eastern Cape Biodiversity Conservation Plan (ECBCP) is responsible for mapping areas that are priorities for conservation in the province, as well as assigning land use categories to the existing land depending on the state that it is in (Berliner et al. 2007).

Critical Biodiversity Areas (CBAs) are defined by Berliner et al. (2007) as: *"CBAs are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning".* These areas are classified as natural to near-natural landscapes. In addition to the CBA's the ECBCP also defines Other Natural Areas (ONA) as well as Transformed Areas.

Biodiversity Land Management Classes (BLMCs) are also used in the plan: "Each BLMC sets out the desired ecological state that an area should be kept in to ensure biodiversity persistence. For example, BLMC 1 refers to areas which are critical for biodiversity persistence and ecosystem functioning, and which should be kept in as natural a condition as possible". Table 3-9 shows how the BLMCs relate to the CBAs.

Table 3-9: Terrestrial Critical biodiversity Areas and Biodiversity Land Management Classes as described by the Eastern Cape Biodiversity Conservation Plan

CBA map category	Code	BLMC		Recommended land use objective
Protected areas	PA1	BLMC 1	Natural landscapes	Maintain biodiversity in as natural state as possible. Manage for no biodiversity loss.
	PA2			
Terrestrial CBA 1 (not degraded)	T1			
Terrestrial CBA 1 (degraded)	T1	BLMC 2	Near-natural landscapes	Maintain biodiversity in near natural state with minimal loss of ecosystem integrity. No transformation of natural habitat should be permitted.
Terrestrial CBA 2	T2			
	C1			
	C2			
Other natural areas	ONA T3	BLMC 3	Functional landscapes	Manage for sustainable development, keeping natural habitat intact in wetlands (including wetland buffers) and riparian zones. Environmental authorisations should support ecosystem integrity.
	ONA			
Transformed areas	TF	BLMC 4	Transformed landscapes	Manage for sustainable development.

Ten principles of land use planning for biodiversity persistence:

1. Avoid land use that results in vegetation loss in critical biodiversity areas.
2. Maintain large intact natural patches – try to minimise habitat fragmentation in critical biodiversity areas.
3. Maintain landscape connections (ecological corridors) that connect critical biodiversity areas.
4. Maintain ecological processes at all scales, and avoid or compensate for any effects of land uses on ecological processes.
5. Plan for long-term change and unexpected events, in particular those predicted for global climate change.
6. Plan for cumulative impacts and knock-on effects.
7. Minimise the introduction and spread of non-native species.
8. Minimise land use types that reduce ecological resilience (ability to adapt to change), particularly at the level of water catchments.
9. Implement land use and land management practices that are compatible with the natural potential of the area.
10. Balance opportunity for human and economic development with the requirements for biodiversity persistence.

The study site falls within CBA 1, CBA 2 and CBA 3 areas. As indicated in Figure 3 11, 17 turbines are located within the CBA 1 area and 22 occur in a CBA 2 area. According to STEP and Mucina

and Rutherford this area was expected to be covered in thicket. However, the site survey revealed it to be a mosaic of grasses and karoo scrub. ECBCP, although mapped at a finer scale than the National Spatial Biodiversity Assessment (Driver et al., 2005) is still, for the large part, inaccurate and 'coarse'. Therefore it is imperative that the status of the environment, for any proposed development must first be verified before the management recommendations associated with the ECBCP are considered (Berliner and Desmet, 2007). This has been done in the EIA phase by the ecological specialist.

The Baviaanskloof Mega-reserve CBA map was mostly taken into account as the vegetation mapping for this area is of the finest scale of all the assessments consulted. This assessment describes three levels of CBAs, and provides land use recommendations for each. Of the development, a small portion of existing road falls in CBA 1 and CBA 2, with the majority of the development falling into CBA 3 and the rest into CBA 2 (see Figure 3-12).

3.7.5 Biodiversity Sector Plan for the Sundays River Valley Municipality (2012)

The biodiversity sector plan for the Sundays River valley municipality (SRVM) provides biodiversity information needed for land use planning and decision making. It identifies sites within the municipality that are critical for conserving biodiversity. The overall aim is to minimise the loss of natural habitat in Critical Biodiversity Areas (CBA's) and to prevent the degradation of Ecological Support Areas (ESA's), while encouraging sustainable development in other natural areas.

The CBA Map assists with identifying appropriate areas for development within the Sundays River Valley Municipality from a biodiversity perspective. It provides the biodiversity information for a credible Integrated Development Plan and Spatial Development Framework.

The plan provides a list of desired management objectives for each CBA map category. The Desired Management Objective for a parcel of land or aquatic ecosystem refers to the ecological state or condition in which it should be maintained (or managed). Different categories require specific management objectives according to their biodiversity priority. On the basis of this the plan has developed a biodiversity compatible land use guideline matrix which links the CBA map categories with specific development types which are suitable e.g. agriculture, conservation and rural housing.

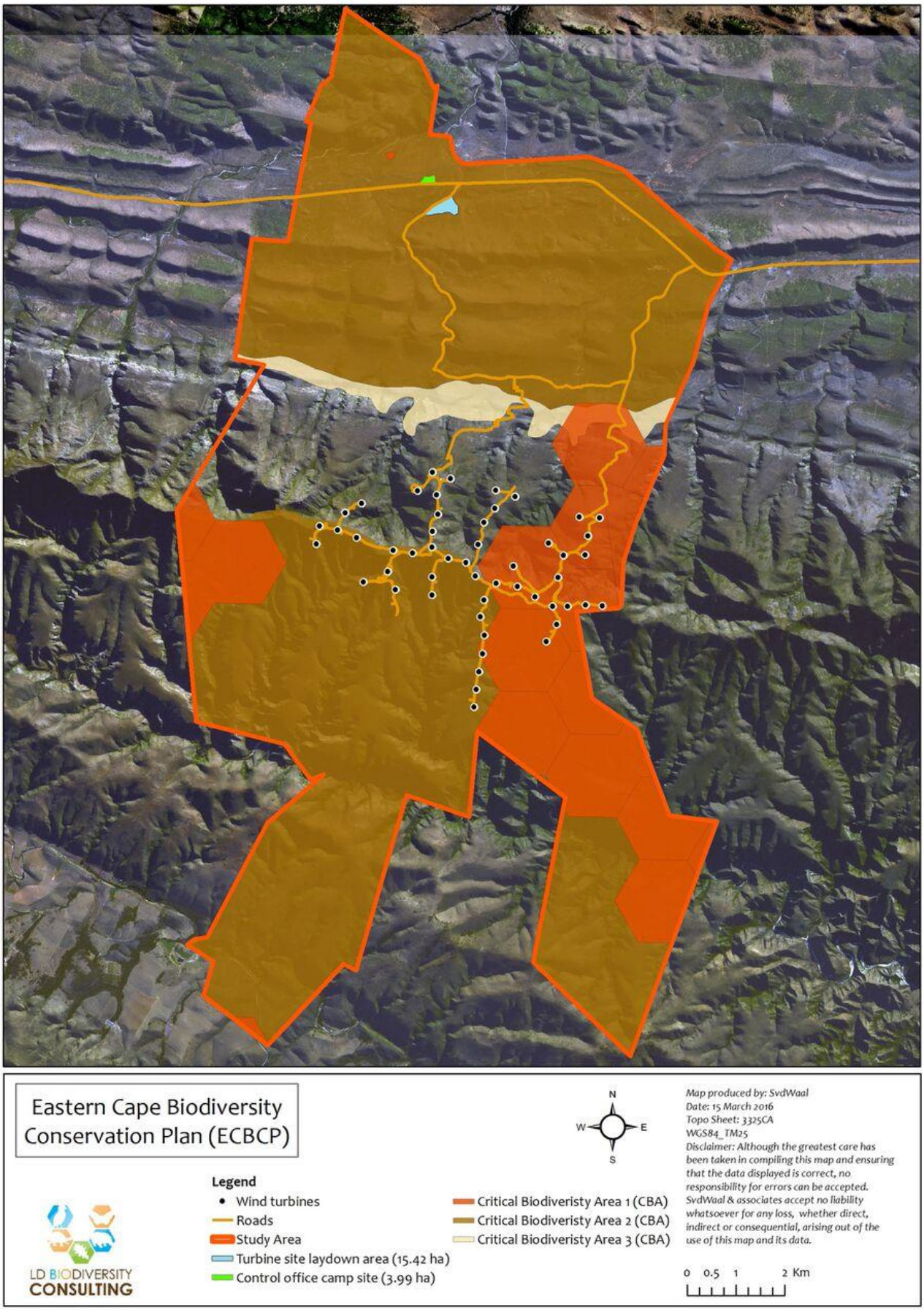


Figure 3-11: ECBCP CBAs in the study site (Source: de Wet 2016)

3.7.6 Baviaanskloof Reserve Cluster

The Eastern Cape Parks and Tourism Agency (ECPTA) is responsible for the management of the Baviaanskloof Nature Reserve (BNR) which forms the core of the Baviaanskloof Mega Reserve. In 2004 the Baviaanskloof Nature reserve was proclaimed a World heritage Site based on the high level of biodiversity and threatened species that are characteristic of the area (Boshoff, 2008). The BNR forms part of the Baviaanskloof Reserve Cluster which includes the Groendal and Formosa Nature Reserves.

The project area lies adjacent to two portions of the Groendal Wilderness Area. Groendal Wilderness Area comprises of two sections. The Kwa-Zunga Section is part of Groendal Wilderness Area and Stinkhoutberg Nature reserve is an independent nature reserve.

The Groendal Wilderness Area lies at the eastern extremity of the Groot Winterhoek Mountains and protects the water catchment of the Swartkops and KwaZunga River. It is characterised by unspoilt vegetation with numerous kloofs and streams that form a pristine wilderness area.

It is estimated that the Baviaanskloof Nature Reserve and World Heritage Site houses over 1 100 plant species, 20 of which are known to be endemic and 52 that are listed as Red Data Book Species (Erlank, 2010). It is expected that this list will increase by at least 100 species if Groendal Nature Reserve and Formosa Nature Reserve are also included.

The ECPTA and SANParks were engaged in the Scoping phase to solicit preliminary opinion on the proposed project as well as the potential for private landowner conservancy agreements for the property portions in question. Early indications from the ECPTA are that they are not supportive of the proposed development, with SANParks indicating that the proposal does not intrude on any areas within their conservation planning domain.

Issues or concerns raised by ECPTA are noted in Table 4-1 and Table 4-2 and in Table 4-3 of this report.

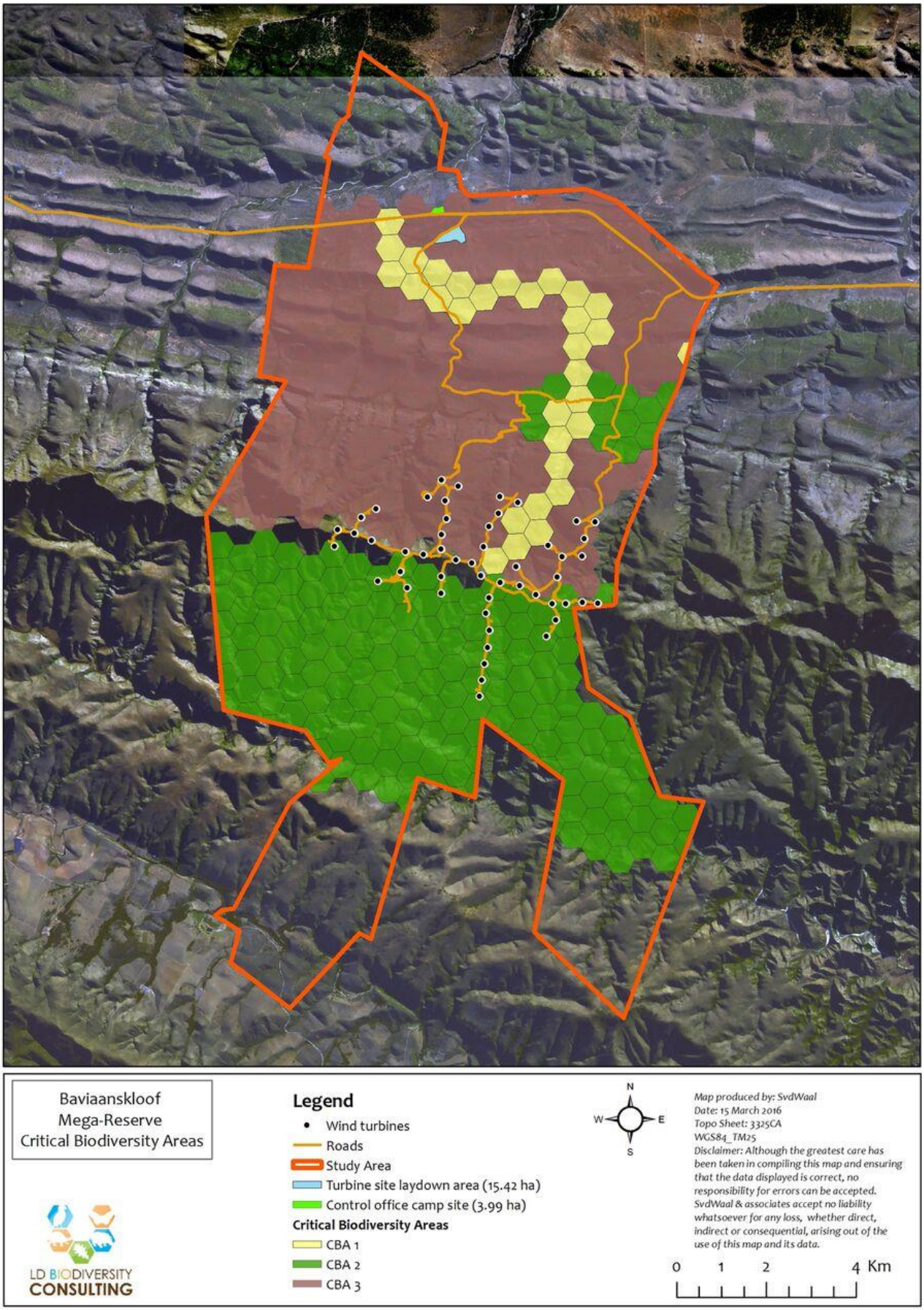


Figure 3-12: Baviaanskloof mega-reserve CBAs in the study site (Source: de Wet 2016)

3.8 Socio-Economic Profile

The proposed Inyanda - Roodeplaat WEF is to be developed in the Sundays River Valley Municipality situated within the Cacadu District Municipality, Eastern Cape Province. The Sundays River Municipality is located approximately 80 km north and east of the Nelson Mandela Bay Municipality and includes the coastal zone between Alexandria and the Sundays River Mouth as well as inland areas that extend to the Klein Winterhoek and Zuurberg Mountains. The main activities in the area include high intensity irrigation farming, eco-tourism and game farming.

The Sundays River Municipality is the fourth most populous municipality within the Cacadu district with a population of 54 504 people (StatsSA, 2011). The population is diversified across race groups and culture and is characterised by varying socio-economic levels of development. These are outlined in Table 3-10 to Table 3-12. These statistics show a predominantly black population with the majority of the population being employed or not economically active. Children constitute 26.1 % of Sunday's River Valley population, the economically active population is at 65.8 % and persons aged 65 and older at 5.6 %.

Table 3-10: Representative population groups in the Sundays River Valley Local Municipality (Census, 2001)

Population Group	Percentage
Black	76.6
Coloured	18.06
Indian/Asian	0.02
White	5.35

Table 3-11: Employment status in the Sundays Rive Valley Municipality (Census, 2011)

Employment Status	Percentage
Employed	29.5
Unemployed	5.2
Not Economically Active	65.3

Table 3-12: Income groups in the Sundays River Valley Municipality (Census, 2011)

Annual average household income	Percentage
No income	11,7%
R1 - R4,800	3,7%
R4,801 – R9,600	6.6%
R9,601 – R19,600	25,3%
R19, 601- R38, 200	26,7%
R38, 201 – R76, 400	15,3%
R76, 401 - R153, 800	5,4%
R153, 801 – R307,600	2,9%
R307, 601 – R614, 400	1,6%
R614, 401 - R1, 228, 800	0,3%
R1, 228, 801 – R2, 457, 600	0,1%
R2, 457, 601+	0,3%

The largest industry in the area is agriculture followed by Community and Social Services (Table 3-13). The largest group of the population is the employed group (between the ages of 15-64) constituting approximately 65.8% of the population. This data reflects that the majority of the population does not receive income and the majority of those who do earn an income earn within the R1601 – R3200 bracket. This reflects the level of poverty within the municipality.

Table 3-13: Industry amongst the employed in Sundays River Valley Municipality (Census, 2007)

Industry amongst the employed aged 15 to 65 years	Percentage
Agriculture; forestry and fishing	48.6
Undetermined	13.2
Community/Social Services	10.2
Private households	9.2
Wholesale Retail	7.5
Manufacturing	4.8
Financial, insurance, real estate	2.3
Construction	2.1
Transport, storage, communication	1.5
Electricity, gas, water	0.6
Mining / quarrying	0.1

The **Cacadu District Municipality Integrated Development Plan (IDP)** recognizes that although the electricity network within the District is generally regarded as reasonable, there are slight disparities that exist between the different local municipalities due to their location. While the majority of the communities of most Local Municipalities have direct access to electricity there are backlogs with respect to electricity provision that need to be addressed. It is envisaged that significant capital outlays will be required to upgrade both the urban and rural networks if they are to meet their target of ensuring universal access to electricity by 2014.

The **Sunday's River Integrated Development Plan (IDP)** identifies the need to continue to build, revamp and maintain electricity infrastructure, including its generation, distribution and reticulation to ensure that there is a sufficient and sustainable supply. It also recognises the need to develop alternative energy sources to meet these requirements.

4 Public Participation

The Public Participation Process (PPP) forms a key component of the EIA process. The objectives of the PPP are outlined below, followed by a summary of the approach taken, and the issues raised thus far.

4.1 Objectives and Approach

The overall aim of the PPP is to ensure that all Interested and Affected Parties (IAPs) have adequate opportunities to provide input into the process. More specifically, the objectives of the PPP are as follows:

- Identify IAPs and notify them of the proposed project and of the EIA process;
- Provide an opportunity for IAPs to raise issues and concerns; and
- Provide an opportunity for IAPs to review the Draft Environmental Impact Report prior to its finalisation.

4.2 Public Participation Activities

The Public Participation Process that was undertaken to solicit public opinion regarding the proposed activity has included the following activities so far:

- Advertisement of the development in two Provincial Newspapers ("Die Burger" on 23 March 2013 and "The Herald on 22 March 2013) as well as one local newspaper ("UD News") on 28 March 2013 (proof of public participation was included in the FSR);
- Distribution of the Background Information Document (BID) to relevant stakeholders and authorities (proof of distribution was included in the FSR);
- Distribution of written notice to relevant stakeholders and authorities (proof of distribution of the FBAR is included in Appendix E3);
- Placement of three onsite notice boards on the boundary of the proposed project sites near the proposed locations;
- Collation of public and IAP comments on the BID and adverts, including responses to these issues;
- Inclusion in the Draft Scoping Report (DSR) of issues that were raised;
- Preparation and Distribution of the DSR to public venues for review by IAPs;
- Distribution of the Executive Summary to all IAPs registered for this process;
- Placement of a second newspaper notice in "Die Burger" on 12 October 2013 and two local newspapers "UD News" and "Coega Express" on 17 October 2013 advising of the availability of the Draft Scoping Report;
- Provision of a 40 day comment period on the DSR;
- Conducting two public meetings on 23 October 2013 in Port Elizabeth and Kirkwood respectively;
- Collation of public and IAP comments on the DSR, and incorporation of these into the FSR;
- Submission of FSR and Plan of Study for EIA to DEA for a decision regarding authorisation to proceed to the Impact Assessment phase of the EIA;
- Receipt of the letter of approval of the FSR and Plan of Study for the EIA from DEA dated 9 October 2015;
- Distribution of the Draft EIR on 8 April 2016 to public venues, identified government departments, as well as the distribution of an Executive Summary to all registered IAPs, and notification of the provision of a 40-day comment period;

4.2.1 Availability of Draft Environmental Impact Report

The executive summary of the Draft Environmental Impact Report (EIR) has been distributed to registered IAPs. A printed copy of this report is available for public review at:

- Uitenhage Public Subscription Library (Caledon Street, Uitenhage); and
- Kirkwood Public Library (Jefferson Avenue, Kirkwood).

The report can also be accessed as an electronic copy on SRK Consulting's webpage via the 'Public Documents' link: http://www.srk.co.za/en/page/za-public-documents.

The public are encouraged to review this Draft Environmental Impact Report and send written comment by **17h00 on 20 May 2016** to:

Wanda Marais at SRK Consulting

PO Box 21842, Port Elizabeth, 6000

Email: wmarais@srk.co.za

Fax: (041) 509 4850

The Draft Environmental Impact Report (this report) has been submitted to DEA and the other relevant authorities, for comment before compilation of the Final Environmental Impact Report.

Once IAPs have commented on the information presented in the DEIR, the Final Environmental Impact Report (FEIR) will be produced and submitted to DEA to use in order to take a decision about the proposed development. The public is therefore urged to submit comments, as the comments will affect the FEIR and the decision taken by DEA.

4.2.2 Issues Raised

During the scoping phase, some IAPs and stakeholders raised issues and concerns regarding the proposed development. Copies of written correspondence received from IAPs were included in the FSR. A list of registered and notified IAPs is given in Appendix D. Issues raised by IAPs to date are summarised in Table 4-1 (comments on the BID); Table 4-2 (comments on the DSR) and Table 4-3 (comments on the FSR) below and original copies of comments on the FSR are provided in Appendix E1. For copies of correspondence received on previous reports, please refer to the FSR.

Table 4-1 Issues and concerns prior to the release of the DSR

Name	Issue	Date	Response
General			
Tinus Vermaak Elands River Fire Protection Association (FPA) and Tourism Chairman	Need information with regards to planned information meetings and program indicating EIA process and progress	10/06/2013 Email	[CES] All interested and affected parties were supplied with a background information document (BID) that contains a brief description of the EIA process. All registered IAPs will be informed of any events such as public meetings and release of report for comment. [CES] The Environmental Impact Assessment (EIA) process is fully explained within the draft Scoping Report that was released and made available for public review and comment.
Alastair Gordon Rudman Merora Farming cc.	Where are the transmission lines and where will it connect into substations	11/06/2013 Email	[CES] The initial placement of the power lines for the project site can be found in the alternatives section of the scoping report. Two alternative line corridors have been proposed; they run from the north of the site and connect

Name	Issue	Date	Response
			to the Eskom grid at the Skilpad substation. [SRK] Since the release of the Draft Scoping Report, it has been confirmed that the southern route alignment in Figure 2-12 is the preferred alignment. A summary of considerations for powerline alternatives is presented in Section 6.1.1.
Asanda Sontele Eastern Cape Parks and Tourism Agency	The Department of Environmental Affairs (DEA) is currently conducting a Strategic Environmental Assessment for South Africa for Wind Energy which will create strategic nodes to site wind energy farms. Due to the high level of sensitivity of the proposed development site and its surrounding, ECPTA recommends that this process aligns itself with the outcomes of that SEA.	6/11/2013 Email	[CES] According to the CSIR website, "*Finalisation of Renewable Energy Development Zones (REDZs) identification is planned for the third quarter of 2014, after which it will be submitted for Cabinet approval and subsequent gazetting*". Even though this will be gazetted and the SEA will recommend ideal placement of renewable energy development, this will not preclude developers from applying for renewable energy developments outside of the areas recommended by the SEA. This information is also available on the CSIR website, which states: "*No existing projects already applied for at DEA will be affected by the SEAs given that the SEAs will only come into effect after 2014 after which the current EIA process, including motivating for development in any area, will still be available for any development outside the REDZs.*"
Asanda Sontele Eastern Cape Parks and Tourism Agency	Is situated in a priority area identified in the ECPAES and between three nature reserves (Groendal, Stinkhoutberg & Mierhoopplaat) and the Baviaanskloof WHS. The nature reserves will all become part of the Cape Floristic Region Protected Areas World Heritage Sites (CFRPA WHS) once the extension process has been completed.	6/11/2013 Email	[CES] This is a concern of ours. The developer has discussed plans to maintain the property as a conservation area after the construction of the wind turbines are completed (should an EA be granted).
	A portion of the site falls within a CBA 1 as identified by the Eastern Cape Biodiversity Conservation Plan (ECBCP). Most of the remainder is in a CBA 2. Portions of the site also identified in the Baviaanskloof Conservation Plan as CBA 1 and 2.		[SRK] Noted. Critical Biodiversity Areas in terms of various conservation planning tools are presented in 3.7 and the significance of these considered in the Ecological Impact Assessment (see the Supplementary Volume of Specialist Studies , Appendix F)
Rolf Clotz	Farmer in the Elands River Valley expressed interest in the project and requested that his property be considered for inclusion.	Email 21/07/13	[CES] CES contacted both the developer and the land owner. [SRK] The potential to expand this WEF, or develop other wind farms, on adjoining properties does not form part of this EIA process.
Visual, noise and ecological impact			
Neil Robert Evans Private land owner Neighbour	Visual and Noise Impact	Fax	[SRK] A Noise Impact Assessment and a Visual Impact Assessment are included in Appendix H and J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.10 and Section 5.12 respectively of this report.
Alastair Gordon	What are the :	11/06/13	[SRK] A Visual Impact Assessment is included in Appendix J of the Supplementary Volume of

Name	Issue	Date	Response
Rudman Merora Farming cc.	Visual and Aesthetic Impacts	Email	Specialist Studies, and summarised in and Section 5.12 of this report.
	Ecological Impact		[SRK] An Ecological Impact Assessment is included in Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report.
	Noise impact on domestic livestock		[SRK] A Noise Impact Assessment is included in Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.10 of this report. Comment is made on the absence of standards for assessing impacts on animals.
	How will this affect indigenous trees, fauna and flora		[SRK] An Ecological Impact Assessment is included in Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report.
Asanda Sontele Eastern Cape Parks and Tourism Agency	Impacts on views and sense of place (especially considering that Groendal is a declared wilderness area). From the top of the plateaus at Groendal (which form part of the network of hiking trails) there is a completely uninterrupted view all the way to the Baviaanskloof. The presence of 120 m wind turbines right on the boundary (the closest one is less than 100 m from the boundary) of Groendal could have a severe impact on views and sense of place.	6/11/2013 Email	[SRK] A Visual Impact Assessment is included in Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report.
Mr Bool Smuts Landmark Foundation	As independent environmental consultants CES should desist from marketing the company that is proposing the development as in your words: *"company, was founded to supply Africa with clean, renewable and sustainable power sources"*. Such comments will in due course be interpreted as a conflict of interest for your company.	Email 19/05/2013	[CES] CES can assure that we have no interest in marketing any applicant, neither do we have any commercial interest or otherwise in any applicants' ventures. The wording about the company is theirs, as are they entitled to in these notifications and process related submissions.
Mr Bool Smuts and Ms Jeannine Landmark Foundation	This new development for yet another wind farm is again transecting a very important leopard connectivity corridor. The PhD that is about to be concluded indicates that we are sitting with a locally and critically endangered population of less than 40 individual territorial cats in the about 350 000 ha region surrounding the Baviaanskloof, Stinhoutberg, Groendal complex, inclusive of the Winterhoek mountains you have identified in this correspondence sequence. I have no doubt that this proposed industrial size development in a key part of their habitat will be the death-knell for the species that already has to contend with intense farmer persecutions.	Email 19/05/2013	[SRK] CES integrated some of the information regarding leopard into the Final Scoping Report. No specific specialist studies regarding habitat fragmentation of leopard were proposed in the EIA phase. An assessment of fragmentation on ecology in general is included in Section 5.8.6 of this report.

Name	Issue	Date	Response
	You would be familiar with our position, which would likely be similar to the objections raised on the Brakkefontein Wind Farm development. The details we can provide as part of the IAP.		
Impact on Groendal dam			
Thomas Pietschmann Neighbour	It is a watershed area servicing the Groendal Dam which supplies drinking water to Uitenhage area. A wilderness area which is sacred for life.	Email	[SRK] A Hydrological Impact Assessment that looks at the potential impact on water resources is included in Appendix G of the Supplementary Volume of Specialist Studies, and summarised in Section 5.9 of this report.
Asanda Sontele Eastern Cape Parks and Tourism Agency	Eastern Cape Parks and Tourism is the designated Management Authority for the Baviaanskloof World Heritage Site as well as the Groendal Nature Reserve. The proposed area for the Wind Energy facility falls within the buffer zone around Baviaanskloof WHS.	18/06/2013 Email	[SRK] Noted. Comment on the proximity to these protected areas is made throughout this report. SRK will consult with ECPTA during the comment period of the Draft EIR.
Neil Robert Evans Private land owner Neighbour	Site is a watershed for Groendal Dam, it will result in siltification.	Fax	[SRK] A Hydrological Impact Assessment that looks at the potential impact on water resources is included in Appendix G of the Supplementary Volume of Specialist Studies, and summarised in Section 5.9 of this report.
Asanda Sontele Eastern Cape Parks and Tourism Agency	This proposed site is situated within a mountain catchment, which is the source of the Kwazunga River which feeds into Groendal Dam – the main water reservoir for Uitenhage domestic water supply. Disturbance of the area has the potential to negatively affect catchment as well as increase siltation of the dam.	18/06/2013 Email	[SRK] A Hydrological Impact Assessment that looks at the potential impact on water resources is included in Appendix G of the Supplementary Volume of Specialist Studies, and summarised in Section 5.9 of this report.
Groendal Nature Reserve			
Thomas Pietschmann Neighbour	Totally unacceptable. The area falls directly between the future planned Groendal and Baviaans Mega Reserve.	Email	[SRK] Noted. Comment on the proximity to these protected areas is made throughout this report. SRK will consult with ECPTA during the comment period of the Draft EIR.
Avifaunal and bat			
Alastair Gordon Rudman Merora Farming cc.	What are the noise impacts on domestic wild life and birds – Endangered species?	11/06/2013 Email	[SRK] A Noise Impact Assessment is included in Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.10 of this report. Comment is made on the absence of standards for assessing impacts on animals.

Table 4-2: Issues and concerns following the release of the DSR

Raised by:	Date	Issue, concern, comment	Response
General Issues			
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Figure1-1: Important information was not included in the map., for example, boundaries of the protected areas., existing power lines, existing substations, minor roads, rivers, catchments/sub-catchments; municipal boundaries.	[CES] The map is meant to show protected areas in the vicinity of the site and putting more information as suggested on the map would render it impossible to read. [SRK] A map showing protected areas is presented (Figure 1-3).
		Is there more than one volume?	[CES] No this is a Scoping Report more volumes will be available in the EIR.
		A summary of the "available wind data" should be included in the EIR to substantiate the statement "According to Inyanda, available wind data in South Africa shows this area to have favourable wind conditions sufficient to support a wind farm" Climate: There is no discussion on wind regimes despite the fact that this is an application for a wind farm.	[SRK] A summary of wind monitoring data from the 60 m mast on the site was included in the FSR and again in this Draft EIR (Figure 3-3 on page 53). An underlying assumption in the EIA process is that the financing of the proposed development would only be forthcoming if the site has a proven wind resource.
		Please indicate in which Registration Division each property is located; the size of the farm; and the owner(s) of the farm.	[CES] The registration division is the administrative District of Cape and the size of the farm portions have been included in Table 1-1 on page 2.
			[SRK] Ownership of farm portions within and adjacent to the study area are depicted in Figure 1-2 on page 3.
		The batching plant should preferably be off-site and concrete brought by trucks.	[SRK] The project engineers have indicated that a concrete batching area is needed for this development. The proposed location of the concrete batching area is depicted in Figure 2-1 and a description of the typical infrastructure in Section 2.2.3. .
		3rd Par; 3rd Bullet: Where are the nearest overhead lines and substation	[SRK] Skilpad is the nearest substation and overhead power line connection to the proposed development approximately 28 km north east of the project site. The length of the preferred powerline route alignment is ±35 km.
		3rd Par; 5th bullet: Why is the fact the area is "not densely populated" an important criteria for choosing the area?	[CES] There will be fewer people that are impacted on negatively by direct impacts of the proposed project.
		In what phase/stage is this project?	[CES] The project is still in the feasibility phase of which the EIA process is an integral component.
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Background to the study: Where does the wind Energy Farm get the name Roodeplaat from?	[Afri-Coast] Roodeplaat is derived from the original farm name.
		Background to the study: There is no figure 1 overleaf. It is on page ii.	[CES] Noted
		Pg. 9; 1st Par; Third line: This is the Draft Scoping Report	[CES] Noted
		Pg. 4 & 12 Figure 1-1 & 2-1: The map is too small. At this scale a lot of detail is lost, it should be provided at an A3 size at least.	[CES] Noted these have been provided with final scoping report.
			[SRK] Larger versions of selected maps / are included in Appendix F.

Raised by:	Date	Issue, concern, comment	Response
		Page 14; (Header): The header refers to the incorrect section of the report.	[CES] Noted
		As with the previous maps there is important information missing, particularly the locality of the protected areas. The reproduction of the maps was poor and certain information is illegible. It should be provided at an A3 size at least. Figure 4-4; 4-7; 4-8; 7-1; 7-2.	[CES] Noted. Each map is presented to show the location of the project in relation to each guideline and management regime. If all information were to be viewed on one map it would render it illegible. It is the opinion of CES that the suggested maps have the appropriate content and are illustrated at the appropriate size. All maps should be read in conjunction with Figure 1.1.
			[SRK] Better quality maps were provided in the FSR and changes in number were noted.
		Section 4.2 describes Climate.	[CES] Noted.
		NPAES and PAES are not in the abbreviation list. Give a brief explanation of these strategies. Pg. 41 (Table 4-5) Second Row: Protected Areas Expansion Strategy:	[CES] Noted. Has been included in the abbreviations list. The explanation of these is presented in the Section 3.7.2.
		Section 4.3 describes current Land Use. Pg. 41 (Table 4-5) Second Row: Protected Areas Expansion Strategy: Right Hand Cell; Third Paragraph:	[CES] Noted
		Pg. 58; 6.1 (Table 6-1)2nd Row; 4th Cell: Design of the turbine layout will……	[CES] Noted
		Pg. 62; 6.1 (Table 6-1) Wetlands & Ground water 1st bullet: Turbines should be placed a minimum of 100 m from the drainage lines.	[CES] Noted this will be part of the Construction Environmental Management Programme (CEMPr).
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 65; 6.2 Issues Arising from IAPs 1st Row: FPA is not in the list of abbreviations.	[CES] Noted
		Pg. 65; 6.2 Issues Arising from IAPs 2nd Row; 4th Cell: The placement of the power lines is not in the alternatives section.	[CES] The placement of power lines is in the alternatives section. Refer to Figure 2-12.
		Pg. 65; 6.2 Issues Arising from IAPs 3rd Row; 3rd Cell: What is the correct date?	[CES] 06/11/2013
		Pg. 65; 6.2 Issues Arising from IAPs 3rd Row; 4th Cell: Please substantiate the opinion that developers may apply for renewable energy projects outside areas recommended by the SEA. This would defeat the objectives of having a SEA. This department supports the ECPTA's recommendation that this EIA process aligns itself with the outcomes of the SEA. The statement from CSIR's website is mainly an opinion. They do not know what will finally be gazetted.	[CES] The SEA referred to is still under development and as such it is impossible for this EIA process align itself with any future outcomes or designations stemming from the SEA process. The lack of an SEA type policy at this time cannot preclude an applicant from continuing with the EIA process. It should be noted that the potential opportunity and constraint areas that would have to be defined in this SEA are those based on a broad scale study and should an applicant wish to conduct an application for a project that may fall in an eventually determined constraint zone they still have the legal right to proceed with an EIA application regardless.
		Pg. 66; 6.2 Issues Arising from IAPs 1st Row; 2nd Cell: These are two of the reasons why this Department does not support the construction of a wind farm	[CES] Noted

Raised by:	Date	Issue, concern, comment	Response
		in this area.	
		Pg. 67; 6.2 Issues Arising from IAPs 4th Column; 4th Cell: Where is "point 2 above"?	[CES] Noted, correction was made in the table.
Elands River Conservancy (ERC)	email 2013/11/25	The ERC strongly supports the development and use of environment friendly renewable energy sources, however these developments still need to be handled responsibly and with the least possible detrimental effect to the environment – in particular the location of sites.	[SRK] Further to the selection of a site for a wind farm, micro-siting of turbine locations can also affect the significance of impacts, e.g. distance from breeding sites may reduce impacts on certain birds. The site layout has been amended to accommodate some of the anticipated impacts (see Section 2.3.2) and will be assessed further during the impact assessment phase.
Marthinus Briers Neighbour	email 25.11.2013	The existence of the Groendal Nature Areas is proof of the need to protect the area. It would be unforgiveable if the Groendal area is split with a wind farm that will change the landscape and potentially devastating consequences for the environment.	[CES] Noted
Tinus Vermaak Elands River Fire Protection Association (FPA) and Tourism Chairman	Undated	Will the land owners of the proposed wind farm join the Elands River Valley Fire Prevention Association?	[Afri-Coast] It would be in the interests of Inyanda Energy, as operator of the wind farm, to be a member of the fire protection association.
Dr Paul Martin Private Environmental Consultant	email 2013.04.02	I would like to know where the wind farm is proposed and whether "standard" turbines (like the Coega one) will be used.	[SRK] It is assumed that CES provided this information to Dr Martin at the time of the request. For the record, the site location is presented in Figure 1-1 and a description of the turbines in Section 2.2. The precise choice of turbine has yet to be confirmed. The assessment is based on a turbine with a 85 m high hub height and approximately 63 m rotor length. The possibility of using concrete towers was under consideration at the time of compiling the FSR but is no longer proposed as a technology alternative and is consequently not assessed in the EIR.
Dr Paul Martin Private Environmental Consultant	email 2013.08.05	There are many potential places for wind farms in the E Cape – this does not seem to be an appropriate location.	[SRK] Noted.
Ecological			
Dr P Martin Private Environmental Consultant	email 2013.08.05	The existing Protected Area Network must be clearly shown and the development assessed in terms of both the nearby protected areas and the future plan for an Eden to Addo Protected Area corridor that would presumably include the project area.	[SRK] The location of protected areas and the NPAES are included in the Figure 3-9 of this report. The noise and visual impact assessments have considered the potential impacts that could be experienced in the neighbouring protected area.
Alastair Gordon Rudman Merora Farming cc	email 11.06.13	How will this affect indigenous trees, fauna & flora?	[SRK] An Ecological Impact Assessment is included in Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report.

Raised by:	Date	Issue, concern, comment	Response
Marthinus Briers Neighbour	email 2013.12.02	It is important to expand the study to the surrounding area and not just the study area as there is minimal fencing and area is part of an eco-system that stretches from Uitenhage into the Baviaanskloof. The potential impact on conservation corridors needs to be studied.	[SRK] Agreed. An Ecological Impact Assessment is included in Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report. As was the case for all specialist studies, the ecological specialist was required to define an appropriate zone of influence of any potential impact and record this in the assessment.
Dr Dave Balfour ECPTA	email 2013.11.20	The DSR notes that the landowner is interested in game farming, is aware that the properties are in an important corridor between protected areas and is interested in biodiversity offset. Due to the high level of sensitivity of the proposed development and its surroundings, the development is definitely not one that ECPTA can support. ECPTA remains of the opinion that the proposed development is fatally flawed.	[SRK] The ECPTA's position was noted in the FSR. SRK has been informed that the landowner and ECPTA have, subsequent to this correspondence, been in discussion regarding a potential stewardship agreement which would amongst other factors, address the proposed wind farm.
Dr Dave Balfour ECPTA	email 2013.11.20	The site is in the Groot Winterberg Mountains and lies between 3 nature reserves (Groendal, Stinkhoutberg & Mierhoopplaat) and the Baviaanskloof section of the Cape Floristic Region World Heritage Site (CFR WHS). Both Stinkhoutberg and Groendal Wilderness are included in a proposed extension to the CFR WHS. The site may also fall within the current 10 km buffer of the Baviaanskloof WHS.	[SRK] The proximity of the proposed development to these conservation areas is recorded in Figure 3-9 and Figure 3-12. An Ecological Impact Assessment is included in Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report.
Dr Dave Balfour ECPTA	email 2013.11.20	The site is situated in a priority area in the Eastern Cape Protected Area Expansion Strategy (ECPAES), and a portion of the site falls within a Critical Biodiversity Area (CBA) 1 as identified by the Eastern Cape Biodiversity Conservation Plan. Most of the remainder is in a CBA 2. Portions of the site are also identified in the Baviaanskloof Conservation Plan as CBA 1 and 2. The DSR does consider the outcomes of planning products such as SKEP and NPAES but these are outdated and the EIA should rather refer to more recent conservation strategies such as ECPAES and the fine-scale conservation plan for the Baviaanskloof.	[SRK] An Ecological Impact Assessment is included in Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report. The assessment includes consideration of the ECPAES and the fine-scale conservation plan for the Baviaanskloof.
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Climate, Geology, topography and current land-use: The relevance of these parameters should be discussed in the EIR.	[CES] Noted
		Pg. 37 (Amphibians) Keeping to the relevance of information for the project is important (malaria and bilharzia in this area?)	[CES] The reference to disease vectors for malaria and bilharzia is a general statement that pertains to the importance of amphibians. This statement has been excised to avoid confusion since as noted is not relevant to the project area itself.

Raised by:	Date	Issue, concern, comment	Response
		Pg. 71; Table 7-1. 1st Row: Twenty four properties covering 12 000ha is a large area. The ecological impact is very much understated in this report.	[SRK] DEDEAT appear to have misunderstood this table which is aimed at the relative merits of different energy generation technologies. The ecological impact of the proposed footprint has been assessed and reported on in the Ecological Impact Assessment (see Appendix F of the Supplementary Volume of Specialist Studies) and Section 5.8 of this report.
		Pg. 41 (Table 4-5) Third Row: National Wetlands Inventory: Routes to cross drainage lines must be chosen very carefully with measures to mitigate the impacts.	[SRK] A Hydrological Impact Assessment that included an assessment of wetlands, is included in Appendix G of the Supplementary Volume of Specialist Studies, and summarised in Section 5.9 of this report.
		Pg. 53 Figure 4-9. Figure 4-9 needs to be brought into the context of the project. What is its relevance?	[CES] The figure showed the Baviaanskloof Planning areas in relation to the wind turbines.
		(ix): Vegetation and flora: This is a pretty meaningless description. Most IAPs will most probably not understand what is described here.	[SRK] The Ecological Impact Assessment is included in Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report. Although written for ecologists, it is hoped that the description is accessible to a wider audience.
		(x) Fauna: Does the chameleon have any legal status in South Africa law?	[SRK] Comment on the status of chameleons in the study area is included in Section 3.6.1 and impacts are assessed in Section 5.8.4 of this report. . The ecological baseline study by CES included chameleons (with input from Dr Werner Conradie) and is included in is included in Appendix F of the Supplementary Volume of Specialist Studies.
		(x) Fauna: All species are of conservation concern. This sentence needs to be reworded.	[CES] CES is unsure which sentence is being referred to
		(x) Fauna: Third Paragraph Last sentence: What are these three species?	[CES] This will be clarified by the Ecological specialist in the EIR.
		(x) & (pg. 40): Fauna: What relevance has this paragraph on the project?	[CES] CES is unsure which sentence is being referred to
		Pg. 32-34: STEP and SKEP: What is the relevance of describing three vegetation types? Unless there is a good reasons. Mucina & Rutherford should be adequate.	[CES] Noted. The scoping phase identifies all relevant planning tools and spatial mapping relevant to the project area. These tools present supplementary information that Mucina & Rutherford does not include.
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 30 Kouga Grassy Sandstone Fynbos: It will important to discuss that fire is a dominant factor in ecological processes in this vegetation type.	[SRK] Input from the ecological specialist has been obtained in this regard, and is reported in Section 7.7 of this EIR.
		Pg. 42 (Table 4-5) Third Row: STEP: Right Hand Cell: Third Paragraph Section 4.4 describes the vegetation of the study area.	[CES] Noted

Raised by:	Date	Issue, concern, comment	Response
		Pg. 46- 48: STEP project What is the relevance of STEP in the project?	[CES] The STEP project in relation to the project area is presented in Figure 3-5, which illustrates the project area includes areas of threatened ecosystem and critically endangered, endangered and vulnerable classified areas. However the land portions proposed for construction fall outside the threatened ecosystem delineations.
		Pg. 50-51: 4.7.4 ECBCP What is the relevance of ECBCP in this project?	[CES] The ECBCP is the main Provincially developed conservation planning tool available. It is uncertain why the DEDEAT would deem it to be irrelevant if that is the statement they are making. As presented on the map and explained in Section 3.7.4 on page 79, according to ECBCP the proposed project falls within CBA 1 and CBA 2 which are described in Table 3-9.
		Pg. 51: 4.7.4 ECBCP; Last Paragraph. What is the relationship between STEP, Mucina & Rutherford and ECBCP?	[CES] STEP, Mucina & Rutherford and ECBCP are the available planning tools and spatial mapping relevant to the project area, however there is no direct relationship between these as they have spate objectives and aims
		Pg. 52 Figure 4-8 A third of the proposed wind turbines are in CBA 1. Figure 4-9 needs to be brought into the context of the project. What is its relevance?	[SRK] The Ecological Impact Assessment, Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report, discussed the significance of the ecological impacts due to the positioning of infrastructure in CBAs.
		Pg. 90 There is a new edition (2007) of Skead that should be consulted for information on mammals.	[CES] Noted and updated
		Pg. 29 & 30 Mucina & Rutherford? The first three paragraphs can be omitted. Just refer to the reference Mucina & Rutherford (2006). It would be appropriate to discuss that this is Regional scale map (1:250 000) and thus gives a general idea of the vegetation types.	[CES] Noted. Reference made to the regional scale mapping of Mucina and Rutherford.
		Pg. 30 Albany Alluvial Vegetation: (last line): Delete the phrase: “However as with the Sundays River Thicket”	[CES] Deleted
		Pg. 34 (Last paragraph) Is this the South African or IUCN Red Data list? Which version of the Red Data list was consulted?	[CES] In the paragraph it is the IUCN Red Data list. As referenced the 2012 version
		Pg. 34 (Last paragraph) Fifth Line: The term “Conservation Body” is inappropriate. The first column is Table 4 actually refers to legislation (NEMBA, CITES, PNCO, and Protected Trees). Only the IUCN is conservation body: an international NGO. A brief explanation of this legislation and the IUCN in the context of SSC would be appropriate as the terminology would be confusing to IAPs.	[CES] Noted the table (now Table 3-1) was corrected to reflect both legislation and conservation body.
D Govender (Regional Manager	email 2013/12/04	Pg. 36 (Table 4-2) The IUCN column should be deleted as third column describes the IUCN Red Data Status of	[CES] Noted, columns were included to illustrate that these were assessed and none were found to occur within the study site.

Raised by:	Date	Issue, concern, comment	Response
DEDEAT; Cacadu)		the species. Is this SA Red Data List? Critically Rare should read Critically Endangered if there is no TOPs (NEMBA) or Protected Trees. Why include these columns in the table?	
		Pg. 38: 4.6.2 (Table 4-3) Is this Red Data List the South African or IUCN version?	[CES] Both are referred to here and are clarified further in the EIA
		Pg. 40: 4.6.3 (Mammals) Explain that these are Threatened or protected Species promulgated in terms of regulations published under NEMBA.	[SRK] Animal species of special concern, including mammals, are reported in Section 5.8.4 of the Draft EIR.
		Pg. 40 Table 4-4 Are these from the South African or IUCN Red Data Species List? PNCO and SITEs column should be added to Table 4-4.	[SRK] Table 4-4 from the DSR is no longer relevant. An ecological specialist study, including species lists, can be found in Appendix F of the Supplementary Volume of Specialist Studies to this report.
		Pg. 77; 8.2.2 2nd Par – Last Line: Plants are also afforded protection by the nature and Environmental Conservation Ordinance (No 10 of 1974) and the Forest Act.	[CES] Noted and included.
		(iii); Pg. 7; Pg. 41- 42 3rd Par; 2nd bullet:	[CES] Noted.
		The department does not support the construction of a wind farm so close to the Groendal Wilderness Area, in an area that is earmarked as part of the expansion strategy of the ECPTA. A CBA 1 and in the catchment of the Groendal Dam.	[SRK] DEDEAT's position was noted in the FSR. SRK has been informed that the landowner and ECPTA have, subsequent to this correspondence, been in discussion regarding a potential stewardship agreement which would amongst other factors, address the proposed wind farm.
		Pg. 67; 6.2 Issues Arising from IAPs 3rd Row: The Department is concerned what impact a development of this size will have on the catchment of the Groendal dam?	[CES] It is unclear what the concerns are here, e.g.is it a concern regarding the catchment hydrological function? [SRK] A Hydrological Impact Assessment that included an assessment of the impact on surface water bodies, is included in Appendix G of the Supplementary Volume of Specialist Studies, and summarised in Section 5.9 of this report.
		(x) Fauna 7th Par: What are these three species? Refer to Table 4.4. on page 40?	[CES] Correct. Species were included in paragraph 7 of that report.
		(iv) 2nd Par: There are future plans to use this area to connect the Baviaanskloof to Groendal. A wind farm would be incomparable to this. Who are the "key stakeholders" that were identified?	[CES] Please refer to the IAP list in Appendix C8 for the list of stakeholders contacted.
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	(x) & (pg. 40): Pg. 68 Mammals: One of the reasons to expand the ECPTA's protected areas would be to provide more habitats to Leopards. The establishment of a wind farm would conflict with this objective.	[CES] The farm could have dual land use options. Conservation and the wind farm. The habitat may be disturbed during construction but during operation there will be minimal activity on site. [SRK] No specific specialist studies regarding habitat fragmentation of leopard were proposed in the EIA phase. An assessment of fragmentation on ecology in general is included in Section 5.8.6 of this report.
		Pg. 51; 4.7.5 Baviaanskloof Reserve	[CES] Noted and corrected

Raised by:	Date	Issue, concern, comment	Response
		Cluster; Second Paragraph The KwaZunga Section is part of Groendal Wilderness Area and Stinkhoutberg Nature reserve is an independent nature reserve.	
		Pg. 51; 4.7.5 Baviaanskloof Reserve Cluster; Third Paragraph; Second Line Groendal Wilderness Area protects the catchments of the Swartkops and Kwazunga Rivers.	[CES] Noted and corrected
Dr Dave Balfour ECPTA	email 2013.11.20	The proposed area is a mountain catchment and includes the source of the Kwazunga River which feeds Groendal Dam, which is the main water reservoir for Uitenhage domestic water supply.	[SRK] Noted. The Department of Water & Sanitation is included in the IAP database and have been notified of the proposed development. So far no concerns have been raised by the custodians of the water resource. A Hydrological Impact Assessment that included an assessment of the impact on surface water bodies, is included in Appendix G of the Supplementary Volume of Specialist Studies, and summarised in Section 5.9 of this report.
Thabo Nokoyo Department of Agriculture, Forestry & Fisheries	email 2013.06.11	As a department we would like to warn that the area of Uitenhage although is mostly covered by thicket with some species that are not covered by our Act i.e. National Forest Act No 84 of 1998, there is usually a large presence of milkwoods and cheesewoods which are protected trees. A license issued under that Act will have to be sought before they are destroyed or disturbed in any manner, This is because wind farms do entail such features as access roads and solid bases for the turbines from 20m x 20m and more and those have huge negative impacts on vegetation especially sensitive ecosystems as thicket and forests. Proper search should be done to establish the presence of the species mentioned above.	[SRK] Comment noted. The potential for protected trees to be impacted on by the proposed development has not been identified during the course of the scoping study. The Ecological Impact Assessment, Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report, did not identify protected trees that may be impacted on during by the proposed development.
Marthinus Briers Neighbour	email 2013.12.02	We also note that the proposed wind farm lies between the eastern and western portions of the Groendal Nature Reserve. The compatibility of these two land uses should be carefully considered.	[SRK] Noted. Comment on the proximity to these protected areas is made throughout this report. SRK will consult with ECPTA during the comment period of the Draft EIR.
		The proposed development is a significant distance from the existing power lines. The impact of the additional power lines needs to be fully investigated, including (a) the impact of the clearance of vegetation under the additional power lines.	[SRK] The terrestrial ecological specialist study has included an assessment on the ecological significance in the loss of vegetation along each of the power line alignment alternatives (see Section 5.8).
		The following should be investigated during the environmental assessment. Biodiversity. Investigate the impact of the construction and operational phase on the biodiversity of the Greater Baviaanskloof Area. Investigate the long term consequences	[SRK] The ecological significance of the proposed development in relation to the Baviaanskloof Mega Reserve vegetation types (see Figure 3-12) is presented in the Ecological Impact Assessment, Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this

Raised by:	Date	Issue, concern, comment	Response
		for biodiversity conservation. A fine scale botanical study needs to be undertaken.	report.
Marthinus Briers Neighbour	email 2013.12.02	Effect the workforce will have on the protection of Cycads in the area. We have hundreds of natural Cape Cycads alone on our property which borders the study area. It will be impossible to control movement of people in the area. These valuable plants could be removed and sold.	[SRK] Management measures aimed at reducing the potential for poaching of plants and animals during the construction phase are routinely included in the Construction Environmental Management Programme (CEMP) (see Section 7.4.20). In the event that DEA authorise the development, then SRK would expect that such authorisation would make compliance with the specifications in the Draft CEMP to be a condition of the authorisation, and as such those specifications become legally binding. .
Elands River Conservancy (ERC)	email 2013/11/25	Included in Annexure D is a list of trees positively identified in the Elands River Valley. A list of special trees, rare and endemic to a corner of the Eastern Cape is also attached. These lists were compiled by Jenny Eldridge, an arborist and member of the Elands River Conservancy. The cycad species *Encephalartos longifolius,* which is found at several locations in the valley, is a protected species and a small clump of *Sterculia alexandrii* has been found on the slopes of Moordenaarskop in the Elands River Valley. The Elands River Valley boasts many species of Aloes as well as Proteas, Leucadendrons, Leucospermums, Ericas and other Fynbos species. The Botanical Society of Port Elizabeth, after visiting only the farm Hillingdon, advised that a specialist should draw up a comprehensive list of the fynbos in the Elands River Valley in order to identify all the species	[SRK] Each of the ecological specialist studies (Appendix F of the Supplementary Volume of Specialist Studies) have considered the various Species of Special Concern, including those identified by the ERC.
		Annexure C contains a list of mammals found in our area, but this list shows only a fraction of the wildlife in the area since reptiles and invertebrates are not included. *Of the less common mammals that roam the Elands River Valley are: Klip springer, Blue Duiker, Grysbok, Cape Mountain Leopard, Mountain Reedbuck, Aardvark, Bushbuck, Honey Badger, Snake mongoose, Aardwolf and Elephant Shrew. * The Mountain Reedbuck's habitat is restricted to bushy, mountainous areas, thus having an ideal habitat in the Elands River Valley and neighbouring Baviaanskloof Wilderness Area and Groendal Nature Reserve. The Reedbuck is a protected species. * The Klipspringer, Grysbok and Bushbuck ewe are also protected. * The Blue Duiker is an endangered species. It is the smallest of all buck	[SRK] The Ecological Impact Assessment, Appendix F of the Supplementary Volume of Specialist Studies considered a number of species identified in the scoping report, and has commented, as summarised in Section 5.8, on the impact on animals on the site.

Raised by:	Date	Issue, concern, comment	Response
		species in South Africa and is also endemic. It is extremely sensitive to any disturbance of its habitat. * For the first time in many years, the Elands River Valley has Kudus and we attribute this to the mutual effort of our residents to conserve and hunt responsibly. * The Cape Mountain Leopard is a vulnerable species, and the Elands River Valley has a Leopard committee working with Nature Conservation officials to look at ways of protecting farm stock as well as the leopard. * Due to the fact that the Valley has an erratic pattern of all-year rainfall, many interesting invertebrates are found here. They form an integral part of the biotic co-habitation which is of the utmost importance to our ecosystem. Some of the protected species encountered in the valley are *Opisthacanthus spp* (Creeping Scorpions) and *Harpactira spp* (Common Baboon Spider). Researchers are currently emphasizing the importance of the Cape Mountain Cockroach in the eco-system. This insect is found in the mountains of the Elands River Valley. * A diversity of reptiles are seen in the area, including tree snakes and different kinds of adders. Although ordinary, they play a vital role in rodent control in the ecosystem. * Of great importance is the Smith's Dwarf Chameleon that is a protected species. This species is currently under a lot of pressure.	
Henk Knoetze Landowner	fax 2013/08/13	Animals such as Rhebok, Rock Jumper (*Oreotragus oreotragus*). Duiker, Bush Buck, Steinbuck and the occasional kudu will no longer be viewed and appreciated and will most definitely disappear from the area.	[SRK] The ecological specialist has commented on the likely impact of the fragmentation, noise and dust on animals (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report). The specialist has reported that no work has been done on the impact of wind turbine noise on fauna of South Africa and consequently impacts are assessed with a low level of confidence. Impacts due to fragmentation are rated with a high level of confidence.
Jeannine McManus Carnegie_Wits Fellow Phd Student	email 2013/05/19	I am concluding research on leopard habitat, geneticism and habitat connectivity which focuses on leopard populations from Addo to Ceres. The development occurs within a corridor connecting leopard populations. Further fragmentation may make these animals genetically isolated over one or two generations.	[SRK] The ecological specialist has commented on the likely impact of the proposed development on large terrestrial mammals (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report).
Henk Knoetze Landowner	fax 2013/08/13	Small animals such as ‘dassies’, rabbits / hares and jackals will vanish	[SRK] The ecological specialist has commented on the likely impact of the proposed development on animals in general

Raised by:	Date	Issue, concern, comment	Response
			(see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report).
Dr Dave Balfour ECPTA	email 2013.11.20	It is suggested that in addition to fauna and flora, the ecological impact assessment should also look at the broader catchment implications of the proposed development.	[SRK] As is the case with all specialist studies, specialists are required to define an appropriate zone of influence of any potential impact and record this in their assessment. The ecological specialist will be required to consider the broader catchment when defining the zone of influence (Section 5.8).
Dr Dave Balfour ECPTA	email 2013.11.20	The DSR notes that no frog species of conservation concern occur in the project area. The proposed site is a possible locality of Hewitt's ghost frog which is classified by the IUCN as Endangered and which has a very limited distribution. The proposed area has not been surveyed for ghost frogs but there is a real possibility that they could occur there.	[SRK] Section 3.6.1 includes an extract from the baseline study included in The Supplementary Volume of Specialist Studies to the Draft EIR and the ecological specialist has commented on the likely impact of the proposed development on Species of Special concern, including the Hewitts ghost frog (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report).
Dr Dave Balfour ECPTA	email 2013.11.20	The DSR notes the possible presence of the Elandsberg dwarf chameleon (listed as critically endangered). Note too the presence of Smith's dwarf chameleon (listed as endangered), which inhabits the grassy fynbos areas – exactly where the development is proposed.	[SRK] Section 3.6.1 includes an extract from the baseline study included in The Supplementary Volume of Specialist Studies to the Draft EIR and the ecological specialist has commented on the likely impact of the proposed development on Species of Special concern, including Smith's dwarf chameleon (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report).
Dr Dave Balfour ECPTA	email 2013.11.20	The high numbers of threatened (critically endangered, endangered and vulnerable) species on this site is something which should be highlighted as a fatal flaw.	[SRK] Noted. It seems to have been CES's view, which SRK is inclined to agree with, that the mere presence of threatened species does not in itself present a fatal flaw to the project, and that to offer an opinion regarding this requires further assessment. Nevertheless, the ecological specialist study (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report) has commented on the significance of the proposed development on these species.
Visual			
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 66; 6.2 Issues Arising from IAPs 4th Row: It will be virtually impossible to mitigate the visual impacts of wind farm in this area.	[SRK] A Visual Impact assessment Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report.
		Pg. 67; 6.2 Issues Arising from IAPs 22nd Row: This Department agrees with ECPTA's opinion on the potential of the proposed project. "Impacts on views and sense of place (especially considering that Groendal is a declared wilderness area). From the top of the plateaus at Groendal (which form part of the network of hiking trails) there is a completely uninterrupted view all the way to the Baviaanskloof. The presence of 120 m wind turbines right on the boundary (the closest one is less than 100 m from the boundary) of Groendal could have a severe impact	[SRK] The Visual Impact Assessment Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report, includes an assessment of the impact on sense of place, and from a selection of vantage points.

Raised by:	Date	Issue, concern, comment	Response
		on views and sense of place."	
Marthinus Briers Neighbour	email 25.11.2013	4. The proposed development is a significant distance from the existing power lines. The impact of the additional power lines needs to be fully investigated, including: a. The visual impact b. The impact on the sense of place	[SRK] The Visual Impact Assessment Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report specifically includes an assessment of the power line alignment and an assessment of the impact on sense of place, and from a selection of vantage points.
		A full visual assessment needs to be undertaken from all areas where the turbines and the additional power lines will be visible.	[SRK] The Visual Impact Assessment Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report includes an assessment of visual impacts from key vantage points.
Dr Dave Balfour ECPTA	email 2013.11.20	From the top of the plateau at Groendal Wilderness Area there is a completely uninterrupted view all the way to the Baviaanskloof (Cockscomb peak. The presence of up to 35 wind turbines of more than 120 m in height right on the boundary of Groendal (the closest one is less than 100m from the boundary) will have a very high impact on landscape aesthetics, views and sense of place of these protected areas and is impossible to mitigate.	[SRK] The Visual Impact Assessment Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report includes an assessment of the impact on sense of place, and from a selection of vantage points.
Rob Markham Eden to Addo Corridor Initiative	Undated	Visual pollution especially for hikers, nature lovers, birders etc.	[SRK] The Visual Impact Assessment Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report includes an assessment of the impact on sense of place, and from a selection of vantage points.
Noise			
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 67; 6.2 Issues Arising from IAPs 2nd Column; 3rd Cell: The sentence "Noise impact on document? Is in incomplete.	[CES] Should read: "What are the: Noise impacts on domestic livestock"
Henk Knoetze Landowner	fax 2013/08/13	The noise that will be caused by these towers will be unbearable not only for humans, but wild life.	[SRK] A Noise Impact Assessment is included in Appendix H of the Supplementary Volume of Specialist Studies, and summarised in Section 5.10 of this report. The noise specialist has included a comment on the absence of noise standards for animals. The ecological specialist (see Section 5.8.9) has commented on the impact of noise on fauna.
Agriculture			
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 70; 7.1.1 4th Row: This is a weak argument. A convincing motivation is required why a wind farm is a better land-use option (ecologically and economically) than agriculture	[SRK] The section of the DSR referred to in this comment discusses alternative technology options. The reader is directed to Section 7.1.3 of that same report (repeated in this report under the discussion of land use alternatives, Section 2.3.1, page 45) commented on compatibility of agriculture with wind farm development.
Alternatives			
D Govender (Regional Manager	email 2013/12/04	Pg. 71; Table 7-1. 4th Row: An advantage of coal fired plant is that it will produce large quantity of electricity.	[SRK] Noted

Raised by:	Date	Issue, concern, comment	Response
DEDEAT; Cacadu)		Pg. 71; Table 7-1. 5th Row: Why is the production of electricity from biomass expensive?	[CES] The production of electricity from biomass is considered expensive because it requires large tracts of land, time and agricultural resources to produce enough plant material that would not contribute to food security efforts.
		Pg. 72; 7.1.2 Different location. 1st Bullet: Wind Speed: The fact that the main determinant for selecting this location for a wind farm is wind supports the motivation for more information as requested in the comment on page 1.	[SRK] A summary of wind monitoring data from the 60 m mast on the site has been included in the FSR and is repeated in this EIR (Figure 3-3 on page 53). An underlying assumption in the EIA process is that the financing of the proposed development would only be forthcoming if the site has a proven wind resource.
		Pg. 72. There is no discussion on proposed alternative routes for the power line to connect the wind farm to a substation as proposed in Figure 7-2.	[SRK] Note that this discussion is included as Section 2.3.2 of this Environmental Impact Report.
		Pg. 72; 7.1.2 Different location 2nd Bullet; Proximity to grid connection: According to figure 7-2 the Skilpad substation is more than 20 km from the wind farm. This is long distance for a power line over visual sensitive environment. What are the criteria when deciding the proximity of substations for power lines in South Africa?	[SRK] Presumably this comment refers to the maximum distance from a proposed wind farm site to an existing substation/power line to make the project economically/technically viable. An underlying assumption is that the power line was taken into consideration in determining the technical and financial feasibility of this project. The environmental impacts associated with the power line form part of the scope of this assessment.
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 72; 7.1.2 Different location 3rd bullet: Available land: It should be appropriate, suitable land. A wind farm should not conflict with existing and future land uses. This includes conservation.	[CES] Noted. It should also be noted that the proposed wind energy facility would not conflict with the existing and current land use. It is possible for the future land use of the proposed project site to be that of a wind energy facility. As stated below and in the report the proposed project site could be utilised for both efforts of conservation and a wind energy facility.
			[SRK] The terms of reference for the ecological, visual, and noise specialists have assessed impacts associated with the development of this site in relation to the current and proposed protected areas.
		Pg. 72 Table 7-3. Under Eco-tourism Yes and No were chosen. No would be the appropriate choice especially from a visual perspective.	[CES] Noted. The table states that the choice is 'perception' dependant. CES contends that eco-tourism and a wind farm development can co-exist, but this is dependent on viewer perceptions around wind farms in general. Literature on twenty-years' experience of operational wind farms in Europe. Denmark, UK and Spain present some case studies with regards to tourism impacts. In the UK, where there are more than 120 operational wind farms and where the sites often correlates with popular tourist areas such as Cornwall, Wales and Scotland¸ the studies show there has been no decrease in the tourism trend since the advent of wind farms. In Australia and America, which are more alike to South Africa than Europe, reports reviewing a number of studies evaluating the impact of wind farms on tourism do not show any negative influence of

Raised by:	Date	Issue, concern, comment	Response
			wind farm on tourism and in some cases show increase of interest in the area.
		Pg. 72 Table 7-3Explain why a wind farm should not occur in conjunction with a settlement when a number of authorised wind farms are close to settlements.	[CES] Previous specialist studies have placed noise restrictions so that turbines are placed 500 m or outside the approximate 45 dB noise buffer from Noise Sensitive Areas (NRAs). Should the ambient noise of a settlement already exceed this buffer then the wind farm could occur in conjunction with a settlement.
		Pg. 72 Table 7-3. Yes and No were chosen. Provide examples of light industry.	[CES] Furniture manufacturing, brick making, agro industry related manufacturing or beneficiation.
		Pg. 72 Table 7-3. These should be raw mineral rights.	[CES] Noted
EIA Process and Reporting			
D Govender (Regional Manager DEDEAT; Cacadu)	2013/12/04	Pg. 85; 8.3.1. It is critical that EIR is not "excessively long and cumbersome" It should only include relevant information necessary to ascertain the potential environmental impacts of the proposed project on the environment.	[SRK] Noted. SRK have endeavoured to provide only the essential information in the EIR to meet the requirements of the various stakeholders. The EIR is supplemented by appendices with the supporting detailed information.
Marthinus Briers Neighbour	email 25.11.2013	5. The cumulative impact of all the above factors needs to be assessed.	[SRK] Cumulative impacts are considered in all specialist studies and are highlighted in Section 5.18 of the EIR.
		A strategic environmental impact assessment should first be undertaken to identify suitable sites for wind farms in the area. This can be undertaken as part of a review of the SDF.	[CES] Noted but this has to be government led and driven, as such there is nothing available at this time although as noted above there is a process under commencement.
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	(vi); Pg. 25: Other relevant legislation 2nd Par: The National Veld and Forest Fire Act (Act 101 of 1998) would mostly be applicable in fire-type vegetation, namely Fynbos.	[CES] Noted this will be considered.
		Pg. 25; 3.2.12 The third and fifth bullets are duplicated.	[CES] While the two points mention are found in the ECA they mention two different provisions of the Act.
		Pg. 25; 3.2.12 Other relevant legislation: 3rd bullet: How much of the ECA still applies?	[CES] Principles
		Pg. 26; 3.2.12 Other relevant legislation: Does the Physical Planning Act still apply?	[CES] Yes – rezoning and land use applications have to be entered into by the project developer.
		Pg. 26; 3.2.12 Other relevant legislation: Does the Tourism Act still apply?	[CES] Yes
		Pg. 34: IUCN is not in the abbreviations.	[CES] Noted. Included in the final scoping report.
		Pg. 103; Appendix C-1 There is no indication in Figure 1 (or verbal description in the text of the BID) that the proposed wind farm is close to a Wilderness Area, other Protected Areas, in areas being considered for expansion of these Protected Areas and in the catchment of the Groendal Dam. This is important information that should have been provided to IAPs.	[CES] The information provided was meant to give IAPs brief information on the project, with more information pertinent to these considerations being provided in the subsequent reports.

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		Pg. 56; 5.1.2: Written Notices First Paragraph: Due to IAPs concerns regarding the proposed establishment of other wind farms in similar habitats, this Department is of the opinion that you should contact more than just "the owners and/or occupants of land immediately surrounding and within 100m of the proposed project area" It would also be appropriate to contact AgriEastCape and farmers Union in the area.	[CES] Thanks for pointing this we will try and contact AgriSA. The farmers union in the area was contacted and are well aware of the project, the majority of neighbouring land owners were contacted with help from the farmers union. Though as per legislation an advert was placed in the newspapers to advertise for the registration to IAPs and those who registered are on the list.
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 76 8.1 EIA Phase 2nd Bullet: A copy of the report should be made available at a venue in Port Elizabeth due to the proposed locality of the project in the proximity of the Wilderness Area and other Protected Areas.	[SRK] The Final Scoping Report, and future reports, are to be placed in the Uitenhage and Kirkwood libraries, these being the closest major libraries to the site.
		(ix); Pg. 34; 4.5 Floristics Lubke et al 1998 is not in the reference (Page 90)	[CES] Noted these have been added to the reference list of the final scoping report.
		Pg. 40; 4.6.3 2nd Par; Last line: Stuart and Stuart, 2007 are not in the references (Page 90).	
		Pg. 89 A number of references were excluded from the list. Refer to the comments that discuss specific references that excluded.	
		(xvi) List of abbreviations: CDE (refer to the seventh reference on page 90 of the Reference list).	
		Pg. 24; 3.2.9 Last Par; 1st Line: Dewey and Le Bouef, 2009 are not in the list of References.	
		Pg. 29; 4.2.Climate: Buckle, 1998 is not in the list of Reference.	
		Pg. 34 (Last paragraph) SIBIS, 2013 is not in the Reference list. Where is Appendix A?	
		Pg. 37 (Amphibians) Phillips, 1994 and Paynton and Braadley, 1991) are not in the Reference List (Pg. 90) There should be more current references than these.	
		Pg. 38: 4.6.2 (paragraph below Table 4-3) Is 1999 the correct date? The date of Birdlife Africa in reference list is 2012.	
		Pg. 50 ECBCP: First Paragraph Last line Berliner *et al,* 2007 is not in the list of references.	
		Pg. 54; 4.8: Socio-economic profile Stats SA 2011 is not in the reference.	
		Pg. 51; 4.7.5 Baviaanskloof Reserve Cluster; First Paragraph Fourth Line Boshoff, 2008 is not in the reference list.	
		Pg. 57; 5.1.4 Is the Site Notice 3 at the junction of the R75 and the access road to the site? It would be appropriate to	[CES] GPS co-ordinates have been inserted below each photo.

Raised by:	Date	Issue, concern, comment	Response
		indicate the GPS reading of each site notice at each photograph.	
		Pg. 43; 4.7.2 Protected Areas Expansion Strategy; Last Paragraph This department should be included in these discussions.	[SRK] SRK has attempted to coordinate a focus group meeting between DEDEAT and the ECPTA and request for such a meeting have been deferred to the release of this Draft EIR. SRK will again request the two organisations to attend a focus group meeting.
		Pg. 44 Figure 4-5 The information provided on the map is difficult to read. Is the eastern boundary of Groendal correct?	[CES] According to the spatial mapping data sourced from the SANBI website used in the mapping.
		Pg. 51; 4.7.5 Baviaanskloof Reserve Cluster; First Paragraph: Fifth Line Groendal is a wilderness area.	[CES] Noted.
		Pg. 56 -57; 5.1.2: Written Notices Were letters sent to the: • Department of Mineral Resources, • Provincial Department of Works and Roads, • Blue Crane Municipality Nelson Mandela Bay Municipality, Cacadu District Municipality, • Birdlife Eastern Cape and • other farmers Associations? Were letters sent to • FROG (Friends of Groendal) and • FOBW (Friends of the Baviaanskloof Wilderness Area)?	[SRK] A list of registered IAPs was included in Appendix E of the FSR.
		Fourth & Sixth Bullet: This Department is the Department of Economic Development, Environmental Affairs & Tourism. Its area of jurisdiction coincides with that of Cacadu District Municipality. Is there such an institution as the Department of Environmental Health? Uitenhage Transitional Council was incorporated into NMBM. Who at the Groendal Wilderness Area was contacted? Who at ECPTA was contacted? Which local tourism offices were contacted?	[SRK] Corrections noted. The IAP database has been revised to address these items.
		Pg. 119 & 120, Appendix C-7, IAP register: Was the information sent to Groendal Wilderness Area? It is an authority and a neighbour. RSA Government (Mierhoop Plaat) is part of the Groendal Wilderness Area. This is the Department of Economic Development, Environmental Affairs and Tourism DMR has been omitted from authorities, Wayne Erlank, Sello Mokhanya, Brian Reeves, Patrick Zake, Sizewe	[SRK] Corrections noted. The IAP database has been revised to address these items and was included in Appendix C of the FSR.

Raised by:	Date	Issue, concern, comment	Response
		Mkhulise, Asanda Sontsele, Peter Bradshaw, John Adendoff and Lennox Zote are associated with authorities. Tiffany Thwaits is post-graduate students at NMMU. Prof Graham Kelly is employed by NMMU. He is no longer a chairperson of the ECPTA. Dr Paul Martin is a private environmental consultant. In general this register needs to be sorted out to ensure accuracy.	
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 95 Appendix B There is no copy of the Application Form submitted to DEA. All the requirements from DEA (their letter dated 5th February 2013) must be met.	[CES] Noted. The application form is not required to be part of the Scoping Report by the relevant regulations; the DEA acceptance of the application form is included. Should DEDEAT wish to see a copy please contact the Department of Environmental Affairs directly.
		Pg. 108 Appendix C-3 Letter of notification to occupiers of land: More information should have been provided. Refer to previous comment.	[CES] Background information documents were sent with these letters.
		Pg. 110 -111 Appendix C-4 Proof of notification to organs of state: This department email address is not here. The South African Wilderness Foundation, Birdlife South Africa and the Landmark Foundation are not organs of state. Were letters of notification sent to all institutions mentioned in Section 5.1.2 (Pg. 56)? If they were not emailed how were they sent?	[CES] Yes letters were sent to all the institutions listed in the report. Appendix C-4 of the DSR included an email that was sent to the different institutions.
		Pg.112: Appendix C-4: Are these people/ institutions all neighbours?	[CES] Some are government departments and some are neighbouring land owners.
		Pg. 51; 4.7.5 Baviaanskloof Reserve Cluster This department should be included in these discussions.	[CES] Noted. Should another focus group meeting be held the department will be invited. All departments were notified of the opportunity to comment on the DSR.
		Pg. 113 & 114, Appendix C-5, The advertisement in the Burger and the Herald are illegible.	[CES] The text for both adverts was inserted below the advert tear sheets in the DSR.
		Pg. 116, Appendix C-6 Map showing site notices: Refer to comment on other maps: The site notice points should be numbered to correspond with the photographs of each site. GPS readings of the points should be given on the map and at each photograph.	[CES] Noted included in the final Scoping Report.
		Pg. 27; 3.2.12 Other relevant legislation: The Mineral and Petroleum Resources Development Act (Act 28 of 2002) will apply.	[CES] Noted.
		(ix): Vegetation and flora: There is no reference to STEP and SKEP. Is SKEP actually relevant to this area?	[CES] There is a reference to SKEP and STEP on pg ix. Yes it is relevant and discussed in detail on pg 34 of the DSR.
		Pg. 29 Geology References to substantiate this description would be	[CES] Noted included in the final Scoping Report.

Raised by:	Date	Issue, concern, comment	Response
		appropriate.	
		Pg. 29; 4.2.Climate: Which scholarly article? Include it in the References and quote in the text.	[CES] Noted included in the final Scoping Report.
Dr Dave Balfour ECPTA	email 2013.11.20	ECPTA strongly encourages that the EAP facilitate an authorities meeting where DEDEAT, DEA, DWA and DAFF are present, in order to discuss these concerns and work on a way forward.	[SRK] Noted. Attempts to arrange such a meeting after the distribution of the FSR was to no avail and DEDEAT requested that this meeting be deferred to a stage in the process when the draft EIR is available. SRK will attempt to facilitate a focus group meeting with these stakeholders during the comment period of the Draft EIA.
Social Responsibility, Employment and Tourism			
Elands River Conservancy (ERC)	email 2013/11/25	The proposed wind farm will hold no advantages to the residents of the Elands River Valley. A community 80 km further will reap the benefits as stated in the DSR.	[SRK] Noted. In the event that the project goes through the REIPP bidding process, one of the key assessment criteria is likely to be the local economic development plan. SRK is of the understanding that this plan may only be concluded after the EIA process. A Socio-Economic Impact Assessment is included in Appendix I of the Supplementary Volume of Specialist Studies, and summarised in Section 5.11 of this report and includes an assessment of the impacts in a local and regional context.

Raised by:	Date	Issue, concern, comment	Response
		Local labour cannot be used for external contractors since the Elands River community has a limited workforce for existing employment. This means that contractors will have to employ strangers in the area who could notice our daily routines, observe our area and we may become a target of criminals * We accept the fact that there is a need for additional electricity (whether for local use or export). * The supply of additional electricity can however not be achieved at the expense of the environment and enrichment of a single landowner. All our natural resources, including plant-, bird-, and wildlife, are under constant pressure of so-called infrastructure development. * This generation has the responsibility to protect and conserve what is left of our environment. If we allow the wrong decisions to be made now, this ecological heritage close to the metropolitan area of the NMMM will be lost forever. * The Conservancy foresees that it will become part of the linking corridors for the planned Mega Reserve including the Addo Park and the Baviaanskloof Wilderness Area. Constructing a wind farm of the proposed scale will have a negative impact on this vision. * The Elands River Conservancy will do everything in its mandate to protect our environment and it is therefore it's proposal that other more suitable sites be investigated.	[CES] If there is no available local labour in the area labour that can be sourced from surrounding areas and transported to and from site daily. The impacts of the wind farm on the environment will be assessed and all impacts will be highlighted in the EIR Report. Mitigation measures will be provided to reduce the negative impacts and promote the positive impacts on the environment.
Tinus Vermaak Elands River Fire Protection Association (FPA) and Tourism Chairman	Undated	Job creation / opportunities for local community?	[SRK] The Socio-Economic Impact Assessment is included in Appendix I of the Supplementary Volume of Specialist Studies, and summarised in Section 5.11 of this report and includes an assessment of the impact on job creation.
Elands River Conservancy (ERC)	email 2013/11/25	Eco-tourism relies heavily on visual aesthetics and biodiversity.	[SRK] The Visual Impact Assessment presented in Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report includes an assessment of the impact on sense of place, and the visual impact from a selection of vantage points, including from eco-tourism sites. The Socio-Economic Impact Assessment (Appendix I of the Supplementary Volume of Specialist Studies, and summarised in Section 5.11 of this report) also comments on eco-tourism impacts.
		For many residents, both established and new, tourism became an income generating opportunity as the Elands River Valley is a gateway to the	[CES] The visual and aesthetics impact of the proposed wind farm have been assessed by means of a specialist study (see Appendix J of the Supplementary Volume of Specialist

Raised by:	Date	Issue, concern, comment	Response
		Baviaanskloof Wilderness Area and borders on the Groendal Wilderness Reserve. During the past 10 years, residents have developed eco-tourism related ventures and it is also one of the aims of the Elands River Conservancy to develop this further. Eco-tourism relies heavily on visual aesthetics and biodiversity.	Studies, and Section 5.12 of this report). The possible impacts on tourism are assessed in the Socio-Economic Impact Assessment (Appendix I of the Supplementary Volume of Specialist Studies, and summarised in Section 5.11 of this report.
Tinus Vermaak Elands River Fire Protection Association (FPA) and Tourism Chairman	Undated	Please make available the national aviation report as our Valley serves as a training airspace for learner pilots.	[SRK] It is unclear which aviation report is referred to. Compliance with Civil Aviation Authority regulations (e.g. the colour of wind turbine generators and warning lights) is understood to be a matter of demonstrating compliance with technical requirements, and is therefore considered to be outside of the scope of this EIA process.
Dr Paul Martin Private Environmental Consultant	Sent via email 2013.08.05	This is one of our great wilderness areas. Hikers (e.g. Mountain Club) use the adjacent area. The wind farm will ruin this ambience for humans.	[SRK] A Visual Impact Assessment is presented in Appendix J of the Supplementary Volume of Specialist Studies, and summarised in Section 5.12 of this report, and includes an assessment of the visual and sense of place impacts from a selection of vantage points.
Heritage			
Marthinus Briers Neighbour	Via Email 25.11.2013	We brought the farm for its natural beauty and biodiversity. The area around the KwaZunga river is absolutely pristine unspoilt nature and should be protected. The KwaZunga river is on the foot of the Winterhoek mountain on which the wind turbines are proposed to be erected. The Winterhoek mountain area affords the Port Elizabeth area a landscape as breath-taking as found in the Low-veld of Mpumalanga and can become the Nelson Mandela Bay's Table Mountain. It links Uitenhage with the Baviaanskloof and has great eco-tourism potential. At the foot of the Winterhoek mountain where the proposed turbine will be erected there are caves where Bushman lived. If you visit the area you can see why they chose to live here. Bushman drawings are found in some of the caves. The KwaZunga river offers one of the best hiking trails close to the Metro. The area contributes to the biodiversity of the Greater Baviaans Area. The following should be investigated during the environmental assessment. Heritage. Significance of the area for our heritage and the negative impact that wind turbine project could have on the protection of the Bushman Caves, Bushman drawings and tourism potential of the area. A full heritage assessment needs to be undertaken.	[SRK] An Archaeological Impact Assessment is presented in Appendix A of the Supplementary Volume of Specialist Studies, and summarised in Section 5.3 of this report. . The possible impacts on tourism are assessed in the Socio-Economic Impact Assessment (Appendix I of the Supplementary Volume of Specialist Studies, and summarised in Section 5.11 of this report.
D Govender (Regional	email	Pg. 40 (Table 4-5) Fourth Row: National List of Ecosystems : Include	[SRK] We do not intend to include regulations as appendices, or otherwise, as part of the

Raised by:	Date	Issue, concern, comment	Response
Manager DEDEAT; Cacadu)	2013/12/04	this regulation as an appendix to prove that no threatened ecosystems occur within the site.	FSR or EIR. The ecological impact assessment has addressed this statement. It is anticipated that the competent authority would have ready access to this regulation and would be in a position to verify the statement.
		Pg. 58; 6.1 (Table 6-1) 3rd Row; 4th Cell; 2nd Bullet: How will the upgrading of roads and electrical connections benefit local communities in such a remote area where many of the properties are owned by one owner?	[CES] More electricity will be available in neighbouring towns and townships as the electricity from the wind farm will be linked to a substation and not individual properties.
		Pg. 54; 4.8: Socio-economic profile Is there a difference between "economically active population" (65.8%) and "employed" (29.5%)	[CES] This should read *"not economically active"* population and yes there is a difference as this group includes *"housewives, retired people, disabled people who cannot work"* between ages of 15-65. (Definition from StatsSA)
		Pg. 54; 4.8: Socio-economic profile (Table 4-8) The percentage column adds up to 100%	[CES] Noted, this was taken directly from StatsSA Census 2001
		Pg. 54; 4.8: Socio-economic profile (Table 4-10) Income Group: Is this minority income? The second column cannot be percentage.	[SRK] The heading for this and the column heading were corrected.
		Pg. 94; Appendix A5 1st Par; last line: "The proponent is obliged to adhere to these conditions" Replace with must. These conditions are a legal requirement.	[CES] Noted
Elands River Conservancy (ERC)	email 2013/11/25	The Elands River Valley's geographical structure consists of undulating hills, extensive deep kloofs with dense undisturbed, indigenous vegetation. This geomorphology complicates the erection of any large structures over extended distances and makes access to the same for maintenance cumbersome and costly. Due to the geographical structure, building large structures on the proposed farm will have a much larger surface impact since the true distance is considerably bigger, resulting in disturbance of many more plant and animal species than would be the case on flat land. The steep slopes in the valley raise the risk of soil erosion on any disturbed areas considerably.	[SRK] The ecological specialist study (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report) has evaluated the footprint of the development, taking into consideration the increased footprint expected due to topography. Measures to control erosion and habitat destruction during construction and operation of the wind farm are included in the Environmental Management Programme (Section 7.4 and 7.5).
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 28; 4.1. Geology and Landform: Information relevant to the site should be provided. The sentence is irrelevant.	[CES] It is unclear which sentence is being referred to
		Pg. 31 Figure 4-1 & 4-3: There is a correlation between altitude and topography and vegetation type in the study area. The vegetation types should thus be depicted in a contour map. As with the previous maps there is important information missing particularly the locality of protected area.	[SRK] Noted, the ecological specialist has utilised the Baviaanskloof mega reserve vegetation data, and it is assumed that this takes into account elevation.

Raised by:	Date	Issue, concern, comment	Response
Avifauna and bats			
D Govender (Regional Manager DEDEAT; Cacadu)	email 2013/12/04	Pg. 38 4.6.2 Birds Information should be relevant to this specific project.	[CES] The scoping report provides broad information known about avifuana in and around the area. An avifaunal specialist study will be conducted for the EIA phase, as well as a year preconstruction bird monitoring study which will provide in depth information specific to the project site.
Elands River Conservancy (ERC)	email 2013/11/25	[comment shortened here – full comment included in the appendix] Included in Annexure B is a list of birds positively identified in the Elands River Conservancy… * 135 species identified, 25 species endemic * …collision of large terrestrial birds with the wires of utility structures, and especially power lines... one of the most important mortality factors. * Certain groups are more susceptible to collisions… As shown in Annexure B, the Elands River Valley hosts many species that will be endangered by the erection of huge structures: * Of significance are various species of ducks, wild geese, raptors and owls. The White Stork, Stanley's Bustard and the Blue Crane are some of the species that have been identified as vulnerable to collisions. *During the erection of wind farms* * Habitat destruction and alteration inevitably takes place. * Many birds are highly susceptible to disturbance … temporary or permanent abandonment of the nest…. Neil Evans, a member of the ERC has reported two breeding pairs of Black Eagles in the vicinity of his farm bordering the proposed wind farm. * As the Elands River Valley has prolific bird life, the Elands River Conservancy actively protects bird breeding sites. * It should also be noted that although certain species might not be protected or endangered, only a handful of them (in some instances only one pair) are resident in the Valley. If any one of these birds are "lost" it could mean their extinction in the valley.	[SRK] The bats, avifauna and ecological specialist studies have (see full reports in the Supplementary Volume of Specialist Studies) have each identified species in the project area, including Species and Special Concern. [SRK] An Avi-Fauna Impact Assessment is included on Appendix D of the Supplementary Volume of Specialist Studies to this EIR, and is summarised in Section 5.6 of this Report.
BirdLife SA		BirdLife South Africa supports the responsible development of wind energy in South Africa. While wind energy can have negative impacts on birds and their habitats, these impacts can be minimised with careful planning and assessment. The considered location of the wind farm itself and the location turbines within the wind farm are both critical factors in determining the significance of the impacts on birds.	[SRK] The best practice guideline has informed the baseline monitoring of the avi-faunal impacts.

Raised by:	Date	Issue, concern, comment	Response
		To this end BirdLife and its partner the Endangered Wildlife Trust have developed Best Practice Guidelines to guide the impact assessment and monitoring of birds at wind farms (see attached). These guidelines address both impact assessment and post-construction monitoring. For ease of reference we have summarised the requirements for impact assessment in the attached Minimum Requirements for Avifaunal Impact Assessment for Wind Energy Facilities.	
		While it would have been useful to have included an avifaunal Scoping Report and the proposed avifaunal assessment methodology in the Scoping Report, we trust that our guidelines will help guide the impact assessment.	[SRK] The baseline study and avi-faunal impact assessment are included in Appendix D of the Supplementary Volume of Specialist Studies to this Environmental Impact Report.
		The proposed facility lies just north of the Kouga-Baviaans Complex Important Bird and Biodiversity Area. A number of species vulnerable to the impacts of wind energy have been recorded in the area. These include African Crowned Eagle, African Fish-Eagle, Black Harrier, Black-shouldered Kite, Blue Crane, Denham's Bustard, Forest Buzzard, Jackal Buzzard, Martial Eagle, Spotted Eagle-Owl, Steppe Buzzard and Verreauxs' Eagle. It is therefore critical that the impacts of the proposed facility on birds are carefully assessed. The importance of the proposed wind farm site for these birds must be understood and the risk of collision, habitat loss and displacement is considered.	[SRK] The Avi-Fauna Impact Assessment included in Appendix D of the Supplementary Volume of Specialist Studies, and summarised in Section 5.6 of this Report, considers the occurrence and potential impact on these birds.
Henk Knoetze Landowner	fax 2013.08.13	Birds such as the Bearded Vulture and Verreaux's Eagle (Black Eagle) and numerous other birds were spotted on my farm.	[SRK] The Avi-Fauna Impact Assessment included in Appendix D of the Supplementary Volume of Specialist Studies, and summarised in Section 5.6 of this Report, considers the occurrence and potential impact on these birds.
Dr Paul Martin Private Environmental Consultant	email 2013.08.05	This wilderness / mountainous area is a haven for birds of prey that will be at risk of collisions.	[SRK] The Avi-Fauna Impact Assessment included in Appendix D of the Supplementary Volume of Specialist Studies , and summarised in Section 5.6 of this Report, considers the occurrence and potential impact birds of prey.
Dr Dave Balfour ECPTA	email 2013.11.20	Groendal is a stronghold of African crowned eagle and probably has some of the highest densities across its range (inter-nest distances of about 2.5 km). This species is long-lived and slow to reproduce (breeds every second year) and mortality from collisions with wind turbines could have a big impact on the local population.	[SRK] The Avi-Fauna Impact Assessment included in Appendix D of the Supplementary Volume of Specialist Studies, and summarised in Section 5.6 of this Report, considers the occurrence and potential impact on the African Crown Eagle.
Tinus Vermaak Elands River Fire Protection	Undated	What will the estimated impact be on the Bat population? I could not find a report showing the study that indicates the different bat species in the Elands	[SRK] The Bat Impact Assessment is included in Appendix E of the Supplementary Volume of Specialist Studies, and is summarised in Section 5.7 of this Report.

Raised by:	Date	Issue, concern, comment	Response
Association (FPA) and Tourism Chairman		River Valley or the negative impact that a wind farm might create.	
Dr Paul Martin Private Environmental Consultant	email 2013.08.05	This may be on a bat migration route – bats are very vulnerable to mortality from turbines.	[SRK] The Bat Impact Assessment is included in Appendix E of the Supplementary Volume of Specialist Studies, and is summarised in Section 5.7 of this Report.
Henk Knoetze Landowner	fax 2013.08.13	The fruit bats will also disappear.	[SRK] The Bat Impact Assessment is included in Appendix E of the Supplementary Volume of Specialist Studies, and is summarised in Section 5.7 of this Report.
Roads and Transport			
Dr Paul Martin Private Environmental Consultant	email 2013.08.05	The huge road infrastructure (smooth, 4 m wide & 6 m on bends and the steep gradient that will have to be overcome) that will be required to construct this wind farm will have major impacts on vegetation, animals, visual & habitat fragmentation.	[SRK] The topography of the site has been identified as having larger footprint, with less flexibility, than that of wind farms located in flatter terrain (e.g. those in the vicinity Jeffreys Bay). Each of the specialist studies listed will be required to take this into considerations.
Marthinus Briers Neighbour	email 25.11.2013	Take in account the risk of erosion and disturbance of habitants during the construction phase.	[CES] These will be done during the EIR phase of the project when specialist studies will be conducted.
		The impact of the roads and hard surfaces and the potential risk of erosion or land slips.	[SRK] It is proposed to include measures for the management of stormwater and erosion in the EMPr
Tinus Vermaak Elands River Fire Protection Association (FPA) and Tourism Chairman	Undated	Repair and maintenance of road during and after construction?	[SRK] It is anticipated that the publically accessible roads to the site would require upgrading (e.g. re-gravelling) prior to construction commencing. The long term maintenance of the road following construction is likely to be the responsibility of the provincial Department of Public Works.
Dr Dave Balfour ECPTA	email 2013.11.20	Currently there are hardly any roads in this area and the terrain is very steep and rugged. The developers will need to build a very complicated network of roads (with detours around the N-S orientated gorges) to service turbines and this could have severe impacts (clearing of vegetation, erosion, increase sediment load in rivers, pathways for invasions of alien species).	[SRK] The topography of the site has been identified as having larger footprint, with less flexibility, than that of wind farms located in flatter terrain (e.g. those in the vicinity Jeffreys Bay). Each of the specialist studies listed will be required to take this into considerations.
Elands River Conservancy (ERC)	email 2013/11/25	The Elands River Road is a gravel road used by tourists to and residents from the Elands River Valley. The road is not properly or regularly maintained therefore any increased and especially heavy traffic will greatly deteriorate the condition of the road. In addition the road can at many places only accommodate a single lane of traffic making access problematic.	[SRK] Access to the site is depicted in Figure 2-11. [Afri-Coast] The main length of road (provincial gravel road) has been assessed by the civils teams, both Owners Engineer and Turbine Supplier, no upgrading would be required as the road is in a good stable condition.
D Govender (Regional Manager DEDEAT;	email 2013/12/04	(iii) 3rd Par; 4th bullet: How far is the site from R75 and what condition is the road in; what measures will have to be taken to make it accessible to the vehicles transporting the wind turbine	[Afri-Coast] The main length of road (provincial gravel road) has been assessed by the civils teams, both Owners Engineer and Turbine Supplier, no upgrading would be required as the road is in a good stable

Raised by:	Date	Issue, concern, comment	Response
Cacadu)		components.	condition. [SRK] The length of the gravel road from the R75 is approximately 40 km to the site.
		(xii) & Pg. 77; 8.2 Specialists Studies: There should be a transport Impact Assessment. Transportation of wind farm components at the wind farms presently being constructed are resulting in major traffic disruptions.	[CES] CES does not agree with the need for a full transport impact assessment and recommends that an appropriate traffic management strategy be developed prior to construction that will determine route and potential road requirements. This will also incorporate a traffic management strategy for construction plant and vehicles so as to minimise these impacts on national and provincial roads. This has been the standard approach employed by the DEA and DOE in IPPPP bidding rounds.
		Pg. 13 Figure 2-2: Indicate the road access to the north and the R75?	[SRK] Access routes from the R75 to the site are depicted in Figure 2-11 .

Table 4-3: Issues and Responses following the release of the FSR (original comments in Appendix E1)

Raised by	Date	Issue	Response
General			
Elands River Conservancy (ERC)	email 2015/04/07	The ERC strongly supports the use of environmentally renewable energy sources, handled responsibly and with the least possible detrimental effect to the environment.	[SRK] Noted.
Elands River Conservancy (ERC)	email 2015/04/07	We accept the need for additional electricity, but it cannot be achieved at the expense of the environment.	[SRK] Noted.
B Kruger Local farmer	fax 2015/04/19	Request that SRK investigate suitability of their farm for similar project.	[SRK] The request falls outside the scope of this particular EIA.
P Swanepoel Uitenhage Aero Club	email 2016/02/16	We confirm our in-principle support of the proposed project, particularly in term of the anticipated investment into renewable energy generation and socio-economic development, subject to the satisfactory submission of all regulatory requirements.	[SRK] Noted.
A Southwood DEDEAT	email 2015/03/31	The Department will only comment once transgression (construction of roads) by Applicant being investigated by Compliance and Enforcement Section is resolved.	[SRK] SRK is of the understanding that the legality of the road referred to in this comment has been assessed by DEA and to our knowledge no case has been opened against the landowner by either DEA or DEDEAT.
Ecological			
Dr B Smuts Landmark Foundation	email 2015/03/20	Industrial development on the proposed site will have adverse effect on a leopard population that is genetically bottlenecking.	[SRK] The potential impacts on fauna, including leopards are assessed as part of the ecological specialist study (see the Supplementary Volume of Specialist Studies Appendix F), findings of which are summarised in Section 5.8.
Elands River Conservancy (ERC)	email 2015/04/07	Elands River Valley is home to less common mammals such as Klipspringer (protected), Blue Duiker (endangered), Grysbok (protected), Cape Mountain leopard (vulnerable), Mountain Reedbuck (protected),	[SRK] The potential impacts on fauna are assessed as part of the ecological specialist study (see the Supplementary Volume of Specialist Studies Appendix F), findings of which are summarised in Section 5.8.

Raised by	Date	Issue	Response
		Aardvark, Bushbuck (ewe protected), Honey Badger, Snake mongoose, Aardwolf and Elephant Shrew.	
Elands River Conservancy (ERC)	email 2015/04/07	Many vulnerable invertebrates, including protected species, are found here which forms an integral part of the biotic co-habitation.	[SRK] The potential impacts on fauna are assessed as part of the ecological specialist study (see the Supplementary Volume of Specialist Studies Appendix F), findings of which are summarised in Section 5.8.
Elands River Conservancy (ERC)	email 2015/04/07	Diversity of reptiles is seen in the area that play vital role in rodent control.	[SRK] The potential impacts on reptiles are assessed as part of the ecological specialist study (see the Supplementary Volume of Specialist Studies Appendix F), findings of which are summarised in Section 5.8.
Elands River Conservancy (ERC)	email 2015/04/07	Of great importance is the Smith's Dwarf Chameleon that is a protected species.	[SRK] Section 3.6.1 includes an extract from the baseline ecological study and the ecological specialist has commented on the likely impact of the proposed development on Species of Special concern, including Smith's dwarf chameleon (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report).
Dr Paul Martin Private Environmental Consultant	email 2015/03/24	Risks that Wind Farm may have on KwaZunga River and its catchment must be assessed, in light of its current excellent water quality and healthy populations of endemic fish. Risk of siltation and seep interference from erosion / runoff from wind farm roads.	[SRK] The potential impacts on hydrological features including the Kwazunga river are assessed as part of the hydrological specialist study (see the Supplementary Volume of Specialist Studies Appendix G), findings of which are summarised in Section 5.9.
Dr Paul Martin Private Environmental Consultant	email 2015/03/24	Cut and fill calculations will be required to see whether there will be excess spoil that needs to be taken somewhere or additional fill required. Where will excess spoil be disposed of / additional fill acquired from?	[SRK] Sourcing and disposal of material is discussed in the project description Section 2.2.3 and impacts relating to spoil disposal are assessed in Section 5.13.
Dr Paul Martin Private Environmental Consultant	email 2015/03/24	Impact of facility on mountain slope / ridge and valley must not be under-estimated as it is in a Protected Area Expansion Area.	[SRK] Measures to control erosion and habitat destruction during construction and operation of the wind farm are included in the Environmental Management Programme (Section 7.4 and 7.5). Specific Stormwater and erosion management plans to address these impacts are included in Appendix G.
Elands River Conservancy (ERC)	email 2015/04/07	Geomorphology complicates erection of large structure over extended distances and makes access for maintenance cumbersome and costly. Large structure on the proposed farm will have a larger surface impact since the true distance is considerably bigger.	[SRK] The ecological specialist study (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report) has evaluated the footprint of the development, taking into consideration the increased footprint expected due to topography.
Elands River Conservancy (ERC)	email 2015/04/07	Steep slopes in valley raise the risk of soil erosion on any disturbed areas.	Measures to control erosion and habitat destruction during construction and operation of the wind farm are included in the Environmental Management Programme (Section 7.4 and 7.5).
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	The process to extend the Baviaanskloof section of the Cape Floristic Region World Heritage Site (CFR WHS) should be noted as the construction of the windfarm on the boundary of the WHS is considered inappropriate.	[SRK] Noted. The proximity of the proposed development to these conservation areas is recorded in Figure 3-9, and the CFR is discussed in Section 3.5.2. The ecological Impact Assessment (Appendix F of the Supplementary Volume of Specialist Studies) has also taken this into account.

Raised by	Date	Issue	Response
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	Concern regarding impacts on the dwarf chameleon and Hewitt's ghost frog remain despite specialist study detailing possible impacts and mitigation measures.	[SRK] The ecological specialist studies have now been completed and both species mentioned have been taken into account in these studies. Section 3.6.1 includes an extract from the baseline ecological study and the ecological specialist has commented on the likely impact of the proposed development on Species of Special concern (see Appendix F of the Supplementary Volume of Specialist Studies, and summarised in Section 5.8 of this report).
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	The FSR (p61) makes no reference to the National Freshwater Ecosystem Priority Areas, although there is a map of NFEPA areas. Please refer to figure 3-8 on page 65.	[SRK] The NFEPA is included in the list of conservation and planning tools relevant to the project in Table 3-7, and has been taken into consideration in the hydrological specialist study (see Section 3.3, and Appendix G of the Supplementary Volume of Specialist Studies).
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	The FSR (p61) makes no reference to the Eastern Cape Protected Areas Expansion Strategy (ECPAES), which has been approved by the National Department of Environmental Affairs (DEA) and should be referred to and included in future reports.	[SRK] The ECPAES has been included in the list of conservation and planning tools relevant to the project in Table 3-7.
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	Quality of Fig 3-11 "Baviaanskloof planning Tools and Protected Areas" is poor as none of the Baviaanskloof planning tools are depicted in the map besides for the planning domain of the Baviaanskloof Mega-Reserve(BMR). There is a need to analyse outcomes of the BMR biodiversity plan and to noted that the proposed site falls within a Critical Biodiversity Area (CBA). The use of polygons to depict biodiversity hotspots is not appropriate at this scale. Biodiversity hotspots reflect regional priorities and should not be displayed at this scale.	[SRK] CBAs in terms of the BMR plan are shown in Figure 3-12, and have been taken into account in the ecological specialist study (see Appendix F of the Supplementary Volume of Specialist Studies).
Alternatives			
Elands River Conservancy (ERC)	email 2015/04/07	The ERC proposes that other more suitable sites be investigated.	[SRK] The investigation of site alternatives is outside the scope of this EIA. Motivation for the selection of this particular site is provided in Section 2.3.1
Process & Reporting			
D Thompson DMR	email 2016/01/27	You will be required to submit a surface usage application for the DMR for approval, since a project of this type will in effect sterilize the area under review for the extraction of potential minerals. Contact details of relevant officials provided.	[SRK] Noted.
Dr Paul Martin Private Environmental Consultant	email 2015/03/24	Will the development require Water Licences?	[SRK] It is expected that Water Use Licenses will be required for certain river crossings (e.g. in cases where existing bridges are widened) and for the abstraction of groundwater during construction. Water Use License applications are however outside the scope of this EIA.
Social Responsibility, Employment & Tourism			
Elands River	email	The Conservancy foresees that it will	[SRK] Comment on the proximity to these

Raised by	Date	Issue	Response
Conservancy (ERC)	2015/04/07	become part of the linking corridors for the planned Mega Reserve including the Addo Park and the Baviaanskloof Wilderness Area. Constructing a wind farm of the proposed scale will have a negative impact on this vision.	protected areas is made throughout this report. SRK will consult with ECPTA during the comment period of the Draft EIR.
Elands River Conservancy (ERC)	email 2015/04/07	For many residents tourism is an income-generating opportunity as the Elands River Valley is a gateway to the Baviaanskloof Wilderness Area and borders on the Groendal Wilderness Reserve. Eco-tourism and related ventures rely heavily on visual aesthetics and biodiversity.	[SRK] Impacts on biodiversity, visual character of the area, and socio-economics (including tourism) are addressed in the relevant specialist studies, which are included in the Supplementary Volume of Specialist Studies Appendices F, J & I, and summarised in Sections 5.8, 5.11 and 5.12.
Elands River Conservancy (ERC)	email 2015/04/07	Proposed project holds no advantages for residents of Elands River Valley as it is stated that local labour cannot be used for external contractors since the Elands River community has limited workforce for existing employment.	[SRK] Potential socio-economic impacts on the local community have been assessed via a specialist study (see the Supplementary Volume of Specialist Studies Appendix I), the findings of which are summarised in Section 5.11.
Elands River Conservancy (ERC)	email 2015/04/07	Employment of workers outside of area opens up risk of criminal activity.	[SRK] Potential socio-economic impacts on the local community have been assessed via a specialist study (see the Supplementary Volume of Specialist Studies Appendix I), the findings of which are summarised in Section 5.11. Impacts on crime are however difficult to predict and manage.
P Swanepoel Uitenhage Aero Club	email 2016/02/16	Due to a number of listed factors, investment into social and economic infrastructure and initiatives is necessary to ignite and expedite growth and development in the region.	[SRK] Noted.
Avifauna & Bats			
Adri Barkhuysen Interested Party	email 2015/03/23	Interested in potential impact of WEF on local eagle populations and requests opportunity to view pre-construction avifauna report.	[SRK] All pre-construction monitoring reports that SRK is aware of are included in the Supplementary Volume of Specialist Studies Appendix D.
Adri Barkhuysen Interested Party	email 2015/03/23	Observation that local eagle population more active in adverse weather conditions increasing likelihood of collision with wind turbine hidden by fog blanket. Suggest study to investigate this.	[Steve Percival (bird specialist)] This possibility has been considered in the assessment. Data have been obtained in restricted visibility conditions though not when visibility has been completely curtailed. Given the general preference of the eagles to use lower ground for foraging during periods when they can be seen, it is considered very unlikely that such behaviour would materially affect the conclusions reached.
Adri Barkhuysen Interested Party	email 2015/03/23	Aggression and focus of territorial display of local eagles renders them vulnerable to collision with turbines.	[Steve Percival (bird specialist)] Baseline data have been obtained from a comprehensive vantage point survey, with little evidence of this behaviour on the wind farm site. Additionally, the site has been designed to avoid turbines in proximity to nests where display behaviour more likely.
Adri Barkhuysen Interested Party	email 2015/03/23	Hunting tactics and use of entire mountain top will increase possibility of local eagles colliding with turbines.	[Steve Percival (bird specialist)] Again we have obtained a comprehensive baseline data set on bird flight activity to assess this possibility, and collision modelling has enabled the collision risk to be quantified – the conclusions was reached that, with the recommended mitigation measures in place,

Raised by	Date	Issue	Response
			any effect on the local eagles would not be significant.
Adri Barkhuysen Interested Party	email 2015/03/23	Concern regarding impact of proposed project on breeding success of eagle population.	[Steve Percival (bird specialist)] The baseline surveys have shown that eagle breeding success in the area is already variable between years. With the proposed mitigation measures in place there should be a net gain in foraging quality for the eagles, so there would then be no reason to expect any reduction in breeding success.
Elands River Conservancy (ERC)	email 2015/04/07	25 species of birds identified in the ERC are endemic. Collisions of large terrestrial birds with wires of utility structures have been determined to be one of the most important mortality factors for this group of birds in South Africa (reference provided). Certain group more susceptible to collision (reference provided), examples being The White Stork, Stanley's Bustard and the Blue Crane.	[SRK] This impact has been assessed as part of the avifauna specialist study, a copy of which is provided in the Supplementary Volume of Specialist Studies Appendix D, the findings of which are summarised in Section 5.6.
Elands River Conservancy (ERC)	email 2015/04/07	During erection of wind farms habitat destruction and alteration takes place which may lead to temporary or permanent abandonment of nest by adult birds or premature fledglings.	[Steve Percival (bird specialist)] The wind farm has been designed to avoid any infrastructure or construction works in proximity to any eagle nests (with a 1.5 km buffer between turbines and all known eagle nesting sites). As a result, the construction activity would not take place within any area where the eagle nest sites might be disturbed. In terms of habitat loss, this will affect only a very small part of the eagles' foraging ranges and will not be significant. Displacement from foraging areas has the potential to be more important, but this will be mitigated through the provision of improved eagle foraging habitat off-site (though still within the same eagles' ranges).
Elands River Conservancy (ERC)	email 2015/04/07	Report of 2 breeding pairs of Black Eagles in vicinity of farm bordering proposed site.	[SRK] Black eagle populations in the area have been monitored by specialists as part of the pre-construction bird monitoring program (see monitoring reports in the Supplementary Volume of Specialist Studies Appendix D).
	email 2015/04/07	Far-reaching implications for certain large, rare species that only breed once every one or two years.	[SRK] Impacts on avifauna have been assessed as part of the avifauna specialist study, a copy of which is provided in the Supplementary Volume of Specialist Studies Appendix D, the findings of which are summarised in Section 5.6
	email 2015/04/07	Disturbance could lead to extinction of certain species in the valley.	
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	Request confirmation that the Crowned eagle was excluded from the target bird species of most concern, as Crowned eagles are vulnerable to wind farms.	[SRK] The Crowned Eagle and Denham's Bustard were both indicated as target species in the 2013-14 monitoring surveys, however Denham's Bustard was not confirmed to be present on the site, and the specialists noted that more suitable habitat for Crowned Eagle was present in the areas adjacent to the site, and they are therefore unlikely to use the WEF area. Further detail is provided in Section 3.6.2, and the avifauna specialist study, a copy of which is provided in the Supplementary Volume of Specialist Studies Appendix D.
Roads & Transport			
B Reeves	email	Is it true that a road has already been	[SRK] We are aware of a road on the site

Raised by	Date	Issue	Response
ECPTA	2015/03/20	constructed for this development? We have requested DEDEAT and DEA to investigate the matter further.	constructed prior to SRK being appointed. One of the internal access roads in the proposed site development plan does largely coincide with this existing road, however, we cannot state whether this road was constructed for the purpose of the wind farm.
L Dodd Elands River Conservancy	email 2015/04/07	We reported the illegal 'road making' and were impressed that the issue was resolved.	[SRK] SRK is of the understanding that the matter of the road is being dealt with separately to the EIA process.
N Gouws SANRAL	email 2015/03/20	Abnormal loads must be transported by road to the site and will need permits obtainable from the Provincial Government of the Eastern Cape. Access to the wind farms must be obtained from secondary roads where possible. An application to utilise a national road must be submitted to SANRAL for consideration accompanied by a Traffic Impact Assessment (TIA). Any upgrade of access roads to accommodate abnormal loads will at the cost of the developer and shall be to SANRAL's standards and requirements.	[SRK] Traffic and transportation management plans are included as Appendix G. The relevant permit applications fall outside the scope of the EIA process, and will be lodged as and when required.
Elands River Conservancy (ERC)	email 2015/04/07	Elands River Road is gravel road which is not properly or regularly maintained. Any increased and especially heavy traffic will greatly deteriorate its condition. The road can at many places only accommodate single lane of traffic making access problematic.	[SRK] Access to the site is depicted in Figure 2-11. [Afri-Coast] The main length of road (provincial gravel road) has been assessed by the civils teams, both Owners Engineer and Turbine Supplier, no upgrading would be required as the road is in a good stable condition.
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	Illegal construction of roads is in contravention of NEMA and triggers various listed activities under 2010 EIA Regulations. Noted that SRK was aware of the construction and did not reference it in the FSR even though activity 3 of Listing Notice 3 of GNR 546 is discussed on page 6. EAP should address this in future reports and inform the relevant authority.	[SRK] This Draft EIR describes and assesses the roads that are proposed as part of wind farm development. SRK has been informed that the road referred to in this comment is not part of the proposed project and as such has not specifically been assessed in this EIR. SRK is further of the understanding that the legality of the road has been assessed by DEA and to our knowledge no case has been opened against the landowner by either DEA or DEDEAT.
Eastern Cape Parks & Tourism Agency (ECPTA)	email 2015/04/07	Page 37 of the FSR states that 'the possible upgrading, resurfacing and/or rehabilitation of these gravel roads and associated borrow pits is outside the scope of the EIA process'. The activity is directly linked to the proposed project and would have not required an upgrade if not for the windfarm. The impacts should also be assessed during the decision-making process.	[SRK] If the need to upgrade of off-site roads is identified during the detailed design of the project, and if such upgrades triggered the need for an environmental authorisation, then a separate authorisation process would be required. The upgrading of off-site roads is specifically excluded from this EIA process.
Infrastructure			
J Geeringh Eskom	email 2015/03/23	Provided Eskom requirements for works at or near Eskom infrastructure.	[SRK] Eskom requirements have been noted in the design.
N Gouws SANRAL	email 2015/03/20	When electrical power lines have to be installed / erected (overhead / parallel) to the national road, the following conditions shall apply and application	[SRK] This information has been conveyed to the developer, to take into account in the design of the powerlines.

Raised by	Date	Issue	Response
		for such way leaves must be submitted to SANRAL: • When crossing national road with overhead powerline, no tower, pole or stay shall be erected within 60 meters from the national road reserve boundary (132 kV lines); and • A vertical clearance of not less than 7.0 metres, measured from crown of national road to lowest wire shall be observed.	

5 Assessment of Environmental Impacts

5.1 Identification of Potential Impacts

The key environmental issues identified during the scoping phase were assessed by means of specialist studies. The objective of the specialist studies was to further investigate each of the issues identified and assess their potential environmental impact, in order to determine their significance and propose mitigation measures to address the impacts, if required. The identification of potential impacts of the proposed activity was based on the following factors:

- The legal requirements;
- The nature of the proposed activity;
- The nature of the receiving environment; and
- Issues raised during the public participation process.

Considering the factors listed above, a number of potential environmental impacts which could result from the proposed Inyanda - Roodeplaat WEF were identified. These are discussed in this section.

Copies of the specialist study reports are provided in the Supplementary Volume of Specialist Studies of this report, as well as signed declarations of interest (either as a separate document or in the report). Assumptions and limitations relating to each of the specialist studies are listed in Section 1.7.

Table 5-1: List of Specialist Studies

Name	Company	Study	Appendix in Supplementary Volume
Ms Celeste Booth	Booth Heritage Consulting	Phase 1 Archaeological Survey	Appendix A
Mr Robert Gess	Rob Gess Consulting	Phase 1 Palaeontological Impact Assessment	Appendix B
Mr Johann Lanz	Private	Agricultural Impact Assessment	Appendix C
Dr Steve Percival	Ecology Consulting	Avifauna Impact Assessment	Appendix D
Mr Werner Marais	Animalia Zoological & Ecological Consultation	Preconstruction Bat Monitoring Survey	Appendix E
Ms Leigh-Ann de	LD Biodiversity	Ecological Impact	Appendix F

Wet	Consulting	Assessment	
Dr Brian Colloty	Scherman Colloty & Associates	Aquatic Ecological Assessment	Appendix G
Dr Brett Williams	Safetech	Noise Impact Assessment	Appendix H
Mr Matthew Keeley	Urban-Econ Development Economists	Socio-economic Impact Assessment	Appendix I
Mr Henry Holland	Private	Visual Impact Assessment	Appendix J

5.2 Impact Rating Methodology

5.2.1 Impact Rating Procedure

The assessment of impacts will be based on the professional judgement of specialists at SRK Consulting, fieldwork, and desk-top analysis. The significance of potential impacts that may result from the proposed development will be determined in order to assist the Department of Environmental Affairs (DEA) in making a decision.

The significance of an impact is defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria used to determine impact consequences are presented in Table 5-1 below.

Table 5-2: Criteria used to determine the consequence of the impact

Rating	Definition of Rating	Score
A. Extent– the area over which the impact will be experienced		
None		0
Local	Confined to project or study area or part thereof (e.g. site)	1
Regional	The region, which may be defined in various ways, e.g. cadastral, catchment, topographic	2
(Inter) national	Nationally or beyond	3
B. Intensity– the magnitude of the impact in relation to the sensitivity of the receiving environment		
None		0
Low	Site-specific and wider natural and/or social functions and processes are negligibly altered	1
Medium	Site-specific and wider natural and/or social functions and processes continue albeit in a modified way	2
High	Site-specific and wider natural and/or social functions or processes are severely altered	3
C. Duration– the time frame for which the impact will be experienced		
None		0
Short-term	Up to 2 years	1
Medium-term	2 to 15 years	2
Long-term	More than 15 years	3

The combined score of these three criteria corresponds to a Consequence Rating, as follows:

Table 5-3: Method used to determine the consequence score

Combined Score (A+B+C)	0 – 2	3 – 4	5	6	7	8 – 9
Consequence Rating	Not significant	Very low	Low	Medium	High	Very high

Once the consequence has been derived, the probability of the impact occurring was considered using the probability classifications presented in Table 5-4.

Table 5-4: Probability classification

Probability– the likelihood of the impact occurring	
Improbable	< 40% chance of occurring
Possible	40% - 70% chance of occurring
Probable	> 70% - 90% chance of occurring
Definite	> 90% chance of occurring

The overall significance of impacts was determined by considering consequence and probability using the rating system prescribed in the table below.

Table 5-5: Impact significance ratings

Significance Rating	Possible Impact Combinations		
	Consequence		Probability
Insignificant	Very Low	&	Improbable
	Very Low	&	Possible
Very Low	Very Low	&	Probable
	Very Low	&	Definite
	Low	&	Improbable
	Low	&	Possible
Low	Low	&	Probable
	Low	&	Definite
	Medium	&	Improbable
	Medium	&	Possible
Medium	Medium	&	Probable
	Medium	&	Definite
	High	&	Improbable
	High	&	Possible
High	High	&	Probable
	High	&	Definite
	Very High	&	Improbable
	Very High	&	Possible
Very High	Very High	&	Probable
	Very High	&	Definite

Finally, the impacts have also been considered in terms of their status (positive or negative impact) and the confidence in the ascribed impact significance rating. The system for considering impact status and confidence (in assessment) is laid out in the table below.

Table 5-6: Impact status and confidence classification

Status of impact	
Indication whether the impact is adverse (negative) or beneficial (positive).	+ ve (positive – a 'benefit')
	– ve (negative – a 'cost')
Confidence of assessment	
The degree of confidence in predictions based on available information, SRK's judgment and/or specialist knowledge.	Low
	Medium
	High

The impact significance rating should be considered by authorities in their decision-making process based on the implications of ratings ascribed below:

- **Insignificant:** the potential impact is negligible and will not have an influence on the decision regarding the proposed activity/development.
- **Very Low:** the potential impact is very small and should not have any meaningful influence on the decision regarding the proposed activity/development.
- **Low:** the potential impact may not have any meaningful influence on the decision regarding the proposed activity/development.
- **Medium:** the potential impact should influence the decision regarding the proposed activity/development.
- **High:** the potential impact will affect the decision regarding the proposed activity/development.
- **Very High:** The proposed activity should only be approved under special circumstances.

Practicable mitigation measures will be recommended and impacts will be rated in the prescribed way both with and without the assumed effective implementation of mitigation measures. Mitigation measures will be classified as either:

- **Essential:** must be implemented and are non-negotiable; or
- **Optional:** must be shown to have been considered and sound reasons provided by the proponent, if not implemented.

5.2.2 "No-Go" Alternative

The no development option assumes the site remains in its current state, i.e. agricultural land. The no-go alternative has been used as a baseline throughout the assessment process against which potential impacts have been compared.

The no-go alternative in this instance is that the farms within the study area would be fenced to enable stocking with endemic game species that would easily broach the current perimeter without fencing – such species include Burchell's zebra and cape eland. This may improve the commercial prospects of the farms, specifically in terms of game farming, hunting and/or game viewing, although there is currently no proposal to pursue such commercial activities. Therefore, the no-go alternative would see the current land use continuing, albeit it in a slightly modified way with the introduction of fencing (which is not precluded in the event that the wind farm is developed), and probably in the absence of a stewardship agreement with the ECPTA.

In most cases, the "No-Go" alternative approximates the baseline situation. In the sections assessing specific impacts below, the "No-Go" alternative is only assessed where the baseline descriptions do not fully capture current impacts.

5.3 Potential Archaeological Impacts

5.3.1 Introduction

SRK Consulting appointed Ms Celeste Booth of Booth Heritage Consulting to conduct a Phase 1 archaeological survey as part of the Environmental Impact Assessment (EIA) for the proposed facility. A copy of the report is included in the Supplementary Volume of Specialist Studies; Appendix A. Archaeological resources referenced below in the report are included on Figure 5-1. Ms Booth has reviewed this section and has confirmed that it is an accurate summary of her report.

The following general mitigation measures are applicable to all identified archaeological impacts, and where applicable, additional specific mitigation measures are listed in the tables below:

- If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including graves and burials) are uncovered during construction, all work must cease immediately and be reported to the Albany Museum and/or the Eastern Cape Provincial Heritage Resources Agency (ECPHRA). Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial heritage material will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities continue; and

- A person must be trained as a site monitor to report any archaeological sites found during the development. Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites.

The possible upgrading, resurfacing, and/or rehabilitation of external gravel access roads and associated borrow pits is outside the scope of this Environmental Impact Assessment process and has not been assessed by the archaeologist. If the need to upgrade external roads, or open a borrow pit, is identified at a later stage, then a Phase 1 Archaeological Impact Assessment may be required in terms of the National Heritages Resources Act.

As is likely that any archaeological resources of importance could be avoided through adjustments to the micro-siting of the powerline pylons, and any residual impacts could be addressed via the standard mitigation measures listed above, archaeological impacts relating to the powerline have not been assessed. The following recommendation has however been made:

- An archaeological walk-through must be conducted for the final power line route chosen out of the three alternatives when the positions of the pylons are known.

5.3.2 Potential Impacts A1: Potential impact on archaeological resources during construction

During the initial survey several stone artefact occurrences were observed along the internal access roads mostly in the lower lying areas within the valley. The stone artefacts encountered were mainly of Middle Stone Age origins. It is unlikely that artefacts encountered occur in situ. The stone artefacts scatters are considered as having a low archaeological importance.

Surface scatters of Middle Stone Age stone artefacts occurred over the whole turbine site laydown area. The artefacts occurred at the surface and eroding at about 20 cm - 30 cm below the surface, therefore, it is possible that artefacts may be found to occur further below the surface when

excavations for construction begins. It is unlikely that the stone artefacts occur in situ and are regarded as being in a secondary and out of context position as they have been washed into the exposed areas and have been disturbed by domestic animal and human activities.

The area proposed for the staff accommodation, plant storage and concrete batching area, and the control office and camp site is situated just north of the MR407 along the entrance road to the Farm Adolphs Kraal 246. Artefacts were found at the surface and eroding at about 20 cm - 30 cm below the surface, therefore, it is possible that artefacts may be found to occur further below the surface when excavations for construction begins. It is unlikely that the stone artefacts occur in situ and are regarded as being in a secondary and out of context position as they have been washed into the exposed areas and have been disturbed by domestic animal and human activities.

The stone artefact scatters in the turbine laydown and other construction areas are considered as having a low cultural importance and have been allocated a heritage grading of:

- '*General' Protection C (Field Rating IV A)*: These sites have been sufficiently recorded (in the Phase 1 assessment). It requires no further recording before destruction (usually Low importance).

A combined impact rating is provided below for the three impacted areas as described above. The following permitting requirements are highlighted by the specialist:

- A destruction permit for the Turbine Site Laydown Area is required.
- A destruction permit for the staff accommodation, plant storage and concrete batching area, and the control office and camp site must be applied for before any development may continue within these areas.

Table 5-7: Significance rating of impact A1

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Long term	Low	Definite	Low	-	High

5.4 Potential Palaeontological Impacts

5.4.1 Introduction

SRK consulting appointed Dr Rob Gess of Rob Gess Consulting to conduct a Phase 1 Palaeontological Impact Assessment (PIA) to determine whether there are any indications that the proposed site is of paleontological importance. A copy of the report is included in the Supplementary Volume of Specialist Studies, Appendix B, and the locations of the palaeontological resources referenced in the report and below are provided on Figure 5-2 and Figure 5-3.

Dr Gess has reviewed this section and has confirmed that it is an accurate summary of his report.

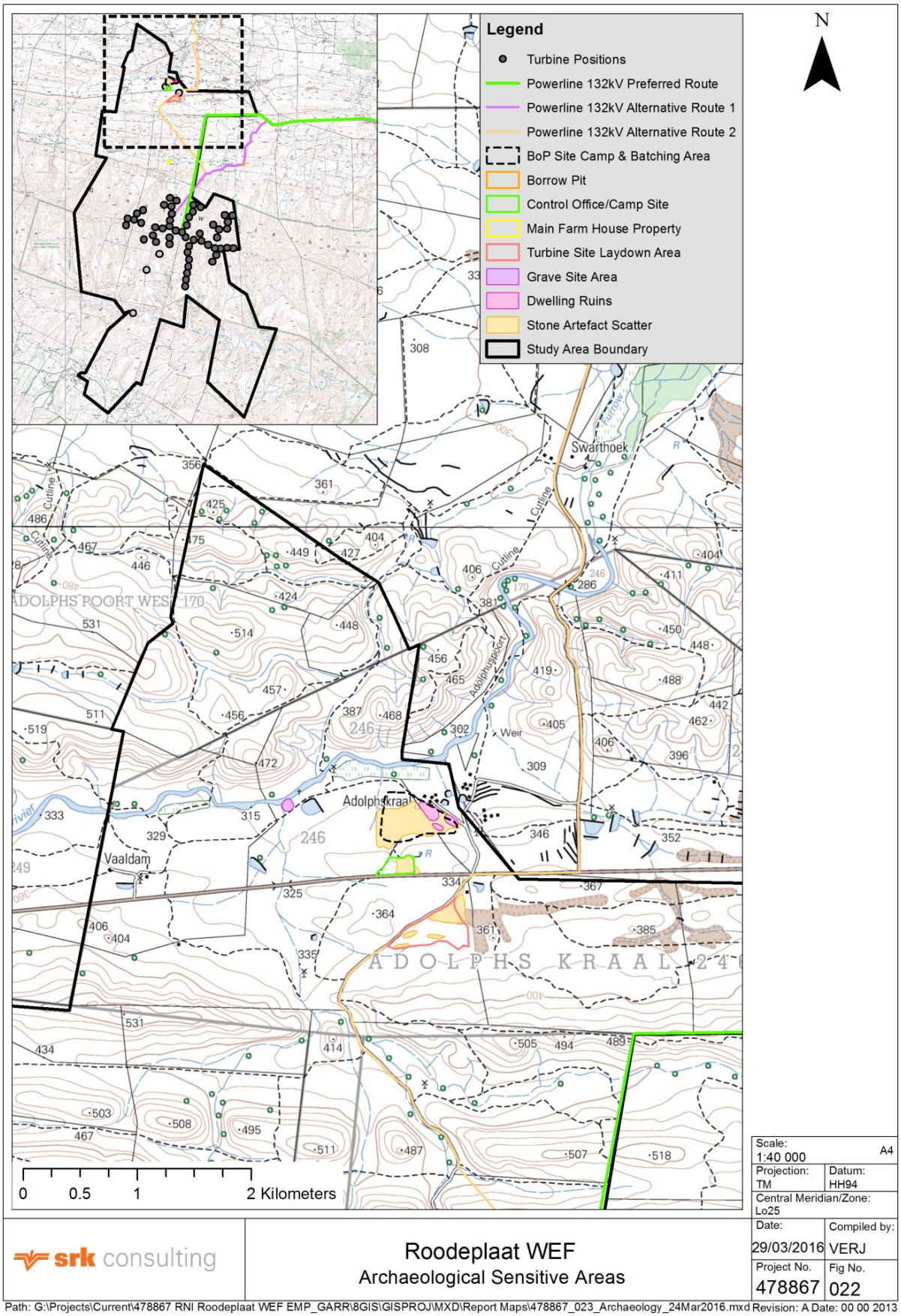


Figure 5-1: Archaeological resources identified by the specialist

5.4.2 Potential Impacts P1: Disturbance, damage or destruction of significant fossils during construction

The construction of the majority of the wind tower positions will occur on strata which are unlikely to be palaeontologically sensitive. Approximately six wind tower positions are however probably situated on the Cedarberg Formation of the Table Mountain Group (Cape Supergroup). Excavations for wind towers situated close to the contact (line on map) between the Peninsular and Goudini Formations are moderately likely to disturb highly sensitive Cedarberg Formation shales.

The powerline route (irrespective of the alignment alternative) will traverse the Bokkeveld group strata, as well as the Kirkwood Formation. These units are potentially fossiliferous. There is a low chance that Kirkwood Formation dinosaur remains will be disturbed, but they would be of high importance. There is a medium chance that Bokkeveld fossils will be disturbed and these would be of moderate to high importance.

Pylon holes will need to be excavated into the Voorstehoek Formation. These strata appear to be locally very fossiliferous. There is a high chance that palaeontological material will be disturbed that is likely to be of medium to high importance.

Pylon holes will also need to be excavated into the Tra-Tra Formation (point 8 in Figure 5-3). The formation is locally unusually fossiliferous. There is a low to moderate chance that palaeontological material of moderate importance would be disturbed here.

An existing borrow pit (into mudstones of the Voorstehoek Formation) is located in close proximity to the proposed Power Line Path 1 (See Point 7 on Figure 5-2) and is of great palaeontological interest, providing one of only three comprehensive sites of this age in the eastern Eastern Cape. It is certain that development of this borrow pit will disturb palaeontological material of high importance. This is acceptable as it will help to reveal palaeontological material for study (provided the mitigation measures are implemented). Assessment of the borrowpit is however outside the scope of this EIA and will be subject to a separate licensing process. The combined impact rating below therefore does not take the borrow pit into consideration.

Table 5-8: Significance rating of impact P1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	High	Long term	high	Probable	High	-	High
Management Measures								
• Excavations for wind tower positions situated close to the contact line between the Peninsular and Goudini Formations should be checked by a palaeontologist before being filled; • The ECO is to look out for palaeontological material where pylon footings are excavated in the Bokkeveld group strata and Kirkwood Formation (all powerline routes) and should report any observed fossils to a professional palaeontologist; and • A palaeontologist should be appointed to inspect pylon holes in the vicinity of point 8 along powerline route 1 and the preferred route within the Tra –Tra formation.								
After Management	Local	Medium	Long term	Medium	Improbable	Low	-	High

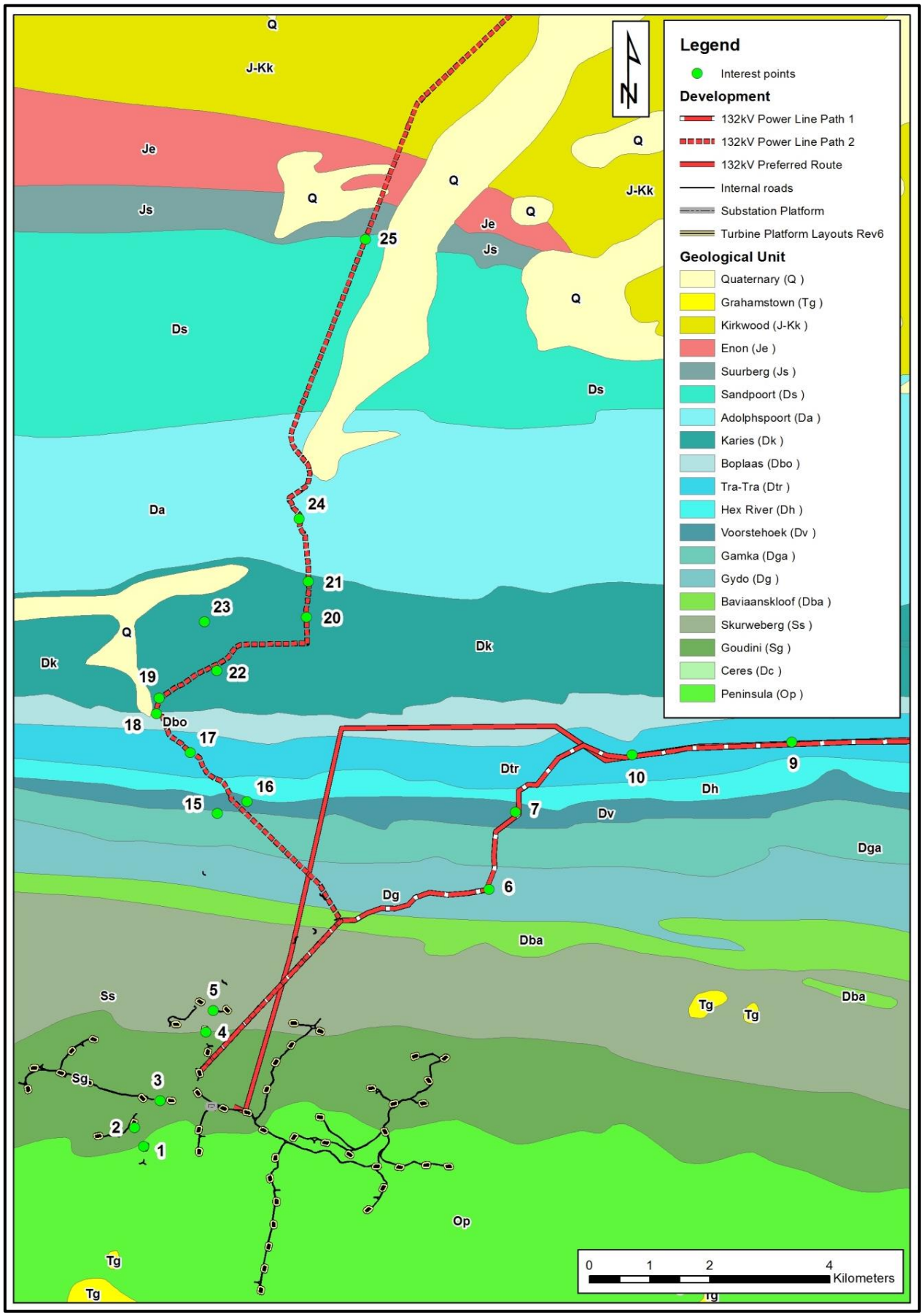


Figure 5-2: Map of development area with geological survey data and points of interest (Source: Gess 2016)

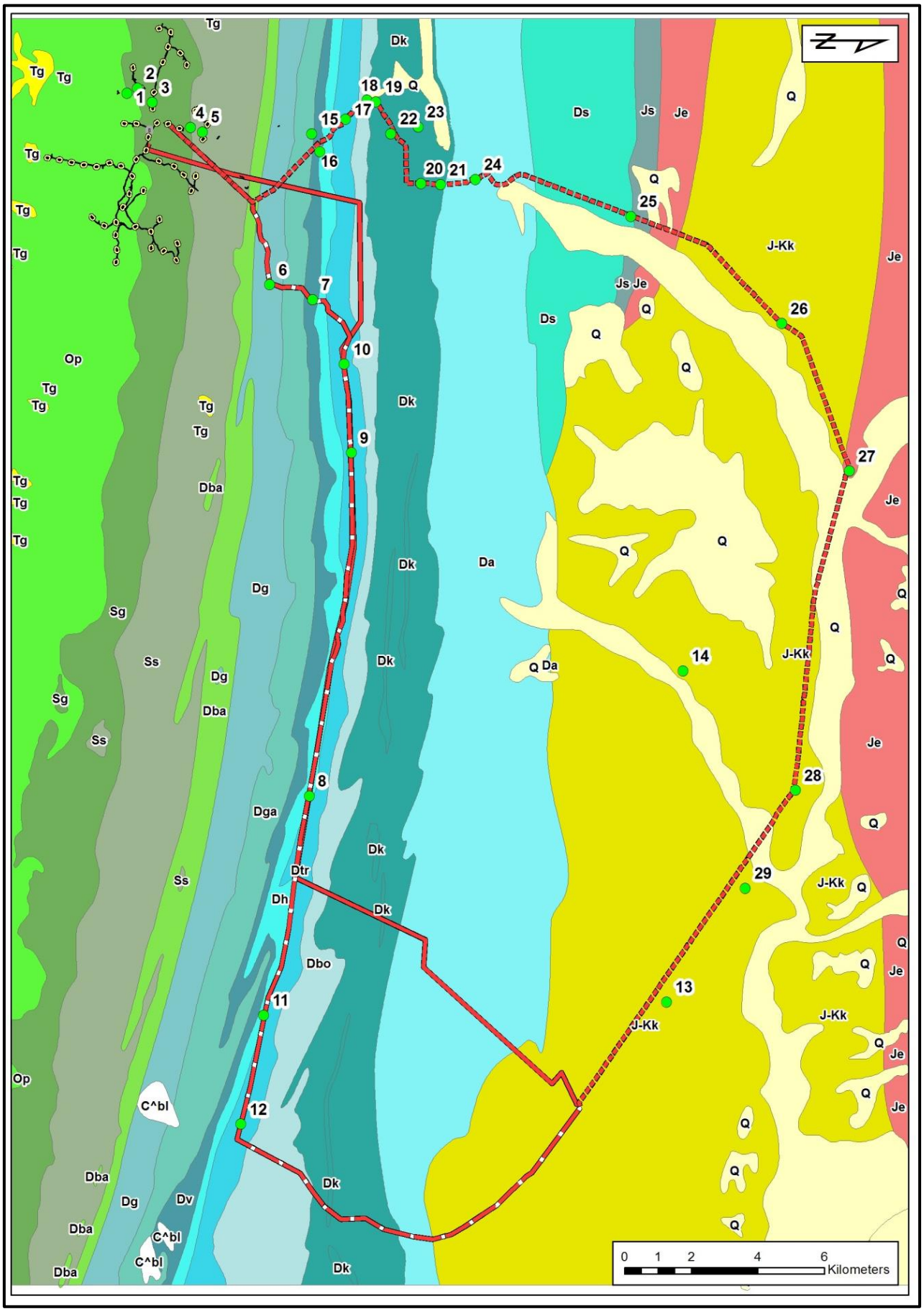


Figure 5-3: Zoomed out map showing geological survey data and points of interest (Source: Gess 2016) (for legend refer to Figure 5-4)

5.5 Potential Agricultural Impacts

5.5.1 Introduction

SRK Consulting appointed Mr Johann Lanz to conduct an Agricultural Impact Assessment as prescribed under point 4 of Section C of the National Development of Agriculture, Forestry and Fisheries document: *Guidelines for the evaluation and review of applications pertaining to wind farming on agricultural land*, September 2010. Mr Johann Lanz conducted a desktop assessment and ground-truthing study to assess the agricultural potential of the proposed windfarm site. A copy of the report is included in the Supplementary Volume of Specialist Studies, Appendix C. Mr Lanz has reviewed this section and has confirmed that it is an accurate summary of his report.

5.5.2 Potential Impacts AG1: Loss of agricultural land use due to clearing

The direct occupation of land by the total footprint of the energy facility infrastructure will result in the loss of agricultural land.

The actual footprint of disturbance of the wind farm (including all infrastructure) is very small in relation to the available land (<1% of the surface area of the farms). The entire Roodeplaat Farm has a land capability classification, on the 8 category scale, of Class 8 (the mountainous land) and 7 (the lower lying parts of the farm). Class 7 is classified as non-arable, low potential grazing land and Class 8 is classified as non-utilisable wilderness land. The limitations to agriculture are terrain, climate and soil related, all of which make the farm unsuited to any form of cultivation. Furthermore the fynbos vegetation type over most of the farm has a very low grazing capacity. No mitigation measures are therefore required.

Table 5-9: Significance rating of impact AG1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Long Term	Low	Definite	Low	-	High

5.5.3 Potential Impacts AG2: Soil erosion due to earth moving activities

Erosion may occur due to the alteration of the land surface run-off characteristics during construction. Alteration of run-off characteristics may be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard standing areas and roads. Erosion will cause loss and deterioration of soil resources.

Table 5-10: Significance rating of impact AG2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Long term	Low	Possible	Very low	-	High
Management Measures								
• Implement an effective system of run-off control, where it is required (for example on roads and hard standing areas), that collects and safely disseminates run-off water from all hardened surfaces and prevents potential down slope erosion. • Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records occurrence or not of any erosion on site or downstream.								
After Management	Local	Low	Long term	Low	Improbable	Very low	-	High

5.5.4 Potential Impacts AG3: Loss of topsoil during construction

Poor topsoil management (burial, erosion, etc.) during construction related soil profile disturbance (levelling, excavations, disposal of spoils from excavations etc.) may result in the reduction in the soil's ability to support vegetation on disturbed areas after rehabilitation.

Table 5-11: Significance rating of impact AG3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Long term	Low	Possible	Very low	-	High
Management Measures								
• If an activity will mechanically disturb below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. • Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them. • Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land. • During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface. • Erosion must be controlled where necessary on topsoiled areas. • Establish an effective record keeping system for each area where soil is disturbed below surface for constructional purposes. These records should be included in environmental performance reports, and should include all the records below: o GPS coordinates of each area. o Date of topsoil stripping. o GPS coordinates of where the topsoil is stockpiled. o Date of cessation of constructional (or operational) activities at the particular site. o Photograph the area on cessation of constructional activities. o Date and depth of re-spreading of topsoil. o Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.								
After Management	Local	Low	Long term	Low	Improbable	Very low	-	High

5.6 Potential Impacts on Avifauna

5.6.1 Introduction

Pre-construction monitoring of avifauna has been conducted during the course of the scoping study. Initial monitoring was conducted by Jon Smallie of Wild Skies Ecological Services over the July 2013 – July 2014 period, incorporating previous work by Dr Andrew Jenkins and Adri Barkhuysen (see monitoring reports in the Supplementary Volume of Specialist Studies, Appendix D). Dr Steve Percival of Ecology Consulting (UK) was subsequently contracted by the applicant to review the previous work and conduct additional collision risk modelling (this report is included as Appendix 2 of Dr Percival's impact assessment report (included in the Supplementary Volume of Specialist Studies, Appendix D), and Jon Smallie's final pre-construction report is included as Appendix 1 of the impact assessment report. This study concluded that additional monitoring data were required for the collision risk modelling, studies for which commenced in August 2015. At this stage a full year of data for collision risk modelling is not yet available, and an interim report, covering the six month monitoring period (August 2015 – February 2016), is included as Appendix 3 of Dr Percival's impact assessment report (included in the Supplementary Volume of Specialist Studies , Appendix D).

Dr Percival has reviewed this section and has confirmed that it is an accurate summary of his report.

The following avifauna study reports are included in the Supplementary Volume of Specialist Studies Appendix D (some as appendices to other reports):

- Pre-construction bird monitoring Progress report 3 (Smallie, June 2013)
- Survey of Verreaux's Eagle and other cliff-nesting birds in the vicinity of the proposed Inyanda-Roodeplaat wind farm site near Uitenhage, Eastern Cape (Jenkins, August 2014)
- Black eagle nest survey (Barkhuysen, September 2013)
- Final pre-construction bird monitoring report (Smallie, November 2014)
- Ornothological review and assessment update: Final report (Percival, June 2015)
- Birds Surveys August 2015-January 2016 (Percival, February 2016)
- Avifaunal impact assessment (Percival, March 2016)

The 2013-14 surveys consisted of desktop studies as well as transect surveys for small terrestrial birds, vehicle-based transect surveys for large terrestrial species and raptors, eagle breeding/nest surveys and vantage point surveys to quantify/map key species flight activity. An update of these surveys to address key issues was undertaken in 2015-16, designed to take into account BirdLife South Africa's guidance (Jenkins et al. 2015) and other international guidance on bird surveys for wind farms (including Natural England, Drewitt 2010 and Scottish Natural Heritage, SNH 2014).

The results of these surveys identified four species of special concern that were active and breeding in the area and could potentially be impacted by operation of the WEF – Verreaux (black) eagle, Black Harrier, Martial eagle and Booted eagle, both due to collisions with turbines and disturbance of habitat during construction and operation. Black Harrier is a species of particular conservation importance, being an IUCN globally vulnerable and a South African endangered red list species. With regard to impacts resulting from collisions with powerlines, blue crane and Ludwig's bustard were identified as the key species of concern.

The impacts and mitigation measures listed below are derived from the avifaunal impact assessment (Percival 2016).

A key mitigation measure proposed by Dr Percival is habitat management. This refers to schemes that are usually implemented to reduce the attractiveness of the wind farm site for foraging birds (e.g. removal of carcasses for carrion feeding species) whilst at the same time increasing food availability elsewhere. It is relevant to note that the ecological specialist has expressed reservations about this type of mitigation measure as it may result in secondary unwanted impacts on local ecosystems, and therefore should be carefully assessed before being implemented. The operational details of how and where the off-site habitat management measures recommended below will best be implemented have not yet been determined.

5.6.2 Potential Impact AV1: Collision with wind turbines during operation

Collision risk for the key species of special concern was modelled based on their current flight behaviour (recorded during vantage point surveys around the site), with the application of predicted collision avoidance rates (which differ between species – in this case proxies based on similar species were used as the avoidance rates for the species under assessment have not yet been determined). Turbine specifications, body sizes, flight speeds and baseline mortality rates are also taken into account in collision risk modelling (CRM). Based on the collision risk for each species, impacts on mortality could be predicted. Further detail on the CRM is provided in the Avifaunal impact assessment report (Percival, March 2016)

Table 5-12: Significance rating of impact AV1 and recommended mitigation measures

	Key Species	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	**Black Harrier**	Regional	Medium	Long term	High	Possible	Medium	-	High
	Verreaux's Eagle	Regional	Medium	Long-term	High	Possible	Medium	-	High
	Martial Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Booted Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Management Measures								
	• On-site habitat management: ○ Avoid increasing attractive habitat for Rock Hyrax by removing all mounds of aggregate or rock created during construction, prior to operation; ○ Avoid creating habitat for potential raptor prey species in the turbine bases; ○ Review the requirement for a carrion removal programme based on post-construction monitoring results. • Off-site habitat management: ○ Implement a management programme within the Verreaux's Eagle nest buffers to enhance the food resources away from the wind farm, and hence reduce eagle flight activity within the wind farm ○ Management of the remaining parts of the site for conservation, in terms of a stewardship agreement and management plan integrating the ecological requirements of the raptors on the site. • Turbine shutdown on demand – as a back-up response should the number of collisions actually approach the worst-case predictions.								
After Management	**Black Harrier**	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Verreaux's Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Martial Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Booted Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High

5.6.3 Potential Impact AV2: Disturbance from foraging/nesting areas during construction and operation

Disturbance of birds is most likely to be highest during construction, when clearing of vegetation and noise and disturbance caused by construction activities could potentially affect both ground-nesting birds and raptors. Disturbance could also include loss of foraging habitat around the wind farm as a result of displacement, as birds are likely to avoid the close proximity of the wind turbines.

Based on studies of Golden Eagles, a 500 m buffer has been used in this assessment as a precautionary distance over which disturbance to eagles might reasonably occur. Range loss was predicted by overlaying the buffers around the proposed wind turbines onto the estimated ranges and measuring the percentage of each range that could be lost through displacement.

Potential impacts of disturbance on the key species of concern were assessed based on predicted range loss (assuming total displacement).

Table 5-13: Significance rating of impact AV2 and recommended mitigation measures

	Key Species	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	**Black Harrier**	Regional	Medium	Long-term	High	Possible	Medium	-	High
	Verreaux's Eagle	Regional	Low	Long-term	Medium	Possible	Low	-	High
	Martial Eagle	Regional	Low	Long-term	Medium	Possible	Low	-	High
	Booted Eagle	Regional	Low	Long-term	Medium	Possible	Low	-	High
	Management Measures								
	During construction: • Limit construction activities to a demarcated area • Implement a Breeding Bird Protection Plan (approved by BLSA and other relevant stakeholders and in accordance with industry best practice) as part of Construction Method Statement, including the following: o Avoid potentially disturbing works near active nests, o Deter birds from nesting in areas that will be affected. During operation: • On-site habitat management – see impact AV1 for details • Off-site habitat management – see impact AV1 for details								
After Management	**Black Harrier**	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Verreaux's Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Martial Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High
	Booted Eagle	Regional	Low	Long-term	Medium	Improbable	Low	-	High

5.6.4 Potential Impacts AV3: Collision mortality with overhead powerlines during operation

The 2015-16 surveys have shown that several species prone to collision with overhead powerlines (including Blue Crane and Ludwig's Bustard) are present in the area through which the overhead lines would pass. It will be important therefore to ensure that suitable mitigation is put in place. The surveys are also informing where those species occur and hence the higher collision risk areas where those measures would need to be applied. It was not possible to obtain access to survey the full routes of all three possible grid connection routes, so a further survey should be undertaken once the final route is confirmed to identify the locations where these measures will be needed (in combination with the 2015-16 data).

The transect surveys have shown similar densities of the two key species at risk of collision (Blue Crane and Ludwig's Bustard) on each of the proposed powerline route options, indicating little difference between the ornithological sensitivity of the different routes, and emphasising the need to implement the mitigation measures set out above whichever route is finally selected.

The impact significance ratings provided below therefore apply to all three route options.

Table 5-14: Significance rating of impact AV3 and recommended mitigation measures

	Key Species	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	**Blue crane**	Regional	Medium	Long-term	High	Probable	High	-	High
	Ludwig's bustard	Regional	Medium	Long-term	High	Probable	High	-	High
	Management Measures								
	• All overhead power line to be on 'bird friendly' pole design as per Eskom Standard, and high risk sections (identified via further surveys of the chosen route) to be marked with 'bird flappers'								
After Management	**Blue crane**	Regional	Low	Long-term	Medium	Possible	Low	-	High
	Ludwig's bustard	Regional	Low	Long-term	Medium	Possible	Low	-	High

In addition to the above-mentioned mitigation measures for construction and operation, the following design mitigation measures should be implemented:

- A 2.5 km buffer for Martial Eagle and a 1.5km buffer for Verreaux's Eagle nesting sites should be applied.
- Both collision risk and disturbance relate to number of turbines, so overall magnitude of impacts will be strongly influenced by the number of turbines. Further reductions in turbine numbers, should they be implemented, would be another way in which to mitigate the ornithological impacts of the Development.

Monitoring requirements are outlined in Section 6.3.

5.7 Potential Impacts on Bats

5.7.1 Introduction

Werner Marais of Animalia Zoological & Ecological Consultation was appointed to undertake a 12 month preconstruction bat monitoring survey. Monitoring took place between July 2013 and July 2014 with transects using a vehicle-mounted bat detectors well as placing bat detectors on three monitoring masts on site. A copy of the report can be found in the Supplementary Volume of Specialist Studies, Appendix E.

Mr Marais has reviewed this section and has confirmed that it is an accurate summary of his report.

Bat activity was monitored using active and passive bat monitoring techniques. Active monitoring has been done through site visits with transects made throughout the site with a vehicle-mounted bat detector. Passive detection has been performed with the mounting of passive bat monitoring systems placed on three monitoring masts on site.

The monitoring systems served the purpose of recording bat activity every night for the 12 month pre-construction study period, and inform mitigation recommendations.

The valley and kloof areas offer potential roosting sites, high insect abundance and surface water, while the mountain slopes may provide roosting sites in the form of rock crevices and caverns.

A sensitivity map was drawn up indicating potentially sensitive roosting and foraging areas based on species ecology and habitat preferences as well as associated recommended buffer areas. The specialist then applied a 350 m buffer around high sensitivity areas (defined as areas that are deemed critical for resident bat populations, capable of elevated levels of bat activity and support greater bat diversity than the rest of the site), and a 150 m buffer around moderate sensitivity areas (defined as areas of foraging habitat or roosting sites considered to have significant roles for bat ecology). Based on the current (52 turbine) layout, no turbines are proposed within areas identified as being of high or moderate bat sensitivity, however turbines are proposed for within the surrounding buffer areas. Turbines 4, 12, 16, 17, 19, 36, 37, 40, 41, 42, 44, 46 and 51 are located within the moderate sensitivity buffers. Turbines 15, 47, 48, 52 and 53 are located within the high bat sensitivity buffers.

The Moderate bat sensitivity areas and associated buffer zones must be prioritised during operational monitoring, and turbines within these areas will require initial mitigation measures listed below. High Bat Sensitivity areas and their respective buffers are 'no – go' areas due to the expected elevated rates of bat fatalities due to wind turbines, and no turbines should be placed within these areas.

5.7.2 Detail on adaptive mitigation proposed

The correct placement of wind farms and of individual turbines to avoid bat sensitive areas as indicated above can significantly lessen the impacts on bat fauna in an area, and should be considered as the preferred option for mitigation. While changes to the turbine layout to accommodate a lesser number of turbines are presently being considered, how these will affect the bat sensitive areas has not yet been determined. The mitigation measures presented in the table below are however based on the assumption that these changes to the development layout will result in avoidance of the bat sensitive areas and associated buffers that were identified, and therefore will contribute to mitigation of impacts on bats.

Where mitigation by location is not possible, other options are required. Currently the most effective option for mitigation is alteration of blade speeds and cut-in speeds under environmental conditions favourable to bats (bat activity is known to be influenced by wind speed, temperature and barometric pressure).

Six levels of increasing intensity of mitigation (based on blade manipulation or curtailment) are available. The specialist has recommended that mitigation commences at level 4 (90 degree feathering of blades below manufacturers cut in speed, with reduced power mode settings between manufacturers' cut-in speed and mitigation cut-in conditions) for the months, times and weather conditions when increased bat activity has been identified to be most likely.

Depending on the results of the post construction mortality monitoring, the mitigation can be either relaxed or intensified (moving down or up in the levels) up to a maximum intensity of Level 5 (90 degree feathering of blades below mitigation cut in conditions). More detail on the mitigation approach is included in the specialist report in the Supplementary Volume of Specialist Studies Appendix E.

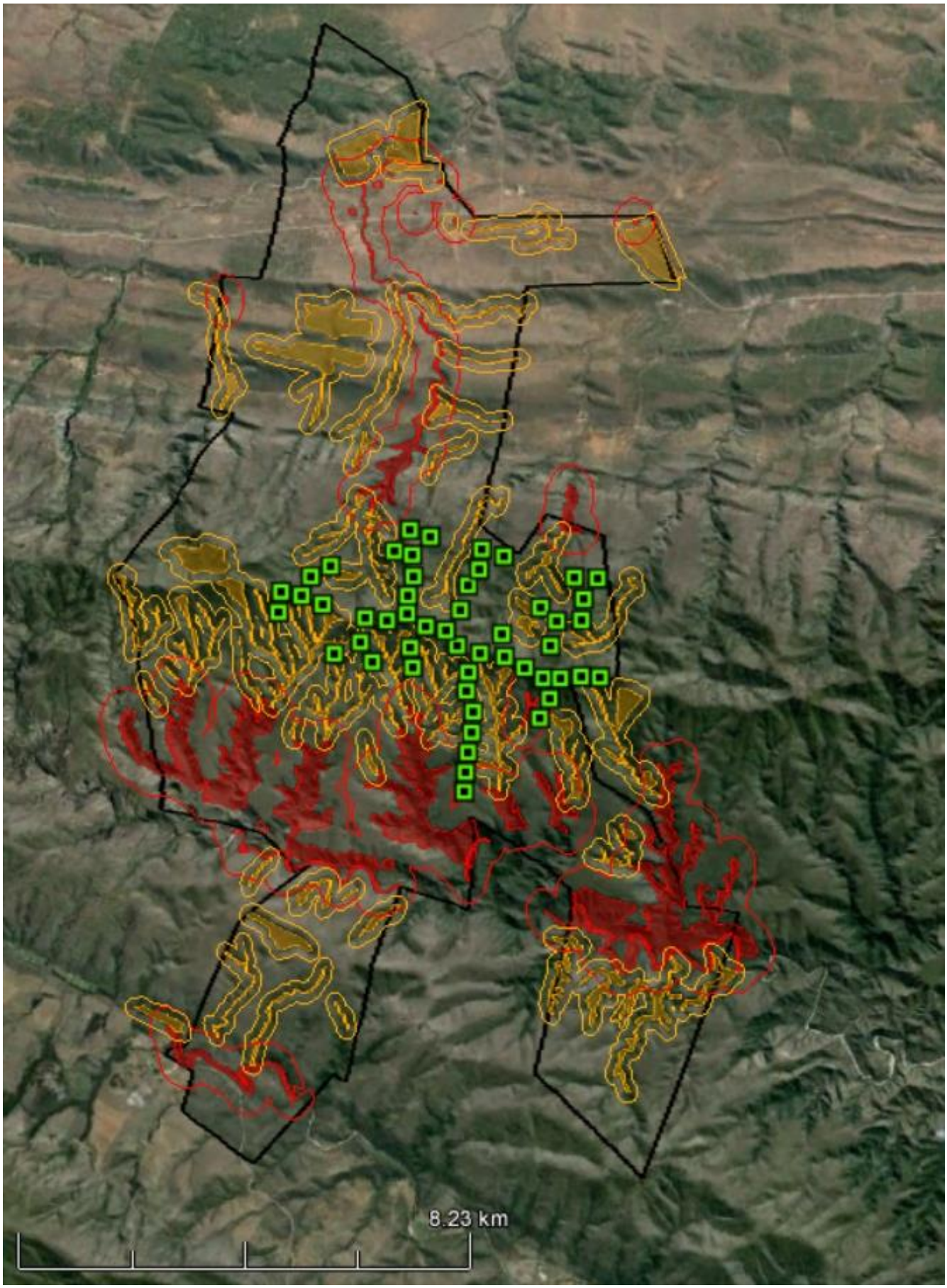


Figure 5-5: Bat sensitivity map of the Roodeplaat site (Source: Marais 2016)

5.7.3 Potential Impacts B1: Damage to bat roosts during construction

During construction, the earthworks can damage bat roosts in rock crevices. Potentially favourable habitat for bats on the site was mapped, and buffers applied to these areas.

Table 5-15: Significance rating of impact B1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Possible	Low	-	High
Management Measures								
• Avoid bat sensitive areas (as per the sensitivity map) during construction activities								
After Management	Local	Low	Long term	Low	Possible	Very low	-	High

5.7.4 Potential Impacts B2: Loss of bat foraging habitat due to construction

Some foraging habitat will be permanently lost by construction of turbines, access roads and associated infrastructure.

Table 5-16: Significance rating of impact B2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Possible	Low	-	High
Management Measures								
• Avoid bat sensitive areas (as per the sensitivity map) during construction activities. • Keep to designated areas when storing building materials, resources, turbine components and/or construction vehicles and keep to designated roads with all construction vehicles. • Damaged areas not required after construction should be rehabilitated by an experienced vegetation succession specialist.								
After Management	Local	Low	Long term	Low	Possible	Very low	-	High

5.7.5 Potential Impacts B3: Mortality due to collisions with turbines and barotrauma during operation

Bat mortalities due to turbines have been attributed primarily to direct impact with the blades, and to a lesser degree to barotrauma (a condition where low air pressure found around the moving blades of wind turbines, causes the lungs of a bat to collapse, resulting in fatal internal haemorrhaging).

Table 5-17: Significance rating of impact B3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Long term	High	Probable	High	-	High
Management Measures								
• No turbines should be placed in areas of High bat sensitivity and their buffers as well as preferably avoid areas of Moderate bat sensitivity and their buffers for turbine layout; and • Apply outlined adaptive mitigation measures								
After Management	Regional	Low	Long term	Medium	Possible	Low	-	Medium

5.7.6 Potential Impacts B4: Changes in bat diversity due to artificial lighting during operation

During operation if strong artificial lights are used at the facility (for example at turbine bases), it will attract insects and thereby also bats. This increases the likelihood of impacts on bats by the wind turbines. Additionally, only certain species of bats will readily forage around strong lights, whereas others avoid such lights even if there is insect prey available. This can draw insect prey away from other natural areas and thereby artificially favour certain species, affecting bat diversity in the area.

Table 5-18: Significance rating of impact B4 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								
• Utilise lights with wavelengths that attract less insects (low thermal/infrared signature). • Any lights at turbine bases must be equipped with passive motion sensors as to only switch on when a person is nearby. • If not required for safety or security purposes, lights should be switched off when not in use.								
After Management	Local	Low	Long term	Low	Possible	Very low	-	High

5.8 Potential Ecological Impacts

5.8.1 Introduction

An Ecological Impact Assessment was originally undertaken by CES during the scoping phase. Subsequent changes to the project description and layout required that the report be updated. This was undertaken by Ms Leigh-Ann de Wet of LD Biodiversity Consulting. Copies of both reports can be found in the Supplementary Volume of Specialist Studies, Appendix F.

The following impacts were addressed via desktop assessment only:

- The impact of noise related to construction and operation of the proposed development on faunal species on and around the site;
- The impact of fencing on fragmentation and on biodiversity in general; and
- Impacts relating to the powerline route alternatives.

During the updated study, 52 sample points along the roads that form part of the proposed development, as well as additional infrastructure, were assessed in order to verify the previous vegetation and habitat mapping, and assess the additional project areas not previously assessed. The area of influence was defined based on direct and indirect impacts of the proposed development on the vegetation and habitats of the sample site, and included a 300 m buffer around roads and turbines, to accommodate dust impacts. The vegetation was then mapped in detail for these areas, and species list compiled, taking into account species of special concern (SSC), and alien invasive species. A sensitivity rating was applied to the vegetation, based on various criteria including topography, presence of SSC, abundance in the area, conservation status, erosion and rehabilitation potential.

The Baviaanskloof Mega-reserve CBA map was mostly taken into account as the vegetation mapping for this area is of the finest scale of all the assessments consulted. This assessment describes three CBA categories, and provides recommended development guidance for each. Of the

development, a small portion of existing roads fall in CBA 1 (natural landscapes, which are recommended to be set aside for conservation) and CBA 2 (near natural landscapes, where limited land use to maintain biodiversity and ecosystem integrity is recommended), with the majority of the development falling into CBA 3 (functional landscapes, including wetlands and riparian zones, where limitations are recommended to support ecosystem integrity) and the rest into CBA 2.

Impacts were rated based on the results of the sensitivity mapping as described above, as well as literature reviews. Ecological impacts resulting from construction of the powerline connection to the grid were rated separately and a rating provided for each alignment option so that an environmental preference could be determined.

In addition to the specific measures listed for each impact below, the following optional mitigation measures relating to all impacts are recommended:

- Move individual turbines out of highly sensitive areas and into less sensitive areas, and away from any SSC, on a small scale.
- Reduce the number of turbines in the development, thus also reducing the total area of roads required to reach all of the turbines.
- Enter into a conservation management agreement with the relevant authority to allow for assurance of the conservation of the site.

5.8.2 Potential Impacts EC1: Loss of vegetation communities due to clearing

Direct loss of vegetation will result from construction of the WEF and associated facilities. Metrics are used to determine the impacts associated with the loss of each identified vegetation type, and to contextualize the loss of habitat. For the powerline route options, loss of vegetation was determined based on Google earth images and vegetation maps of the area. For the purposes of this study, community types were not elucidated.

Table 5-19: Significance rating of impact EC1 and recommended mitigation measures

	Key Species	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	**Thicket**	Local	Low	Long term	Low	Definite	Low	-	High
	Proteaceous fynbos	Local	Low	Long term	Low	Definite	Low		High
	Grassy fynbos	Local	Low	Long term	Low	Definite	Low	-	High
	Suculent thicket	Local	Low	Long term	Low	Definite	Low	-	High
	Karoo vegetation	Local	Low	Long term	Low	Definite	Low	-	High
	Degraded thicket	Local	Low	Short term	Very Low	Definite	Very Low	-	High
	Renosterveld	Local	Low	Long-term	Low	Definite	Low	-	High
	Acacia riparian thicket	Local	Low	Long-term	Low	Definite	Low	-	High
	Powerline options								
	Preferred Option	Regional	Low	Long term	Medium	Definite	Medium	-	Low
	Option 1	Region	Mediu	Long	High	Definite	High	-	Low

	Key Species	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
		al	m	term					
	Option 2	Regional	Medium	Long term	High	Definite	High	-	Low
	Management Measures								
For the WEF: • Keep the footprint of the development as small as possible and ensure that the maximum road width (15m) is not exceeded. • Rehabilitate areas that will not need to remain cleared in the operational phase, especially remaining areas of turbine platforms that will not be used during the operational phases. For the powerlines: • Keep the footprint of the development as small as possible and ensure that the maximum servitude width (31m) is not exceeded. • Rehabilitate areas that will not need to remain cleared in the operational phase. • Mow or flatten vegetation, rather than clear it wherever possible. • Ensure that as far as possible servitudes are placed in areas of already existing disturbance, for example along the edges of roads.									
After Management	**Thicket**	N/A							
	Proteaceous fynbos	Local	Low	Long term	Low	Probable	Low	-	High
	Grassy fynbos	Local	Low	Long term	Low	Probable	Low	-	High
	Suculent thicket	N/A						-	
	Karoo vegetation	Local	Low	Long term	Low	Possible	Very low	-	High
	Degraded thicket	N/A							
	Renosterveld	N/A							
	Acacia riparian thicket	N/A							
	Powerline options								
	Preferred Option	Local	Low	Long term	Low	Definite	Low	-	Low
	Option 1	Local	Low	Long term	Low	Definite	Low	-	Low
	Option 2	Local	Low	Long term	Low	Definite	Low	-	Low

5.8.3 Potential Impacts EC2: Loss of plant species of special concern due to clearing

In the site overall, there is a high number of SSC as well as an expected increase in the SSC recorded should a ground-truthing study be done for permit applications to remove or destroy SSC on site. As a result, the loss of SSC is one of the highest negative impacts of the proposed development. The area of each vegetation type lost is very small, with a total area of 118.26 ha that will be lost as a result of the proposed development (an area which does include roads that have already been constructed.). SSC include members of the Proteaceae family, Mesembyanthemaceae family and others and specifically an *Encephalartos longifolius*, which are protected through various pieces of legislation.

If search and rescue and rehabilitation is done effectively in conjunction with propagation trials, the numbers of individuals of each SSC will not be reduced and can be increased, resulting in an overall positive impact on the numbers of these species.

Table 5-20: Significance rating of impact EC2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+/-	Confidence
Before Management	Local	High	Long term	High	Definite	High	-	Medium
	Powerlines							
Preferred option	Regional	Low	Long term	Medium	Definite	Medium	-	Low
Option 1	Regional	Medium	Long term	High	Definite	High	-	Low
Option 2	Regional	Medium	Long term	High	Definite	High	-	Low
Management Measures								
• Keep the footprint of the development as small as possible and ensure that the maximum road or servitude width is not exceeded. • Ground-truth the SSC for the entire footprint of the proposed development with the development of a full and complete list of all SSC. • Search and rescue of any SSC within the footprint of the development prior to construction. (Application of permits for the removal for destruction or transplantation of SSC (depending on what is most practical for each group) • Rehabilitation of any areas that were cleared for construction but not required for operation using rescued plants. • Ensure that as far as possible powerline servitudes are placed in areas of already existing disturbance, for example along the edges of roads.								
After Management	Local	Medium	Long term	Medium	Possible	Low	+	Medium
	Powerlines							
Preferred option	Local	Low	Long term	Low	Definite	Low	-	Low
Option 1	Local	Low	Long term	Low	Definite	Low	-	Low
Option 2	Local	Low	Long term	Low	Definite	Low	-	Low

5.8.4 Potential Impacts EC3: Loss of animal species of special concern due to clearing of vegetation

Direct loss of species would include slow-moving animals that may be run over by vehicles, specifically tortoises and chameleons. In addition, loss of animals may occur during construction when these are killed as a result of vegetation clearing. Construction personnel may trap animals. Mitigation measures to avoid these impacts on animals such as amphibians and reptiles (including the ghost frog, Elandsberg dwarf chameleon, and Smith's dwarf chameleon – none of which were recorded from the site) are listed below.

Table 5-21: Significance rating of impact EC3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+/-	Confidence
Before Management	Local	Low	Short term	Very low	Probable	Very low	-	Low
	Powerlines							
Preferred option	Regional	Low	Long term	Medium	Possible	Low	-	Low

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Option 1	Regional	Medium	Long term	High	Possible	Medium	-	Low
Option 2	Regional	Medium	Long term	High	Possible	Medium	-	Low
Management Measures								
Measures related to the construction and operational phase: • A search and rescue must be undertaken during construction to ensure that any of these species are relocated prior to vegetation removal. • The speed limit on roads within the proposed development should not exceed 40km/h to avoid road fatalities. Any road fatalities should be monitored and mitigation measures adapted to reduce these. • Workers must not be allowed to trap any animals on site and must be trained in the value of biodiversity.								
After Management	Local	Low	Short term	Very low	Improbable	Insignificant	-	Low
	Powerlines							
Preferred option	Local	Low	Long term	Low	Possible	Very Low	-	Low
Option 1	Local	Low	Long term	Low	Possible	Very Low	-	Low
Option 2	Local	Low	Long term	Low	Possible	Very Low	-	Low

In addition to the measures listed above, the following optional mitigation measure is recommended:

- The majority of the large earthworks involved in construction should take place in a season where faunal SSC are not active (such as the dry season) to avoid fatalities.

5.8.5 Potential Impacts EC4: Loss of biodiversity due to clearing of vegetation

Biodiversity loss will result from the clearance of vegetation for the construction of the proposed development. As a result, individuals of many species will be lost over the total 118.26 ha that will be removed for construction. Species richness and diversity is high for the site, especially considering the range of different vegetation types recorded on site.

Table 5-22: Significance rating of impact EC4 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	Medium
	Powerlines							
Preferred option	Regional	Low	Long term	Medium	Definite	Medium	-	Low
Option 1	Regional	Medium	Long term	High	Definite	High	-	Low
Option 2	Regional	Medium	Long term	High	Definite	High	-	Low
Management Measures								
• Keeping the footprint for the construction as small as possible; • Collecting and propagating many of the species other than the SSC from the site to serve as part of the rehabilitation of the site								
After Management	Local	Low	Medium term	Very low	Probable	Very low	-	Medium
	Powerlines							
Preferred	Local	Low	Long term	Low	Definite	Low	-	Low

option								
Option 1	Local	Low	Long term	Low	Definite	Low	-	Low
Option 2	Local	Low	Long term	Low	Definite	Low	-	Low

5.8.6 Potential Impacts EC5: Fragmentation and edge effects due to clearing of vegetation

In a site with the roads reaching 15 m at their widest and the turbine construction platforms taking up very little space, fragmentation is unlikely to be a large impact. The roads are narrow enough to allow for the crossing of small animals such as tortoises and chameleons as well as large animals such as leopards. In addition, such road widths are unlikely to affect seed dispersal and pollination. Thus the proposed development does not pose a fragmentation problem, and no mitigation measures are required.

Table 5-23: Significance rating of impact EC5 and recommended mitigation measures

	Spatial Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**+ -**	**Confidence**
Before Management	Local	Low	Long term	Low	Improbable	Very low	-	High

5.8.7 Potential Impacts EC6: Invasion of alien species due to earth moving during construction

Several alien pant species were recorded from the site, some of which are concerning. A *Pinus* species has invaded the fynbos, a large concern considering the sensitivity of this vegetation. In addition various succulent species (including prickly pear and jointed cactus) have invaded the thicket and Acacia riparian areas that can be a major problem in these vegetation types. Currently, the invasion level is low however; the activity associated with the construction of the proposed development will result in the spread of these species and could result in a very large detrimental impact.

Table 5-24: Significance rating of impact EC6 and recommended mitigation measures

	Spatial Extent	**Intensity**	**Duration**	**Consequence**	**Probability**	**Significance**	**+ -**	**Confidence**
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	Medium
	Powerlines							
Preferred option	Regional	Medium	Long term	High	Definite	High	-	Low
Option 1	Regional	Medium	Long term	High	Definite	High	-	Low
Option 2	Regional	Medium	Long term	High	Definite	High	-	Low
Management Measures								
Measures related to the construction and operational phase: • Removal and control of all alien species continually throughout the lifespan of the proposed development. • Ensure trucks entering the site do not bring alien invasive species in. This can be done by visually scanning each vehicle and ensuring no jointed cactus or prickly pear are attached. • Implementation of an alien invasive management plan.								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	Medium
	Powerlines							

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Preferred option	Local	Low	Long term	Low	Definite	Low	-	Low
Option 1	Local	Low	Long term	Low	Definite	Low	-	Low
Option 2	Local	Low	Long term	Low	Definite	Low	-	Low

5.8.8 Potential Impacts EC7: Impacts of dust generation on vegetation

Vehicles travelling on unpaved roads result in the emission of dust into the atmosphere. It is anticipated that dust will have an impact on the vegetation up to 300 m surrounding the roads. Impacts of dust on vegetation include reduction in the productivity and photosynthesis of the plants adjacent to the roads, and reduction in palatability for herbivores, resulting in consequences for grazing of livestock and wildlife.

Table 5-25: Significance rating of impact EC7 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+ -	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	Medium
Management Measures								
• Reduction of the speed of vehicular traffic, it is recommended that the speed limit for the roads within the study area be no more than 40 km/h with a recommended speed of 20 km/h which will not only reduce dust generation but also reduce faunal road fatalities; • It is recommended that dust suppression options are researched and the best method both functionally and cost-effectively should be chosen for the site to ensure reduction of dust generation as well as the reduction of the erosion potential of roads on the site.								
After Management	Local	Low	Long term	Low	Possible	Very low	-	Medium

In addition to the measures listed above, the following optional mitigation measures recommended:

- The roads could be sealed, reducing the dust generation as well as potential erosion of the road surfaces on site. This may be beneficial considering the steep slopes of the site that will be subject to erosion as exposed surfaces;
- Mechanical stabilization options are available: that is using specific materials for road construction. This option may be prohibitively expensive;
- Water can be used to suppress dust and is often recommended as a spray to reduce dust generation during high traffic periods (for example the construction phase of the development). However, considering the arid nature of the site and the current drought being experienced, this is not considered a reasonable mitigation measure for dust suppression; and
- Calcium chloride sprays may be used to absorb atmospheric moisture and bind particles together, reducing dust generation, ligno-suphonates may also be used in a similar manner.

5.8.9 Potential Impacts EC8: Impacts of noise on fauna

Noise generation during construction will include the traffic noise of construction vehicles and associated construction noises. Operational noise is restricted primarily to the noise and vibrations of the turbines themselves. Noise is likely to have an impact on animal species, particularly SSC. No work has been done on the impact of wind turbine noise on fauna of South Africa, and wind facilities currently in operation will provide an opportunity to achieve this. Until then, impacts can be inferred from studies done on WEFs in other countries. Due to lack of knowledge in this area, impacts area, impacts are assessed with a low level of confidence. No mitigation measures are proposed for this impact.

Table 5-26: Significance rating of impact EC8 and recommended mitigation measures

	Key Species	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	**Mammals**	Local	Low	Long term	Low	Definite	Low	-	Low
	Reptiles	Local	Low	Long term	Low	Definite	Low	-	Low
	Amphibians	Regional	Medium	Long term	High	Possible	Medium	-	Low

5.8.10 Potential Impacts EC9: Impacts of fencing on fauna

The act of containing wildlife/ livestock within confined areas, especially in South African farms, has been observed to have negative impacts on their genetic structures, as well as behavioural changes. Physically structured fences could potentially entangle, or electrocute large herbivores and also pose a threat to smaller animals such as tortoises. Fencing on site has been reduced to a large extent to allow for free movement of wildlife in the area. Should fencing be required, the mitigation measures below are recommended.

Table 5-27: Significance rating of impact EC9 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Low	Long term	Medium	Probable	Medium	-	Medium
Management Measures								
Measures related to the operational phase: • Mesh sizes should allow for the passage of small animals; • Electrical bottom-wires should be avoided as these can lead to the death of small animals, in particular tortoises; • Flags and other methods of ensuring fence visibility to animals such as Kudu should be employed where fences are erected to avoid animals being caught in fences; and • Fences not required should be removed to allow for free movement of animals.								
After Management	Local	Low	Long term	Low	Possible	Very low	-	Medium

In addition to the mitigation measures listed above, the use of metaphorical fences (hedges, stones, cacti, thorn) where appropriate - some research may need to be done depending on which animal species need to be excluded from certain areas – is recommended.

5.9 Potential Hydrological Impacts

5.9.1 Introduction

SRK Consulting appointed Dr Brian Colloty of Scherman Colloty & Associates to conduct an aquatic ecological assessment. A copy of the report is included under the Supplementary Volume of Specialist Studies, Appendix G.

Dr Colloty has reviewed this section and has confirmed that it is an accurate summary of his report.

The study consisted of a desktop assessment as well as site visits conducted in January and March 2016. Information was also collected to determine the Present Ecological State (PES) and

Ecological Importance and Sensitivity (EIS), which were used to inform the baseline characterisation and therefore impact assessment.

Based on the present layout, no natural wetlands are located within the region and no new watercourse crossings will be required. The existing gravel road crossings may need to be upgraded which provides the opportunity to improve the current state (lack of habitat continuity) of the crossings for example by replacing pipe culverts with box culverts, while also reducing the height of the bridge footings (culvert bases) to reinstate natural water course levels.

The proposed powerline alternatives cross watercourses at various points. This is reflected in Figure 5-6. The Endangered Eastern Cape Redfin (*Pseudobarbus afer*) was observed in small rock pools during the hydrologist's site visit. The potential indirect impacts of the development if not managed (stormwater / erosion and water quality) could have an impact on the local fish population that have a national importance (Endangered endemic).

A possible residual impact on the remaining catchment due to changes in run-off characteristics in the development site may be expected.

5.9.2 General mitigation recommendations

As the proposed activities have the potential to create erosion and contaminate water resources, the following general recommendations are provided:

- Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment.

- Only indigenous plant species must be used in the re-vegetation process.

- All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be more than 50m from any demarcated water courses.

- All cleared areas must be re-vegetated after construction has been completed.

- It is also advised that an Environmental Control Officer, with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas, using selected species detailed in this report.

- All alien plant re-growth must be monitored and should it occur these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.

- This assessment is based on the assumption that following conditions will be adhered to:

- No transmission line towers will be placed within the delineated water courses as well as their respective buffers.

- Access will be kept to a minimum and where possible steep areas will be provided with suitable stormwater management features to prevent soil erosion and completely prevent any sediment from entering the downstream areas.

- Chemicals (e.g. poisons / hazardous substances) must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early

- Littering and contamination of water sources during construction/operation must be prevented by effective solid waste management.

- Emergency plans must be in place in case of spillages onto works areas and water courses.

- All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds.

- Stockpiles must be located away from river channels.

- Erosion and sedimentation into river channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks. It is the intention for the project to allow the alien vegetation to regrow to allow for a cost effect project. However, it is suggested that no alien regrowth be allowed in the river buffers (32m).

- It is further recommended that a comprehensive rehabilitation plan be implemented form the project onset within these areas (inclusive of buffers) to ensure a net benefit to the aquatic environment.

- Any stormwater runoff from the plan should not be allowed to enter any water courses directly, to minimise the potential hydrocarbon/sediment related issues.

Additional recommendations specific to each impact assessed are provide in the impact rating tables below.

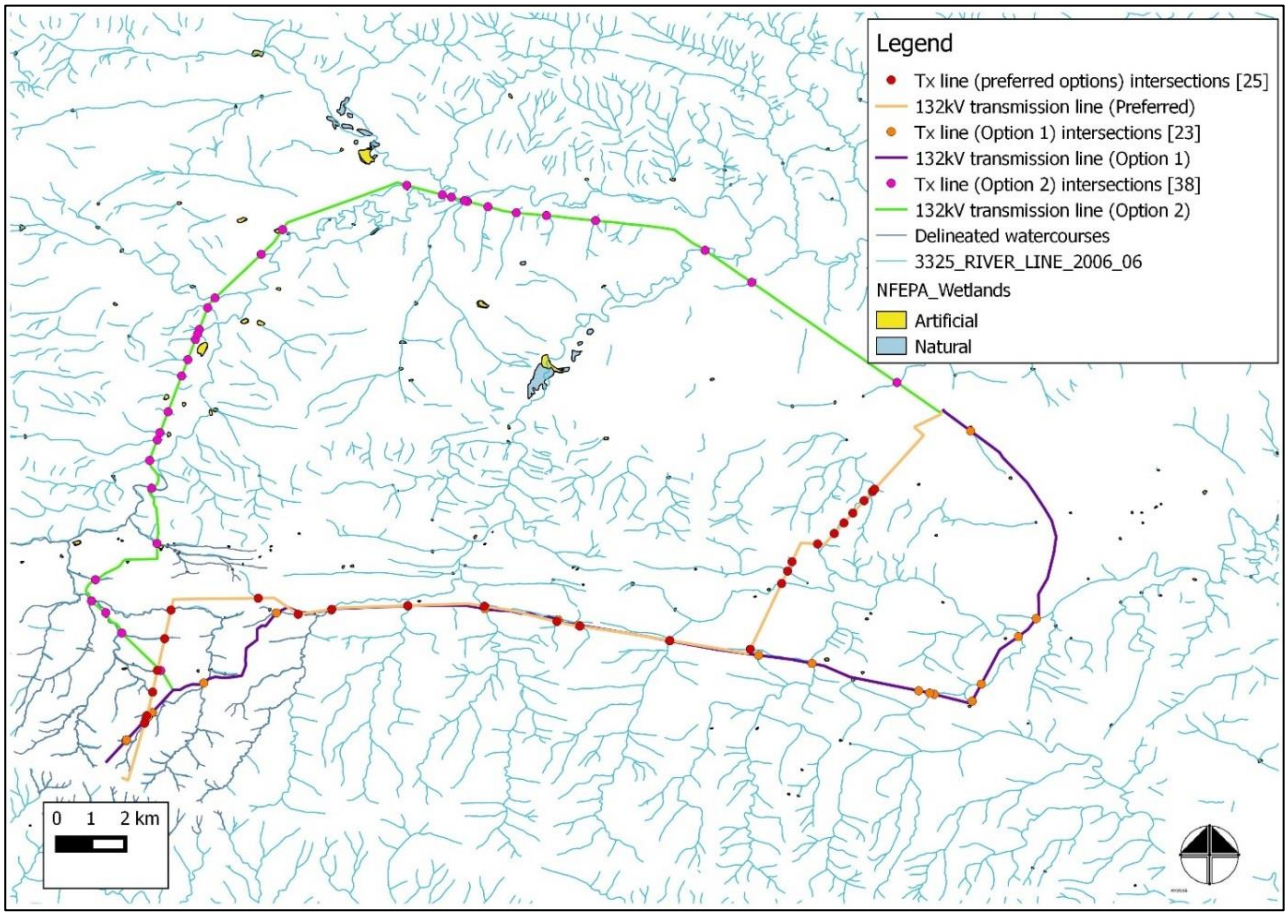


Figure 5-6: The proposed transmission line alternatives, together with the water course intersections for each option (Source: Colloty 2016)

5.9.3 Potential Impacts H1: Diversion and Increased Velocity of Surface Water Flows during construction and operation

Due to the nature of the proposed project this would be an operational phase impact, as a result of the clearing of tracts of vegetation that will destabilise the soils, as well as the provision of new access roads and hard stand areas for the turbines within very steep portions of the affected catchments. The soils within the study area are susceptible to erosion when subjected to high flows (high volumes and velocities). This creates bed and bank instability in the aquatic ecosystems and consequent sedimentation of downstream areas.

Based on the current layout no new water course crossings or disturbances are anticipated, however upgrades to some of the road crossings will be required. One of these crossings is directly downstream of the Redfin population identified in a pool on site, and if not designed to allow for adequate erosion protection and maintenance of the suitable hydrological conditions could result in significant impacts on this population, hence the national extent and high intensity of the rating provided below. The EAP notes however that impacts on species of special concern (including the Redfin) are rated under Impact H4, and this rating applies to this particular fish population only. The hydrological impacts relating to the other crossings on the site would be of lower significance, however the conservative approach has been adopted in presenting the impact rating below.

Table 5-28: Significance rating of impact H1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	National	High	Long term	Very High	Possible	High	-	High
Management Measures								
• Where water course crossings need to be upgraded, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint); • No transmission line towers must be placed within any water courses or their 32 m buffer • No vehicles to refuel within drainage lines/ riparian vegetation; • During the operational phase, monitor culverts and stormwater management features to see if erosion issues arise and if any additional erosion control is required; • Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers; and • No flows within any of the water courses should be altered by any of the proposed access roads.								
After Management	National	Low	Long term	High	Possible	Medium	-	High

5.9.4 Potential Impacts H2: Changes to Water Quality during construction and operation

Presently little is known about the water quality of the water courses directly in the study area, but it is assumed due to the activities in the study area, that the aquatic systems contain very little in the form of pollutants, other than elevated sediment loads during floods.

During construction various materials, such as sediments, diesel, oils and cement, could pose a threat to the continued functioning downstream areas, if by chance it is dispersed via surface run-off, or are allowed to permeate into the groundwater. The possible negative changes to water quality during the operational phase would be limited to sedimentation and erosion related issues assessed in impact H1.

Table 5-29: Significance rating of impact H2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Long term	High	Probable	High	-	High
Management Measures								
• Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early; • Littering and contamination of water sources during construction must be prevented by effective construction camp management; • Emergency plans must be in place in case of spillages onto road surfaces and water courses; • No stockpiling should take place within a water course; • All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds; • Stockpiles must be located away from river channels; • Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks; • The construction camp and necessary ablution facilities meant for construction workers must be beyond the 32m buffer described previously; and • No transmission line towers must be placed within any water courses or their 32m buffer								

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
After Management	Regional	Medium	Medium term	Medium	Probable	Medium	-	High

5.9.5 Potential Impacts H3: Loss of riparian vegetation, aquatic habitat and stream continuity

Riparian and aquatic corridors create longitudinal links between a variety of habitats and refugia. The refugia are particularly important in times when surface flows are low, i.e. fish populations are able to survive in deeper pools during droughts as was observed in this assessment. These populations are then able to recolonise the remaining river reaches, when reconnected by increased river flows. This function of a catchment and its ability to act as refugia is highlighted by the conservation plans that have earmarked the study area as such.

Road crossings, and in particular culvert crossings disrupt both the instream and riparian continuity, both in terms of flows and physical habitat availability. It is thus important for powerline infrastructure and road designs, especially any proposed upgrades to incorporate these aspects with the aim of retaining instream and riparian continuity.

Table 5-30: Significance rating of impact H3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Long term	High	Probable	High	-	High
Management Measures								
Measures related to the construction phase: • Any road crossing embankments are outside of the floodline areas or the 32m buffer; • Only box culverts should be used in the crossing upgrades, with their bases level with the natural riverbed height; • Old structures with elevated / sing pipe culverts should be removed; and • No transmission line towers must be placed within any water courses or their 32m buffer.								
After Management	Regional	Low	Long term	Medium	Improbable	Low	-	High

5.9.6 Potential Impacts H4: Loss of species of special concern

Loss of riparian and instream habitat and or water quality changes could possibly result in the loss of species of special concern as a result of the destruction of habitat during the construction phase or increased sediment levels in the operational phase. Changes in the hydrological regime in the operational phase, could also impact on the presence of other species, should surface water flows be increased or refugia become disconnected from available habitat (fish & invertebrates).

Table 5-31: Significance rating of impact H4 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	National	Medium	Long term	Very High	Possible	High	-	High
Management Measures								
• Where water course crossings need to be upgraded, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint);								

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
• No vehicles to refuel within drainage lines/ riparian vegetation; • During the operational phase, monitor culverts and stormwater management features to see if erosion issues arise and if any additional erosion control is required; • Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers; and • No flows within any of the water courses should be altered by any of the proposed access roads.								
After Management	National	Low	Long term	High	Possible	Medium	-	High

5.10 Potential Noise Impacts

5.10.1 Introduction

Dr Brett Williams of Safetech was appointed by the applicant to conduct a noise impact assessment. A copy of the noise impact assessment report can be found in the Supplementary Volume of Specialist Studies, Appendix H. Dr Williams has reviewed this section and has confirmed that it is an accurate summary of his report.

Ambient noise measurements were taken at various points around the site, and predictive noise modelling was used to assess potential noise impacts on receptors. The modelling takes into account factors such as potential noise generation of the turbines and construction equipment, topography and climatic conditions, and distance from the noise source. The study assessed two alternative turbine layouts, (consisting of 44 and 52 turbines respectively), however the impact ratings provided refer to the 52 turbine layout.

The area was categorised as a rural district in terms of SANS 10103:2008, which provides guideline ambient noise limits for day and night time. Predicted exceedances of these limits resulting from the project inform the noise impact rating.

Noise pollution will be generated during the construction phase (due to operation of vehicles and machinery, including the batching plant) as well as the operational phase (from the turbines themselves). Potential Noise Sensitive Areas (NSA's) were identified within the vicinity of the construction and operational activities, primarily based on existing buildings in the area, but including some potential NSAs in the adjacent Groendal Nature Reserve. Further detail on the noise impact modelling, including noise contour maps, are provided in the specialist study report.

Potential noise impacts on fauna are excluded from the scope of this assessment, and are addressed in the ecological impact assessment (Section 5.8.9).

5.10.2 Potential Impacts N1: Noise disturbance from construction activities at turbine locations

The construction phase could generate noise during different activities such as:

- Site preparation and earthworks to gain access using bulldozers, trucks etc.
- Foundation construction using mobile equipment, cranes, concrete mixing and pile driving equipment (if needed).
- Heavy vehicle use to deliver construction material and the turbines.

None of the turbines are located closer than 1600 m from the Noise Sensitive Areas.

Table 5-32: Significance rating of impact N1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Short term	Very low	Probable	Very low	-	High
Management Measures								
• All construction operations should only occur during daylight hours if possible. • No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions. • Construction staff should receive "noise sensitivity" training such as switching off vehicles when not in use, location of NSA's etc. • An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High

5.10.3 Potential Impacts N2: Noise disturbance from construction activities at batching plant

A concrete batching will be located on the northern portion of the site. The sound power levels for Concrete Batching Plants have been derived from the United States Federal Highway Construction Noise Database. It is assumed that during the peak construction period the Concrete Batching Plant will be operational for 24 hours per day. The estimated sound power levels are as follows:

- Concrete Batching Plant – 115 dB(A)
- Concrete Mixing Truck (whilst mixing) – 117 dB(A)

Table 5-33: Significance rating of impact N2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Short term	Very low	Probable	Very low	-	High
Management Measures								
Measures related to the construction phase: • Noise levels from the reverse warning devices on all mobile equipment should be kept as low as possible; • Construction staff should receive "noise sensitivity" training such as switching off vehicles when not in use, location of NSA's etc; and • An ambient noise survey should be conducted at the noise sensitive receptors during the construction phase.								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High

5.10.4 Potential Impacts N3: Noise disturbance during operation (NSA 1-5 for 52 layout)

The potential effects of low frequency noise (during operation) on humans include sleep disturbance, nausea, vertigo etc. These effects are unlikely to impact upon residents due to the distance between the turbines and the nearest communities. Sources of low frequency noise also include wind and vehicular traffic, which are all sources that also impact on the receptors.

Table 5-34: Significance rating of impact N3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High
Management Measures								
Measures related to the operational phase: • The noise impact from the wind turbine generators should be measured during the operational phase, to ensure that the impact is within the required legal limit; and • Wind turbine generators should be maintained to ensure the noise emissions are within the legal and design specifications								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High

5.10.5 Potential Impacts N4: Impact on receptors in Groendal Nature Reserve during operation

The existing hiking trail and camping grounds of the Groendal Nature Reserve will not be impacted by the noise emissions from the windfarm due to the distance from the noise source. This applies to both the 52 WTG and 48 WTG layouts. There could be a very slight night-time impact at one location on the Kwazunga River if hikers proceed in a westerly direction in the Groendal Nature Reserve. However, this is outside the marked trails and it is highly unlikely that hikers will overnight there.

Table 5-35: Significance rating of impact N4 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High
Management Measures								
Measures related to the operational phase: • The noise impact from the wind turbine generators should be measured during the operational phase, to ensure that the impact is within the required legal limit. • Wind turbine generators should be maintained to ensure the noise emissions are within the legal and design specifications.								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High

5.11 Potential Socio-Economic Impacts

5.11.1 Introduction

SRK Consulting appointed Matthew Keeley of Urban-Econ Development Economists to conduct a Socio-Economic Impact Assessment. A copy of the Socio-Economic Impact Assessment report is included in the Supplementary Volume of Specialist Studies, Appendix I. The purpose of the study was to quantify and qualify the potential positive and negative impacts resulting from the construction and operation of the Inyanda Roodeplaat WEF. The study included a contextual analysis of all relevant policy and planning documents related to the broader study area. The study also included a socio-economic profile which allowed for a demographic and economic trend analysis to be performed. Primary research in the form of surveys were administered to property owners (the findings of which will be incorporated into an updated version of the specialist report appended to the Final EIR) of the immediate area around the proposed development, as informed by the visual

impact assessment. The study also compares the perceived negative impact on tourism to the positive GDP and economic gains stated in the sections below and expanded upon in the report..

Mr Keeley has reviewed this section and has confirmed that it is an accurate summary of his report.

The assessment made use of the economic models based on the Eastern Cape Social Accounting Matrix (SAM) developed in 2006 and adjusted to represent 2015 figures. Changes that could be expected in the economy and community were calculated by using the SAM model. Further information on the model and impact assessment is provided in the specialist's report.

The report provides for an analysis of the impacts anticipated for the construction and operational phases of the WEF.

5.11.2 Potential Impacts S1: Impact on GDP growth rates

The most notable impacts on production and GDP stimulated during construction economic activities will be created through the multiplier effects, specifically through production and consumption induced effects. Production effects result when the project creates the demand for goods and services required for construction and this in turn stimulates the business sales of the suppliers of inputs that are required to produce these goods and services. Consumption effects result from household spending, which is derived from an increase in salaries and wages directly and indirectly stimulated by the project's expenditure. The sectors that are expected to benefit the most from these effects are tertiary services such as trade, accommodation, transport services, personal services, real estate, and insurance.

Table 5-36: Impact on GDP growth rates during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Short term	Medium	Definite	Medium	+	High
Management Measures								
• The developer should encourage the EPC contractor to increase the local procurement practices and employment of people from local communities as far as feasible to maximise the benefits to the local economies; and • The developer should engage with local authorities and business organisations to investigate the possibility of procurement of construction materials, goods, and products from local suppliers where feasible.								
After Management	Regional	High	Short term	Medium	Definite	Medium	+	High

Table 5-37: Impact on GDP growth rates during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Long term	High	Probable	High	+	High
Management Measures								
• The operator of the proposed development should be encouraged to procure materials, goods and products required for the operation of the facility from local suppliers to increase the positive impact in the local economy as far as possible.								
After Management	Regional	High	Long term	Very High	Probable	Very High	+	High

5.11.3 Potential Impacts S7: Impact on household income

The proposed wind farm will create approximately 1,800 employment positions during construction, generating R567 million of revenue for the affected households through direct, indirect and induced effects. Given the average household size in the Sarah Baartman District Municipality and South Africa is 3.6, a total of 6541 people nationally are likely to benefit from the employment positions created and the income derived. Although temporary, this increase in household earnings will have a positive effect on the standard of living these households.

During operation the creation of employment positions throughout the country will generate about R7.5 million of income, which will be sustained for the duration of the project's lifespan. Given the average household size in affected local municipalities and nationally, this increase in household earnings will support up to 255 people. The sustainable income generated as a result of the project's operation will positively affect the standard of living of benefitting households.

Table 5-38: Impact on household income during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Short term	Medium	Probable	Medium	+	High
Management Measures								
• Recruit local labour as far as feasible to increase the benefits to the local households; • Employ labour intensive methods in construction where feasible; • Sub-contract to local construction companies where possible; and • Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews								
After Management	Regional	High	Short term	Medium	Probable	Medium	+	High

The following residual impacts are anticipated:

- Possible increase of households' saving accounts

Table 5-39: Impact on household income during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Probable	Medium	+	High
Management Measures								
• Where possible, the local labour supply should be considered for employment opportunities to increase the positive impact on the area's economy. • As far as feasible, local small and medium enterprises should be approached to investigate the opportunities for supply inputs required for the maintenance and operation of the facility.								
After Management	Local	Medium	Long term	Medium	Probable	Medium	+	High

The following residual impacts are anticipated:

- Possible increase of households' saving accounts

5.11.4 Potential Impacts S2: Impact on investment

The proposed development will provide a renewable energy source for not just the study area but for South Africa as a whole, thereby potentially bringing investment into South Africa. The proposed development will contribute towards government revenue by way of payments for utilities used in the operation of the facility. The revenue derived by the project during its operations, as well as payment of salaries and wages to the permanent employees will contribute to the national fiscus. No mitigation or enhancement measures are proposed for this impact.

Table 5-40: Impact on investment during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Short term	Medium	Probable	Medium	+	High

Table 5-41: Impact on investment during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Low	Long term	Medium	Probable	Medium	+	High

5.11.5 Potential Impacts S3: Impact on employment and skills transfer

The proposed facility is anticipated to create approximately 1,800 (consisting of direct, indirect and induced employment) employment positions during construction. The study area's construction sector is relatively small, meaning that there is not a sufficient supply of the labour force in the municipality to satisfy the demand for construction workers. The developer is likely to involve foreign experts during the construction process that will result in skills and knowledge transfer between the foreign and local professionals involved in the project. Besides the direct effects of the project on skills development in the country and in the local economy, the project could contribute to the development of the local Research and Development (R&D) and manufacturing industries associated with wind technology. This project is likely to directly increase the number of labourers employed in the local construction industry by 60%.

During operation the proposed facility will create approximately 200 employment positions along the value chain, of which approximately 50 will be direct and will be retained for 20 years or longer. South Africa has only recently developed the commercial WEF industry and so the skills base to operate and maintain such facilities is not readily available. WEFs however, do not require complex operating and maintenance procedures, which means that personnel with adequate qualifications and expertise can be trained to operate and maintain the facility. This project is likely to directly increase the number of labourers employed in the construction industry by approximately 7%.

Table 5-42: Impact on employment and skills transfer during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Short term	Low	Probable	Low	+	High
Management Measures								
• Organise local community meetings to advise the local labour on the project that is planned to be established and the jobs that can potentially be applied for; • Establish a local skills desk (in Jansenville and Kirkwood) to determine the potential skills that could be sourced in the area;								

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
• Recruit local labour as far as feasible; • Employ labour-intensive methods in construction where feasible; • Sub-contract to local construction companies where possible; • Use local suppliers where feasible and arrange with the local Small and Medium Enterprises to provide transport, catering, and other services to the construction crew; and • Facilitate knowledge and skills transfer between foreign experts and South African professionals during the pre-establishment and construction phases.								
After Management	Regional	High	Short term	Medium	Probable	Medium	+	High

The following positive residual impacts are anticipated:

- Experience in building of wind energy facilities; and
- South Africa's human capital development.

Table 5-43: Impact on employment and skills transfer during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Long term	High	Probable	High	+	High
Management Measures								
• Where possible, local labour should be considered for employment to increase the positive impact on the local economy; • Local Small and Medium Enterprises should be approached to investigate the opportunities for supplying inputs required for the maintenance and operation of the facility, as far as feasible; and • The developer should consider establishing vocational training programmes for the local labour force to promote the development of skills required by the wind energy industry and thus provide for the opportunities for these people to be employed in other similar facilities elsewhere around the study area or other parts of the country; • Create skills development programmes through which the Sundays River Valley LM community can be uplifted.								
After Management	Regional	Medium	Long term	High	Probable	High	+	High

The following positive residual impacts are anticipated:

- Experience in operating and maintaining a wind facility; and
- Human capital development of the affected workers.

5.11.6 Potential Impacts S4: Impact on tourism and game farming

While agriculture is one of the predominant activities in the region, it is unlikely that the wind farm development would have a significant impact on the production of this industry. The immediate operations within close proximity to the proposed development that are most likely to be affected by the proposed development would be the tourism and game farming industry which are more susceptible to changes in the natural environment.

In order to determine the impact the proposed development may have on the local tourism industry, telephonic interviews were conducted with property owners situated in close proximity to the proposed development site. The increased noise as well as the visual disturbance generated by the construction phase of the development will affect tourists' and resident's sense of place. The surveys

with stakeholders revealed that there was a concern about how the wind farm would be an eyesore for the region and that it would dissuade tourists from coming to the area.

For both international and domestic tourists the visual experience of the area is one of the factors considered when visiting a game farm. Given the sensitivity of international and domestic tourists towards the various developments and the exposure of these farms to a visual impact (based on the visual impact assessment), the potential losses to the game farming and tourism industries have been estimated.

Table 5-44: Impact on tourism and game farming during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	High	Short term	Low	Definite	Low	-	High
Management Measures								
• Mitigation proposed by the visual specialists should be implemented during the beginning of the construction period to screen off visual disturbances as soon into the development phase as feasible. • Heavy vehicles travelling on secondary roads should adhere to low speed limits to minimise noise and dust pollution. • If feasible, no construction activities should be carried out during weekends and outside day time working hours.								
After Management	Local	Medium	Short term	Very low	Probable	Very low	-	High

The following residual impacts are expected:

- Visual impacts cannot be eliminated due to the height of the turbines thus the local industry could still experience some losses.
- Perceptions of international tourists regarding the area's representation as "Wild Africa" would change due to the development.

Table 5-45: Impact on tourism and game farming during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								
• The mitigation measures proposed by the visual and noise specialists should be adhered to; • Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during construction; • In the case when employees of nearby farms are retrenched and a strong causal link can be established between the retrenchments and the project activities, the developer should assist the retrenched workers to find alternative employment by either recruiting them to work at the facility or assisting them through the enterprise development programme and/or social development funding allocations prescribed by government; and • In order to avoid exerting a negative impact on the families dependent on local game farms and any other household that could be effected by the project, the developer should seek to partner with the various game farms to support affect families and ensure that the aid given to them is retained.								
After Management	Local	Medium	Long term	Medium	Probable	Medium	-	High

The following residual impacts are expected:

- Altered characteristics of the environment
- Change in the perception of tourists of the local environment

5.11.7 Potential Impacts S5: Impact on development planning

The proposed development is situated on rural land outside the urban edge. The Policy Review conducted as part of the study showed that the proposed development has positive impacts in terms of development planning.

Table 5-46: Impact on development planning during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Short term	Medium	Definite	Medium	+	High

Table 5-47: Impact on development planning during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very high	Definite	Very High	+	High

5.11.8 Potential Impacts S6: Impact on in – migration

The proposed development will create many employment opportunities during the construction phase; and a few during the operational phase. Construction companies make use of labourers from several areas and this would create an opportunity for an influx of workers to the proposed site. Negative impacts may result from to an increased usage of services such as water and electricity and infrastructure by the new residents. Although it is difficult to ensure that contractors only employ labourers from the area (in order to minimise migration) it would be mandatory to manage this through a labour desk.

The local economy of the SRVM is not sufficiently diversified to supply the entire work force for the construction of the facility, specifically as far as skilled positions are concerned. It is anticipated that some jobs will be filled by labourers coming from nearby areas.

The migration of people to the area may result in social conflicts between the local population and the migrant work force from the local population. The influx of job seekers and social conflicts associated with immigration of temporary workers is difficult to mitigate, however, appropriate awareness campaigns and strict adherence to the recruiting practices could potentially reduce the adverse effects.

Semi-skilled and unskilled construction workers are unlikely to choose to remain in the area following the completion of the construction phase given the rural nature of the project site (with limited human settlements in the surrounding area). In addition skilled labour will be sourced from outside the area but most of which will go home after the development is finished.

Table 5-48: Impact on in – migration during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Short term	Low	Probable	Low	-	High
Management Measures								
• Set up a recruitment office in the nearby towns (i.e. Jansenville and Kirkwood) and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the properties in hope to find temporary employment; • Employ locals as far as feasible through the creation of the local skills database and recruitment of suitable candidates; • Control the movement of workers between the site and areas of residence to minimise loitering around the proposed facility by providing scheduled transportation services between the urban areas and the construction site; • Engage communities with respect to their possible involvement during construction in providing supporting services such as catering, temporary housing of workers, transportation, etc.; • Formalise trading and service provision on the site, by providing a dedicate area for such services and signing contracts with service providers; • Establish fencing around the property to reduce the desire of workers to trespass between the construction site and adjacent properties; • Set up a gate and controlled access system to monitor the movement of people to and from the property, as well as to reduce the influx of job seekers to the site itself; • Ensure that any damages or losses to the nearby farms that can be linked to the conduct of the construction workers are adequately reimbursed; and • Assign a person to deal with complaints and concerns of the affected parties.								
After Management	Regional	Low	Short term	Very low	Probable	Very low	-	High

The following residual impacts are expected:

- Contribution towards crime and social conflicts in the area by construction workers and job seekers who decide to stay in the area after construction is complete and unable to find sustainable income.

Table 5-49: Impact on in – migration during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Long term	Low	Possible	Very low	-	High
Management Measures								
• Adhere to strict labour recruitment practices that would increase the use of local labour.								
After Management	Local	Low	Long term	Low	Improbable	Very Low	-	High

The following residual impacts are expected:

- Contribution towards crime and social conflicts in the area by construction workers and job seekers who decide to stay in the area after construction is complete and unable to find sustainable income.

5.11.9 Potential Impacts S8: Impact on economic and social infrastructure

Migrant workers will create an additional demand for rental accommodation, social services, and access to water and electricity particularly during the construction phase of the project. The SRVM has limited resources and funds to expand this infrastructure. The developer is planning to establish

a construction camp on site to accommodate construction workers. These impacts can however be mitigated if the developer engages with the local municipality and plans accordingly. The proposed WEF will make a notable contribution to poverty and social and community development in the area. If the project is awarded a generating license through the REIPPP process, then between 1% and 1.5% of the revenue derived by a project should be allocated towards the needs of the community. This represents extensive funding to uplift rural communities which under those conditions would be coupled with a high degree of accountability from the Department of Energy.

Table 5-50: Impact on economic and social infrastructure during construction

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Short term	Medium	Definite	Medium	-	High
Management Measures								
• Provide adequate signage along the roads in the area to warn motorists of the construction activities taking place on the site; • The plan should be developed in consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits; • Engage with local authorities and inform them of the development as well as discuss with them the ability of the municipality to meet the demands for social and basic services created by the migrant construction workers; and • Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate making use of the social responsibility allocations.								
After Management	Regional	High	Short term	Medium	Definite	Medium	+	High

Table 5-51: Impact on economic and social infrastructure during operation

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very High	Definite	Very High	+	High
Management Measures								
• A social development and economic development programme should be devised by the developer throughout the project's lifespan; • Engage with local authorities and inform them of the development as well as discuss with them their ability to meet the additional demands on social and basic services created by the in migration of workers; • Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations; • The plan should be reviewed on an annual basis and where necessary updated; and • When devising enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises.								
After Management	Regional	High	Long term	Very High	Definite	Very High	-	High

5.12 Potential Visual impacts

5.12.1 Introduction

SRK Consulting appointed Mr Henry Holland to conduct the Visual Impact Assessment (VIA) as per the terms of reference included in the Final Scoping Report. A copy of the VIA is included under the Supplementary Volume of Specialist Studies, Appendix J.

Mr Holland has reviewed this section and has confirmed that it is an accurate summary of his report.

The VIA was based on guidelines for visual assessment specialist studies as set out by South Africa's Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) (Oberholzer 2005) as well as guidelines provided by the Landscape Institute of the UK (GLVIA 2002).

A visibility analysis was conducted for the region surrounding the proposed development site (within 20 km) and components of the development relevant to assessment of the potential visual impact to identify key representative viewpoints and sensitive visual receptors. A site visit and photographic survey of this region followed to establish a baseline for visual resources to compare the proposed developments against. Spatial development frameworks (SDF's) and integrated development plans (IDP's) for the relevant municipalities were studied to align the visual impact assessment with municipal objectives in terms of landscape and visual resources.

The study concluded that the landscape character of the region is highly sensitive to the proposed wind energy facility due to the value put on the sense of remote wilderness by visitors to the Groendal Nature Reserve. Scenic views of the mountain ranges containing few man-made structures are found in the reserve as well as in the landscape surrounding the reserve.

Visual intrusion indicates the level of compatibility or congruence of the project with the particular qualities of the area – its sense of place. This is related to the idea of context and maintaining the integrity of the landscape (Oberholzer, 2005). It can be ranked as follows:

- High – results in a noticeable change or is discordant with the surroundings;
- Moderate – partially fits into the surroundings, but is clearly noticeable; and
- Low – minimal change or blends in well with the surroundings.

It should be noted that while construction and decommissioning phases are temporary, certain construction activities are however likely to cause long term to permanent changes to the visual landscape, and this is reflected in the impact ratings below. These include road cuttings and other areas cleared of vegetation and levelled where slopes are steep. Rehabilitation of these areas is unlikely to completely restore the landscape to its current state and vegetation recovery will take a long time.

Potentially the most intrusive components of the proposed development, the wind turbines, are the biggest concern in terms of visual and landscape impact. The other major component that is likely to cause concern in terms of visual impact is the overhead transmission lines which connects the WEF with the Eskom grid. Road cuttings are also likely to potentially be highly visible in the landscape, and will be permanent features.

Additional specific mitigation measures applicable to the various impacts assessed are provided in the impact rating tables. The impact assessment is based on the assumption that the following standard mitigation measures will be in place to reduce visual impacts during construction:

- The contractor will maintain good housekeeping on site to avoid litter and minimise waste;
- Construction boundaries will be demarcated and areas of surface disturbance minimised;
- Vegetation and ground disturbance will be minimised and advantage taken of existing clearings;
- Construction of new roads will be minimised and existing roads will be used where possible;

- Topsoil from the site will be stripped, stockpiled, and stabilised before excavating earth for the construction of the facility;
- Vegetation matter from vegetation removal will be mulched and spread over fresh soil disturbances to aid in rehabilitation process;
- Plans will be in place to control and minimise erosion risks;
- Plans will be in place to minimise fire hazards and dust generation;
- Plans will be in place to rehabilitate cleared areas as soon as possible; and
- If helicopter transport of wind turbine components is possible then this should be preferred.

Further, significance ratings assume that night lighting of buildings and substation will minimise light pollution such as glare and light spill (light trespass) by:

- Using light fixtures that shield the light and focus illumination on the ground (or only where light is required);
- Using minimum lamp wattage within safety/security requirements;
- Avoiding elevated lights within safety/security requirements;
- Where possible, using timer switches or motion detectors to control lighting in areas that are not occupied continuously (if permissible and in line with minimum security requirements); and
- Switching off lights when not in use in line with safety and security.

5.12.2 Potential Impacts V1: Visual intrusion of wind turbines during construction

Potential visual intrusion of construction activities associated with wind turbines may negatively impact on existing views of sensitive visual receptors in the surrounding landscape.

It is evident from the few existing roads which provide access into the mountains that roads and road cuttings could potentially detract from scenic views of the mountains. The access roads that will be required to transport components of the wind turbines will be wider and more visible than the existing roads. If it is possible to use helicopter transport for wind turbine components from a laydown area at the base of the mountain to the turbine sites then this should be preferred.

The extent of the impact will be regional since construction activities will occur in an elevated area of the landscape and some activities will be exposed against the skyline. Impact intensity will be high since construction activities will occur in a rural landscape with a sense of remoteness and scenic views will be affected. Construction of the WEF will take less than two years but some effects of construction are likely to be long term – it is highly unlikely that roads required for transport of large wind turbine components will be completely rehabilitated and road cuttings along steep slopes will be highly visible for a long time, if not permanently. The impact will definitely occur since this is a very large development in a quiet rural area with many highly sensitive visual receptors.

Table 5-525-53: Significance rating of impact V1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very High	Definite	Very High	-	High
Management Measures								
• Access roads must be carefully planned to minimise road cuttings where high slopes require them and to eliminate them from highly visible areas.								
After Management	Regional	High	Short term	Medium	Definite	Medium	-	High

5.12.3 Potential Impacts V2: Visual intrusion of powerlines during construction

Potential visual intrusion of construction activities associated with overhead transmission lines may impact on existing views of sensitive visual receptors in the surrounding landscape.

The extent of the impact will be local since the active construction site is only a small section of the route. Impact intensity will be high since construction activities will occur in a rural landscape with a sense of remoteness, and scenic views will potentially be affected. Construction of the transmission line will be short term although the construction site moves along the route and any visual impact on sensitive visual receptors caused by construction activities is likely to be much shorter than a year.

Table 5-54: Significance rating of impact V2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	High	Short term	Low	Definite	Low	-	High
Management Measures								
• Standard construction best practice guidelines listed above to be followed.								
After Management	Local	High	Short term	Low	Probable	Low	-	High

5.12.4 Potential Impacts V3: Visual intrusion on sense of place during operation

Visual intrusion on sense of place may result from the potential impact of a wind energy facility on a landscape valued for its sense of remote wilderness and its scenic views.

Although the area could be considered to be a national scenic resource, for the purposes of this impact assessment the impact will have at least a regional extent. The intensity of the landscape impact is high since the landscape is highly sensitive to the development which will alter the landscape character. The probability of the impact occurring is probable since not everyone will agree that the landscape is highly sensitive to the development. The significance of the landscape impact is very high and mitigation measures other than avoidance are unlikely to reduce the significance. Its status is negative according to I&AP's comments in the Scoping Report although this is not necessarily true for all the visual receptors that will potentially be affected by the development. Reversibility of the impact is moderate since although the most visible components of the development can be removed it is unlikely that roads and road cuttings will rehabilitate. Irreplaceability of the landscape character is very high since it is an ever-diminishing, non-renewable resource.

Table 5-55: Significance rating of impact V3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very High	Probable	Very High	-	High

5.12.5 Potential Impacts V4: Visual intrusion of wind turbines during operation

Potential visual intrusion of highly visible wind turbines may impact on the existing views of sensitive visual receptors in the surrounding landscape.

The extent of the impact is regional since key components of the WEF are highly visible and sensitive visual receptors up to at least 20 km from the facility will be affected. The intensity of the

impact is high since highly sensitive visual receptors in Groendal Nature Reserve and highly sensitive visual receptors in the region will potentially be affected. Mitigation measures are unlikely to lower the significance rating. The impact status is negative since an aspect of what attracts highly sensitive visual receptors to the Groendal Nature Reserve is the scenic views which show little if any signs of human impact. Reversibility of the impact is moderate since although the most visible components of the development can be removed it is unlikely that roads and road cuttings will rehabilitate. Irreplaceability of visual resources is very high since highly valued scenic views will be altered for a long time).

Table 5-56: Significance rating of impact V4 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very High	Definite	Very high	-	High
Management Measures								
• Maintenance of turbines is important; • Signs near turbines should be avoided; and • Turbines should be painted according to CAA regulations for wind turbines.								
After Management	Regional	High	Long term	Very High	Definite	Very high	-	High

5.12.6 Potential Impacts V5: Visual intrusion of obstruction lights during operation

Potential intrusion of obstruction lights associated with a wind energy facility may impact on the nightscape of the surrounding region.

The extent of this impact is regional since the lights are likely to be seen in the surrounding region due to their elevated placement in the landscape and the dark nightscape of the region. The intensity of the impact is high since the existing nightscape is very dark with only very few farmstead lights and occasional car lights. The mountains are almost completely devoid of lights and the introduction of 20 or more lights along the mountain top is likely to have an impact on sensitive visual receptors in the surrounding landscape. The duration of the impact is long term since the nightscape will be altered for the WEF lifetime. Since the lights are required by law there are no mitigation measures that will lower the significance. The reversibility of the impact is high since removal of the obstruction lights (and other lights at ancillary structures/buildings) will remove the impact. Irreplaceability of the existing dark nightscape of the region is high since it is a scarce resource that is diminished with every new development.

Table 5-57: Significance rating of impact V5 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very High	Definite	Very high	-	High
Management Measures								
• Lighting of ancillary buildings and structures should be designed to minimise light pollution without compromising safety.								
After Management	Regional	High	Long term	Very High	Definite	Very high	-	High

5.12.7 Potential Impacts V6: Visual intrusion of powerlines during operation

Potential visual intrusion of high voltage overhead transmission lines may impact on the existing views of sensitive visual receptors in the surrounding landscape.

The extent of the impact is regional due to the length of the development and the height of the pylons – a large number of sensitive visual receptors are likely to be affected. The intensity of the impact is high since there are existing, scenic views of highly sensitive visual receptors that will be highly intruded on by the proposed development (regardless of the route option chosen). The duration of the impact is long term since it will be required for the lifetime of the WEF. The impact will definitely occur since there are many highly sensitive visual receptors that will potentially be affected. Power lines are almost universally experienced as detracting from scenic views and the impact status is therefore negative. Reversibility of the impact is high since the most visible components of the development - the power lines and towers - can be removed completely from views. Irreplaceability of visual resources is very high since highly valued scenic views will be altered for a long time.

Mitigation measures can lower the visual intrusion of the power line but it's unlikely that it can do that for all highly sensitive visual receptors on the route.

Table 5-58: Significance rating of impact V6 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very High	Definite	Very high	-	High
Management Measures								
Measures related to the operation phase: • Minimal clearing of vegetation for servitudes; • Rehabilitate temporary areas cleared during construction; • Locate towers in such a way as to maximise the screening effect of existing topography; and • Use wooden towers where available and practical.								
After Management	Regional	High	Long term	Very High	Definite	Very high	-	High

5.12.8 Potential Impacts V7: Visual intrusion of turbines during decommissioning

Potential visual intrusion of decommissioning activities associated with a wind energy facility may impact on the existing views of sensitive visual receptors in the surrounding landscape.

Impact intensity will be high since activities will occur in a rural landscape with a sense of remoteness and scenic views will be affected. Decommissioning of the WEF is likely to take a shorter time than its construction but a long term duration for this phase is still envisaged – it is highly unlikely that roads required for transport of large wind turbine components will be completely rehabilitated and road cuttings along steep slopes will be highly visible for a long time, if not permanently. If the construction of roads were done in such a way as to avoid permanent scarring of the landscape in highly visible areas then the decommissioning phase impacts should also be of short term duration.

Table 5-59: Significance rating of impact V7 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	High	Long term	Very high	Definite	Very high	-	High
Management Measures								
• Standard construction best practice guidelines listed above to be followed; and • Avoid permanent scarring of the landscape in highly visible areas in the construction of the roads required for decommissioning.								
After Management	Regional	High	Short term	Medium	Definite	Medium	-	High

5.12.9 Potential Impacts V8: Visual intrusion of powerlines during decommissioning

Potential visual intrusion of decommissioning activities associated with overhead transmission lines may impact on the existing views of sensitive visual receptors in the surrounding landscape.

The extent of the impact will be local since the active decommissioning site will comprise only a small section of the route. Impact intensity will be high since decommissioning activities will occur in a rural landscape with a sense of remoteness, and scenic views will potentially be affected. Decommissioning of the transmission line will take less time than its construction and the impact duration is therefore short term. Decommissioning activities, similar to those during construction, cause negative impacts on visual receptors.

Table 5-60: Significance rating of impact V8 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	High	Short Term	Low	Definite	Low	-	High
Management Measures								
• Standard construction best practice guidelines listed above to be followed.								
After Management	Local	High	Short Term	Low	Definite	Low	-	High

5.13 Waste Management Impacts

5.13.1 Introduction

This section describes the waste management impacts associated with the proposed development, the significance thereof and the recommended mitigation measures. During the Scoping Phase, it was not considered necessary that a specialist be appointed to assess potential waste impacts, and it was therefore assessed and rated by the Environmental Assessment Practitioner (EAP).

5.13.2 Potential Impact W1: Waste management impacts associated with construction

Construction activities will involve the generation of significant quantities of construction waste such as spoil material and packaging. Domestic waste will be generated by construction personnel who will be housed on-site. Permitted wasted disposal facilities are a considerable distance from the project site and uncontrolled waste management and/or disposal of waste on the site may lead to

wind-blown litter and visual impacts. A large portion of the domestic waste stream is recyclable and disposal of this waste would result in a needless loss of natural resources.

Volumes of inert construction waste and excess spoil material are undetermined but are expected to be significant and their disposal on site may lead to increased ecological (through loss of habitat) and hydrological (through increased pollution of watercourses) impacts. In this EIA it is assumed that spoil material that cannot be accommodated within the assessed footprint will be removed from site and disposed of at a registered landfill site.

Table 5-61: Significance rating of impact W1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Definite	Medium	-	High
Management Measures								
• A waste management plan should be in place and should address classification of waste streams, segregation at source, control of waste on site before disposal, removal of wastes from site, and record keeping; • The Contractor must identify and separate materials that can be reused or recycled to minimise waste, e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling; • No disposal of wastes, other than at registered landfill sites; • No waste may be burned ; • Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes); • Ensure that construction materials (e.g. bags of cement) are suitably stored and protected to avoid wastage; and • Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in conjunction with the ECO								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High

5.13.3 Potential Impact W2: Waste management impacts associated with operation

Operational activities will involve the generation of small quantities of domestic waste, and some construction waste resulting from maintenance and repairs. Permitted wasted disposal facilities are a considerable distance from the project site and uncontrolled waste management and/or disposal on the site may lead to wind-blown litter and/or illegal dumping, both of which can lead to further visual impacts.

Table 5-62: Significance rating of impact W2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Long term	Medium	Definite	Low	-	High
Management Measures								
• The developer must identify and separate materials that can be reused or recycled to minimise waste e.g. metals, packaging and plastics, and provide separate marked bins/ skips for these items. These wastes must then be sent for recycling and records kept of recycling; • No dumping within the surrounding area shall be permitted, and no waste may be buried or burned on site; and								

• Sufficient portable on-site weather & vermin proof bins with lids need to be provided and appropriately placed and emptied regularly (contents to be disposed of at a licensed landfill site, and proof of disposal retained for auditing purposes).								
After Management	Local	Low	Long term	Medium	Possible	Very Low	-	High

5.13.4 Potential Impact W3: Waste management impacts associated with decommissioning of the WEF

Should the WEF be decommissioned at some stage, materials such as steel and rubble will need to be removed from site so that they do not litter the environment. The impacts related to decommissioning will be similar to those during construction, however the volumes will be significantly higher.

Table 5-63: Significance rating of impact W3 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	High	Long term	High	Definite	High	-	High
Management Measures								
• All infrastructure, equipment, plant, fencing, temporary services and foreign materials with no ongoing purpose on the site should be removed from the site and recycled or properly disposed of; • Waste material should be removed entirely from the development area and disposed of at a registered disposal facility								
After Management	Local	Low	Short term	Very low	Possible	Insignificant	-	High

5.14 Stormwater and Erosion Impacts

The hydrological specialist has addressed stormwater and erosion impacts relating to watercourses (see Section 5.9.4), and the agricultural specialist has addressed erosion impacts on soils from an agricultural potential perspective (see Section 5.5.3 and 5.5.4).

5.15 Impacts relating to storage & handling of hazardous goods

5.15.1 Introduction

Inappropriate management and storage of hazardous substances could lead to soil and ground water pollution during construction and operation. These impacts have been assessed and rated by the Environmental Assessment Practitioner (EAP). The possible contamination of surface water resources is assessed under hydrology impacts in section 5.9.4.

5.15.2 Potential Impact SH1: Soil and groundwater contamination during construction

Apart from the storage of cement powder associated with the batching plant, it is anticipated that various solvents, paints, and hydrocarbons would be required during construction including petrol, diesel, and transformer oils. If not correctly controlled, spillage of these substances could result in contamination of soil and groundwater.

Table 5-64: Significance rating of impact SH1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Medium	Long term	Medium	Possible	Low	-	Medium
Management Measures								
• All hazardous substances must be stored in a bunded area with an impermeable surface beneath, in accordance with the manufacturer's instructions; • A Spill Response Emergency Plan must be drafted and implemented; • Spill kits should be available at key locations; • All contaminated soil and wastewater to be disposed of at a registered waste disposal facility, and the proof of disposal be retained for auditing purposes; • Solvents and chemicals should be stored in accordance with regulations/ manufacturer's guidelines, and Material Safety Datasheets to be kept on site; • Drip trays to be placed under all stationary plant and vehicles; • No storage of hazardous materials in or within the 32 m buffers of watercourses; and • Wash water from cleaning vehicles and implements must be collected, any greases or oils separated out, and disposed of in on-site septic tanks.								
After Management	Local	Medium	Long term	Medium	Possible	Low	-	Medium

5.15.3 Potential Impact SH2: soil and groundwater contamination during operation

The permanent storage of hazardous liquids on site during operation is not anticipated. Transformer oil which will be required for maintenance purposes will not be stored on site but will be transported to site as necessary. Under normal operational conditions, the transformers should only be re-filled after a 10 year operation period. Maintenance and repairs to equipment may require the use of small amounts of solvents, paints, fuels and oils. Incorrect handling and storage of these could result in soil or groundwater contamination.

Table 5-65: Significance rating of impact SH2 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Local	Low	Long term	Low	Possible	Very Low	-	Medium
Management Measures								
• A Spill Response Emergency Plan must be drafted and implemented; • All contaminated soil and wastewater to be disposed of at a registered waste disposal facility, and the proof of disposal be retained for auditing purposes; • Solvents and chemicals should be stored in accordance with regulations/ manufacturer's guidelines, and Material Safety Datasheets to be kept on site; • Drip trays to be placed under all stationary plant and vehicles; • No storage of hazardous materials in or within the 32 m buffers of watercourses; and • Wash water from cleaning vehicles and implements must be collected, any greases or oils separated out, and disposed of in on-site septic tanks.								
After Management	Local	Low	Long term	Low	Improbable	Very Low	-	Medium

5.16 Air Quality Impacts

5.16.1 Introduction

Nuisance impacts from dust may result from construction vehicles travelling on gravel access roads past existing dwellings and agricultural lands to the site, and could negatively affect local communities, who may experience dust as a nuisance. Dust impacts on vegetation have been assessed separately under ecological impacts in Section 5.8.8. Excess dust could also reduce visibility along the surrounding gravel access roads creating safety concerns, and may contribute to visual impacts.

5.16.2 Potential Impact AQ1: Impact of dust during construction

Dust generated by construction activities has the potential to impact on off-site access roads by creating a dust nuisance to pedestrians and residents and impairing visibility on the roads thereby affecting traffic safety.

Table 5-66: Significance rating of impact AQ1 and recommended mitigation measures

	Spatial Extent	Intensity	Duration	Consequence	Probability	Significance	+-	Confidence
Before Management	Regional	Medium	Short term	Low	Definite	Low	-	High
Management Measures								
• Vehicle speeds should be limited to 40 km/h on unpaved surfaces to reduce dust generation; • When transporting fine materials, dust tarps should be installed on vehicles; and • When necessary, gravel roads shall be surfaced.								
After Management	Regional	Low	Short term	Very low	Possible	Insignificant	-	High

5.17 Traffic Impacts

Impacts on traffic flow and safety for other road users on public roads leading to the site may result from transportation of materials and equipment to and from the site, primarily during construction. As a full traffic impact assessment has not been conducted as part of this EIA, the significance of impacts relating to traffic have not been assessed, however traffic and transportation management plans will be in place to manage any impacts.

5.18 Cumulative Impacts

Most renewable energy projects currently in progress or authorised in the region are more than 40 km from the proposed site. The Innowind Grassridge Wind Farm is situated near Coega, 43 km east of the proposed Inyanda-Roodeplaat WEF, and is the only wind farm that has been built in this region to date. Ukomeleza Wind Power wind farm adjacent to the Grassridge wind farm has been authorised but construction has not yet started, and will be approximately 38 km from the Inyanda-Roodeplaat site. A map showing the proximity of the site to other WEFs in the area is provided in Appendix F.

Due to the rural nature of the area, the EAP is not aware of any other developments (existing, planned or authorised) in the vicinity of the site that may result in cumulative impacts. Relevant comments made by the various specialists on potential cumulative impacts are summarised below.

5.18.1 Hydrology

Possible impacts on the remaining catchment may result due to changes in run-off characteristics in the development site.

Cumulative impacts are expected to be unlikely and of low significance due to the lack of other projects of a similar nature (or that may affect hydrological features) in the area.

5.18.2 Visual

The two wind energy facilities in the region that may contribute to cumulative visual impact are both almost 40 km and more from the proposed site for this WEF. If a visual receptor can see the Inyanda-Roodeplaat WEF as well as one of the other two (Innowind Grassridge or Ukomeleza WEFs) then it is likely that they will make up a very small part of the view. The cumulative impact of wind energy facilities on existing views of sensitive visual receptors in the region is therefore seen as low.

5.18.3 Ecological

Cumulative impacts of the power lines and the WEF are low overall (with mitigation). This is due to the comparatively small amount of natural vegetation that will be lost and the development of the power line (the preferred alternative is recommended) along existing linear developments (roads and fence lines) thus reducing the impact of a new linear development. It is anticipated that due to the narrow roads and the power line servitudes left as natural vegetation (perhaps mown), fragmentation will be negligible overall. The development will allow for the movement of fauna as well as the pollination and seed dispersal of flora.

High impacts of concern include the removal and/or destruction of flora SSC. This needs to be carefully managed to ensure the proper permitting is in place and that plants that can be transplanted are housed in a nursery and used for rehabilitation. The loss of faunal species may also be relatively high, and all slow-moving reptiles should be rescued and relocated during construction to ensure no losses.

5.18.4 Socio-economic

The following potential cumulative impacts were listed by the specialist:

Impacts on GDP growth rates (+ve impacts)

During construction:

- A number of wind energy facilities are proposed to be built (some of which are completed) in the province and it is highly likely that if the projects are approved by government the demand for goods and services required for the construction of similar facilities would grow. This could provide sufficient economies of scale and thus open up opportunities for the establishment of new industries in the country and new businesses in the local area, specifically in the sectors that are not well represented in the economy.

During operation:

- Improved energy supply in the country

- Reduced carbon emissions in generation of electricity.
- If other renewable energy projects are established around the study area, sufficient economies of scale could be created to establish new businesses in the local economies that would supply goods and service required for the operation and maintenance of the facilities that cannot be acquired in the area currently; this would contribute to the local economies' growth and development.

Impacts on investment (+ve impacts)

- Lower government debt and servicing costs during construction.
- Possible improvement in local service delivery during operation.

Impacts on employment and skills transfer (+ve impacts)

During construction:

- Improved labour productivity and employability of construction workers for similar projects.
- Possible development of local skills and expertise in R&D and manufacturing industries related to wind technologies.

During operation:

- Improved living standards of the directly and indirectly affected households.
- Development of new skills and expertise in the country to support the Wind Energy industry development.

Impacts on tourism and game farming (-ve impacts)

During construction:

- Reduction in the number of tourists visiting the area due to the construction of other wind turbine developments in the surrounding area albeit temporarily.

During operation:

- Change in perception of the area due to the operation of wind turbine developments in the surrounding area.

Impacts on household income (+ve impacts)

During construction

- Improved standard of living of the affected households;

During operation:

- Improved productivity of workers.
- Improved health and living conditions of the affected households.

Impacts on economic and social infrastructure (+ve impacts)

- Possible improvements in access to services and status of local infrastructure.

5.19 Decommissioning or re-powering phase

Current wind turbines are designed to last for over 25 years and this is the figure that has been used to plan the life span of a modern wind farm. Should the repowering of the wind farm be financially, environmental and socially viable, the life span can be extended by another 25 years.

The potential impacts of repowering would be similar to those of the construction and operation phase, potentially less severe given that all infrastructure would already be in place.

6 Findings, Evaluations and Recommendations

This chapter evaluates the impact of the proposed Roodeplaat WEF based on the findings of the Environmental Impact Assessment. The principal findings are presented in this chapter, followed by a discussion of the key factors DEA will have to consider in order to make a decision in the interests of sustainable development.

As is to be expected, the Inyanda – Roodeplaat WEF and associated infrastructure has the potential to cause both negative and positive impacts. The EIA has examined the available project layout information and drawn on both available (secondary) and specifically collected (primary) baseline data to identify and evaluate the environmental (biophysical and socio-economic) impacts of the proposed project.

The EIA Report aims to inform decision-makers of the key considerations by providing an objective and comprehensive analysis of the potential impacts and benefits of the project, and has created a platform for the formulation of mitigation measures to manage these impacts. Mitigation measures are consolidated in the Draft Environmental Management Programme which forms the next chapter (Section 7) of this Environmental Impact Report.

This chapter presents the general conclusions drawn from the EIA process which should be considered by decision makers in evaluating the project. The chapter should be viewed as a supplement to the detailed assessment of individual impacts presented in the previous chapter (Section 5).

6.1 Environmental Impact Statement

The evaluation is undertaken in the context of:

- The information provided during the EIA;
- The assumptions made for this EIR;
- The recommended mitigation measures, which it is assumed will be effectively implemented;
- The assessments provided by the specialists; and
- The practicality of the recommendations for mitigation.

The evaluation and the basis for the subsequent discussion are represented concisely in Table 6 1 below, which summarises the potentially significant impacts and their significance ratings before and after application of mitigation and/or management measures.

Table 6-1: Summary of potential impacts of the proposed Inyanda – Roodeplaat Wind Energy Facility and associated infrastructure

Impact group	Impact Description	+ / -	Significance without mitigation	Significance with mitigation
	CONSTRUCTION			
Archaeological	A1: Destruction of resources	-	Low	Very Low
Palaeontological	P1: Destruction of resources	-	High	Low
Agricultural	AG1: Loss of agricultural land due to clearing	-	Low	N/A
	AG2: Soil erosion due to earth moving activities	-	Very Low	Very Low

Impact group	Impact Description	+ / -	Significance without mitigation	Significance with mitigation
	AG3: Loss of topsoil	-	Very Low	Very Low
Avifauna	AV2: Disturbance from foraging/nesting areas (Black Harrier)	-	Medium	Low
	AV2: Disturbance from foraging/nesting areas (Verreaux's Eagle)	-	Low	Low
	AV2: Disturbance from foraging/nesting areas (Martial Eagle)	-	Low	Low
	AV2: Disturbance from foraging/nesting areas (Booted Eagle)	-	Low	Low
Bats	B1: Damage to bat roosts	-	Low	Very low
	B2: Loss of bat foraging habitat	-	Low	Very low
Socio-economic	S1: Impacts on GDP growth	+	Medium	Medium
	S2: Impacts on investment	+	Medium	N/A
	S3: Impact on employment and skills transfer	+	Low	Medium
	S4: Impact on tourism and game farming	-	Low	Very Low
	S5: Impact on development planning	+	Medium	N/A
	S6: Impact on in-migration	-	Low	Very low
	S7: Impact on household Income	+	Medium	N/A
	S8: Impact on economic and social infrastructure	+	Medium	Medium
Visual	V1: Visual intrusion of wind turbines	-	Very high	Medium
	V2: Visual Intrusion of powerlines	-	Low	Low
Ecological	EC1: Loss of Thicket	-	Low	N/A
	EC1: Loss of Proteaceous Fynbos	-	Low	Low
	EC1: Loss of Grassy Fynbos	-	Low	Low
	EC1: Loss of Succulent Thicket	-	Low	N/A
	EC1: Loss of Karoo vegetation	-	Low	Very Low
	EC1: Loss of Degraded Thicket	-	Very low	N/A
	EC1: Loss of Renosterveld	-	Low	N/A
	EC1: Loss of Acacia	-	Low	N/A
	EC1: Loss of Riparian Thicket	-	Low	N/A
	EC1: Loss of vegetation communities due to preferred powerline	-	Medium	Low
	EC1: Loss of vegetation communities due to Powerline (Option 1)	-	High	Low
	EC1: Loss of vegetation communities due to Powerline (Option 2)	-	High	Low
	EC2: Loss of plant SSC due to WEF	-	High	Low
	EC2: Loss of plant SSC due to preferred powerline	-	Medium	Low
	EC2: Loss of plant SSC due to powerline (Option 1)	-	High	Low
	EC2: Loss of plant SSC due to powerline (Option 2)	-	High	Low
	EC3: Loss of fauna SSC due to clearing for WEF	-	Very Low	Insignificant
	EC3: Loss of fauna SSC due to preferred powerline	-	Low	Very Low

Impact group	Impact Description	+ / -	Significance without mitigation	Significance with mitigation
	EC3: Loss of fauna SSC due to powerline (Option 1)	-	Medium	Very Low
	EC3: Loss of fauna SSC due to powerline (Option 2)	-	Medium	Very Low
	EC4: Loss of Biodiversity due to clearing for WEF	-	Medium	Very Low
	EC4: Loss of Biodiversity due to preferred powerline	-	Medium	Low
	EC4: Loss of Biodiversity (powerline Option 1)	-	High	Low
	EC4: Loss of Biodiversity (powerline Option 2)	-	High	Low
	EC5: Fragmentation and edge effects	-	Very Low	N/A
	EC6: Invasion of alien species due to WEF	-	Medium	Insignificant
	EC6: Invasion of alien species (preferred powerline)	-	High	Low
	EC6: Invasion of alien species (powerline Option 1)	-	High	Low
	EC6: Invasion of alien species (powerline Option 2)	-	High	Low
	EC7 Impacts of dust on vegetation	-	Medium	Very Low
Hydrology	H1: Diversion and increased velocity of flow	-	High	Medium
	H2: Changes to water Quality	-	High	Medium
	H3: Loss of riparian vegetation, aquatic habitat and stream continuity	-	High	Low
	H4: Loss of aquatic SSC	-	High	Medium
Noise	N1: Construction of turbines	-	Very Low	Insignificant
	N2: Construction at batching plant	-	Very Low	Insignificant
Waste	W1: Lack of Waste Management	-	Medium	Insignificant
Hazardous Substances	SH1: Soil and groundwater contamination	-	Medium	Low
Air Quality	AQ1: Impact on human receptors	-	Low	Insignificant
	OPERATION			
Avifauna	AV1: Collision risk for Black Harrier	-	Medium	Low
	AV1: Collision risk for Verreaux's Eagle	-	Medium	Low
	AV1:Collision risk for Martial Eagle	-	Low	Low
	AV1:Collision risk for Martial Eagle	-	Low	Low
	AV3: Collision with powerlines (Blue Crane)	-	High	Low
	AV3: Collision with powerlines (Ludwig's Bustard)	-	High	Low
Bats	B3: Mortality due to turbines	-	High	Low
	B4: Artificial lighting	-	Medium	Very low
Socio-economic	S1: Impacts on GDP growth rates	+	High	High
	S2: Impact on investment	+	Medium	N/A
	S3: Impact on employment and skills transfer	+	High	High
	S4: Impact on tourism and game farming	-	Medium	Medium
	S5: Impact on development planning	+	Medium	Medium

Impact group	Impact Description	+ / -	Significance without mitigation	Significance with mitigation
	S6: Impact on in-migration	-	Low	Very low
	S7: Impact on household income	+	Medium	Medium
	S8: Impact on economic and social infrastructure	+	Very High	Very High
Noise	N3: Disturbance during operation	-	Insignificant	Insignificant
	N4: Impact on visitors to Groendal Nature Reserve	-	Insignificant	Insignificant
Visual	V3: Visual intrusion on sense of place	-	Very High	Very High
	V4: Visual intrusion of wind turbines	-	Very High	Very High
	V5: Visual intrusion of obstruction lights	-	Very High	Very High
	V6: Visual intrusion of powerlines	-	Very High	High
Ecological	EC 8: Impacts of noise on mammals	-	Low	N/A
	EC 8: Impacts of noise on reptiles	-	Low	N/A
	EC 8: Impacts of noise on amphibians	-	Medium	N/A
	EC9: Impacts of fencing	-	Medium	Very Low
Hydrology	H1: Diversion and increased velocity of flow	-	High	Medium
	H2: Changes to water Quality	-	High	Medium
	H3: Loss of riparian vegetation, aquatic habitat and stream continuity	-	High	Low
Waste	W2: Lack of Waste management	-	Low	Very Low
Hazardous substances	SH2: Soil and groundwater contamination	-	Very Low	Very Low
	DECOMMISSIONING			
Visual	V7: Visual intrusion of turbines	-	Very high	Medium
	V8: Visual intrusion of powerlines	-	Low	Low
Waste	W3: Lack of Waste management	-	High	Insignificant

Observations with regard to the overall impact ratings, assuming mitigation measures are effectively implemented, are highlighted as follows:

- The predicted archaeological impact, associated with earthworks during the construction phase, is rated as *very low* and negative.
- The predicted palaeontological impact, also associated with earthworks during the construction phase, is rated as *low* and negative. Palaeontological resources are noted as being important I this area and if borrow pits are to be opened (which is not part of this assessment) then further palaeontological assessment would be required.
- The predicted impact on agricultural resources, including soil, is rated as *very low* and negative. The sites are unsuitable for cultivation due to topography and rainfall, and is noted as having a low carrying capacity for grazing.
- The predicted impacts on avifauna, and in particular Black Harrier, Verreaux's Eagle, Martial Eagle, and Booted Eagle, assuming that management measures are acceptable from an ecological point of view, are rated as *low* and negative.

- The predicted impacts on Blue Crane and Ludwig's Bustard, due to interactions with the various powerline route alignments, are rated as *low* and negative.
- The predicted impact on bats is rated as *low* and negative. Sensitive areas have been identified by the bat specialist which, if not avoided, result in the predicted impact on bats due to collisions with turbines being *high* and negative.
- The predicted socio-economic impacts during construction are generally positive with the impact on GDP growth, employment and skills transfer, and economic and social infrastructure, being rated as *medium* and positive.
- The predicted impact of in-migration is rated as *very low* and negative during construction and operation.
- The predicted socio-economic impacts during operation are generally positive with the impact on GDP growth and employment and skills transfer being rated as *high* and positive and the impacts on economic & social infrastructure and development planning being rated as *medium* and positive.
- The predicted impact on tourism and game farming is rated as *medium* and negative during operation, and *very low* and negative during construction.
- The predicted visual impacts of the wind turbines, including the impact on sense of place, are rated as *very high* and negative during operation. The very high negative visual impacts identified suggest that the proposed site for the Inyanda - Roodeplaat WEF is not ideal in terms of landscape and visual considerations;
- The predicted ecological impacts are generally rated as being of *low* significance and negative, both during construction and operation. The predicted impact resulting from fencing of the site, which could occur as part of the development and the no-go option, is rated as having a *medium* and negative significance.
- The predicted impacts on water resources are due to changes in water quality and flow regime, and the potential loss of species of special concern. These impacts have been rated as having a *medium* and negative significance.

The challenge for DEA is to take a decision which is sustainable in the long term and which will entail trade-offs between social, environmental and economic costs and benefits. In addition to the significance rating listed above, SRK believes the following key points should also be considered in making a decision:

- Located on the ridge of the Groot Winterhoek Mountains, the topography of the site is a key factor constraining the positioning of infrastructure. Repositioning of turbines and roads on the site may not be technically feasible. A key focus of the EIA process has therefore been to request the applicant to provide a technically and economically feasible site layout alternative.
- Alternative development opportunities on the affected properties are similarly constrained (i.e. by topography) and the no-go option is expected to see the current land use continuing.
- SRK's understanding is that the landowner's willingness to enter into a stewardship agreement with ECPTA for the portions of land in the study area is contingent on the development of a wind energy facility and as such a stewardship agreement with the ECPTA is a motivation for the development proposal.
- The site is in a rural area that could be described as wilderness, with visible man-made structures being largely absent, in between two portions of the Groendal Nature Reserve, and in

close proximity to the Baviaans World Heritage Site. The views of ECPTA as the custodians of these protected areas are therefore of particular importance.

- The commitments made to inform the Socio-Economic Impact Assessment are understood to be aligned to the requirements of the REIPPPP and that the implementation of the project (should it be authorised) might not necessarily be through the REIPPPP bidding process. As such, the mechanism through which these commitments would be administered is not certain.

A consolidated map showing sensitive areas of the site identified by the various specialists relative to the WEF layout (52 turbines) is provided as Figure 6-1 (A3 size copy is provided in Appendix F). The map includes the following:

- Buffers around Martial and Verreaux eagle nests (2.5 and 1.5 km respectively) identified on and near the site (buffers indicate areas of increased collision and disturbance risk as opposed to no-go areas);
- Buffers around watercourses on the site (32 m, within which it is recommended that no new structures are located);
- Archaeologically sensitive areas (to be avoided or the appropriate licenses to be obtained);
- Sensitive habitat and buffers with regard to bats (high sensitivity areas and their associated 350 m buffers are recommended as no-go areas, and medium sensitivity areas and their 150 m buffers are to be avoided where possible, and if not, mitigation measures applied).
- CBAs – included for reference; and
- Formally protected areas adjacent to the site.

Note that plant species of special concern have not been mapped due to their wide distribution over the site, and where it is not possible to avoid these plants, the appropriate permits would be require to destruct or relocate them.

6.1.1 Powerline options

Relevant specialists were asked to comment on the three alternative powerline route options (as shown on Figure 2-12) and provide an opinion with regard to preference in terms of their specific area of expertise. For clarity the “preferred route” is the developer’s preferred route (not necessarily environmentally) as it is the shortest and most cost effective.

A summary of the preferred routes of each specialist based on their findings and is given in Table 6-2 below. Although many specialists favour Option 2, it is noted that this preference is relatively marginal, and none of the specialists raised specific concerns relating to the “preferred” route (which was also preferred by the ecological specialist). It is therefore SRK’s conclusion that, based on the information currently available, development of Option 2 (the longest and therefore most costly route) would not be merited, over the “preferred” route.

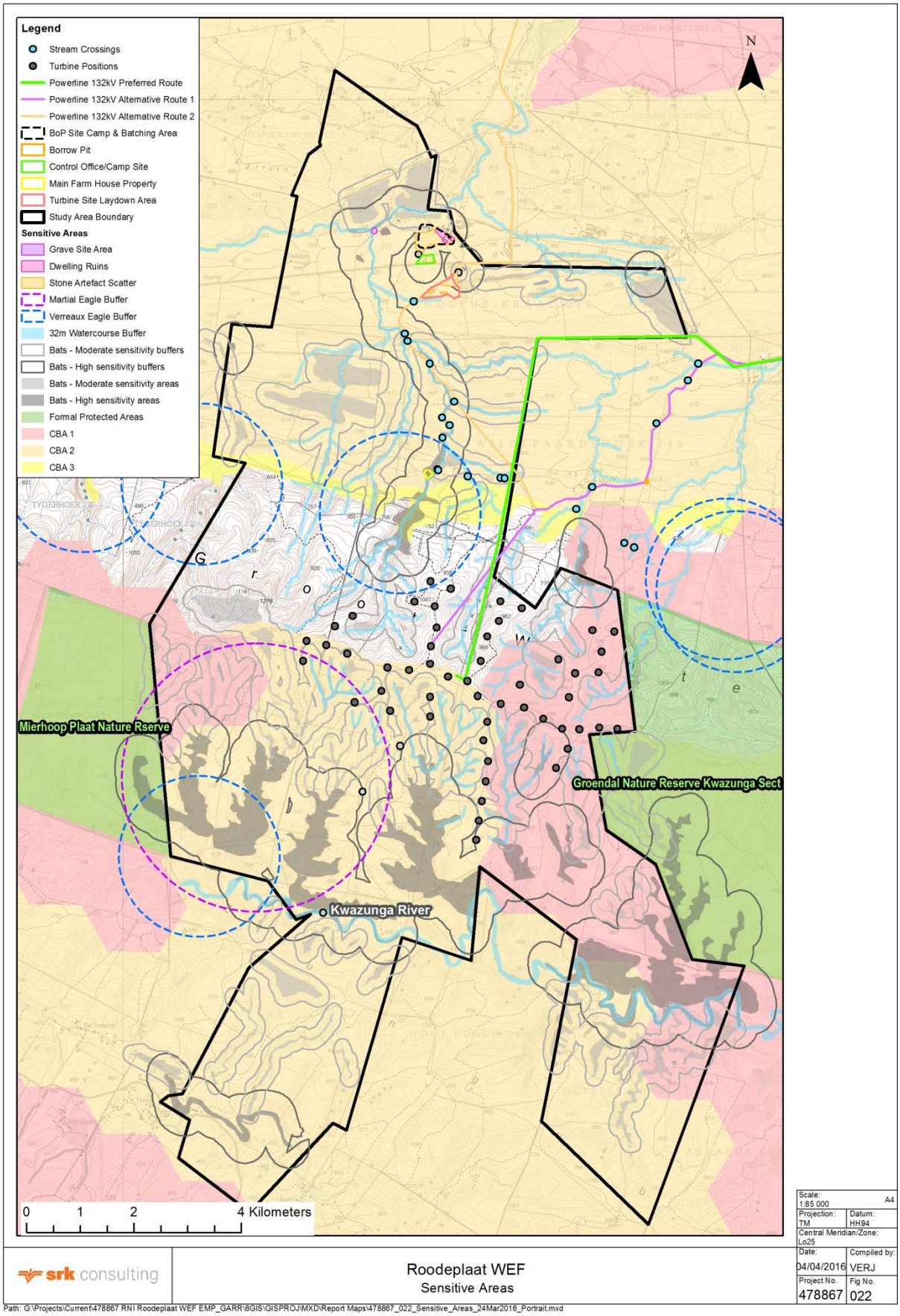


Figure 6-1: Map showing sensitive areas on and around the site, as identified during the EIA process (for A3 size copy see Appendix F)

Table 6-2: Matrix of powerline route alternatives

Specialist study	Preferred route	Option 1	Option 2	Explanation (as per specialist reports)
Avifauna			Preferred (marginally)	This route runs adjacent to the existing line and road and passes through less remote areas than other options, which lowers its potential ornithological sensitivity. However, the transect surveys have shown that this route holds similar densities of the two key species at risk of collision (Blue Crane and Ludwig's Bustard), indicating little difference between the ornithological sensitivity of the different routes, and emphasising the need to implement the mitigation measures set out above whichever route is finally selected.
Visual			Preferred	In terms of visual intrusion the proposed routes are very similar. Route Option 2 is likely to affect more sensitive visual receptors than the other two but its intrusion on scenic views will be lower since most of it is through a region that is already somewhat affected by large scale structures such as power lines, substations, roads and buildings. The preferred route and Option 1 follow the MR00407 and pass through a part of the region that appears relatively intact and contain few man-made structures. Route Option 2 is preferred if the choice is based on minimizing visual impact only.
Hydrological	Preferred		Preferred	This is based on the fact that the water courses that the powerlines need to span are narrower along these routes and thus towers could be placed outside of the riparian zones. The Path 1 option follows wider rivers systems thus some towers may end up within the associated water courses or their buffer. Thus requiring a minimum of a WULA / GA for each of those towers together with specific rehab/monitoring with mitigations.
Ecological	Preferred			The smallest area of Critically Endangered habitat will be traversed by this option. The line does not traverse any green fields areas as it is located next to existing roads and fence lines.

6.2 Conclusion and Authorisation Opinion

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised and this section a qualified opinion is ventured.

The Inyanda – Roodeplaat WEF and associated infrastructure will result in unavoidable permanent and adverse environmental impacts, particularly in terms of sense of place, given the project's prominent location on the Groot Winterhoek Mountain and proximity to the Groendal Nature Reserve and Baviaanskloof World Heritage Site. The predicted biophysical impacts on these protected areas have been assessed and in the most part are insignificant. Decommissioning is unlikely to return the site to predevelopment conditions and certain impacts (in particular visual and ecological) are irreversible due to the topography of the site (see Figure 3-2).

The potential impact on game farming and eco-tourism, influenced largely by visual impacts, is predicted to be negative with a medium significance and is outweighed by the predicted very high and positive significance of socio-economic benefits to the region. The visual impacts are predicted to be high and negative and are in all probability incongruent with the visual expectations of visitors to declared nature reserves and the goals of the custodians of the protected areas in the vicinity of the development. The EIA has sought to investigate the concerns raised by ECPTA which it is expected would inform their final position regarding the development. However, in the context of the predicted visual impact, and if the lack of support from these custodians persists, then this suggests that the development should not be authorised.

The remainder of the specialist studies have shown that if the recommended mitigation measures are implemented, that the development of the Inyanda - Roodeplaat Wind Energy Facility and associated infrastructure is generally acceptable. The EIA has also assisted in the identification of essential mitigation measures that will mitigate the impacts associated with these components to within tolerable limits.

6.3 Recommendations

The specific recommended mitigation measures are presented in the impact assessment (Section 5) and are recorded in the Draft Environmental Management Programme (Section 7) of this report.

Key recommendations (in addition to those referred to above), which are considered essential, are:

1. Implement the EMPr to guide construction and operations activities and to provide a framework for the ongoing assessment of environmental performance;
2. Appoint an Environmental Control Officer (ECO) to oversee the implementation of the EMPr and supervise any construction activities in particularly sensitive habitats;
3. Minimise the physical footprint of the development and areas disturbed by construction activities, particularly in sensitive habitats and habitats supporting species of conservation concern;
4. Rehabilitate all areas disturbed by construction activities;
5. Obtain other permits and authorisations as may be required, including, but not limited to
    a. Water Use Authorisations;
    b. Permits for the disturbance or translocation of species of conservation concern; and
    c. Heritage destruction permits.
6. Develop and implement the Monitoring Plans for avifauna and bats, as per the relevant best practice guidelines and recommendations of the specialists.
7. In order to ensure that the positive socio-economic impacts of the proposed development are maximised and any negative impacts reduced (by way of implementation of the management recommendations provided in Section 5.11), specific management strategies and mechanisms need to be incorporated into the overall development.
8. The noise impact from the wind turbine generators should be measured during the operational phase, to ensure that the impact is within the required legal limits.
9. Bat sensitive habitats and the associated buffers should be avoided in the layout, and the additional mitigation measures relating to turbine curtailment implemented as necessary.
10. Implementation of on-and off-site habitat management programmes, to reduce the attractiveness of the wind farm site for foraging birds, as well as turbine shut-down on demand, and a breeding bird protection programme.
11. Installation of bird flappers on high risk portions of the overhead powerlines.
12. Minimising impacts on aquatic systems through erosion and stormwater control, and minimising activities within the 32 m buffer of watercourses. These measures also aim to protect the endangered Eastern Cape Redfin population on the site, which will be sensitive to changes in water quality and flow.

7 Draft Environmental Management Programme

This chapter presents a draft Environmental Management Programme (EMPr) that describes how the environmental aspects identified in the Environmental Impact Report (EIR) should be managed in the event of environmental authorisation being granted. Although the EMPr is written as if the project has been authorised, this approach in no way presupposes that the project will be approved. Rather, the style of writing is aimed at providing a clear picture to the Department of Environmental Affairs (DEA), other organs of state, and IAPs, regarding the management of environmental aspects associated with the design, construction and operational activities of the proposed development.

The preceding chapters in this EIR form an integral part of the EMPr as they provide details of the Environmental Assessment Practitioner(s) (EAP) who compiled the EMPr, details regarding the sensitivity of the affected environment, the issues and concerns raised by Interested and Affected Parties (IAPs), the findings of the impact assessment, and mitigation measures proposed by the EAP and/ or relevant specialist(s). As such, while the EMPr provides a list of environmental specifications aimed at mitigation of the identified impacts, and in a more general sense compliance with environmental legislation, the preceding Chapters are particularly useful for understanding the importance of the measures proposed here.

In the event that the application is authorised by DEA, then this EMPr will be finalised according to the conditions specified in the Environmental Authorisation.

The EMPr stipulates the environmental standards to be adhered to by the parties involved in the various phases of the project life cycle of the project. As such the draft EMPr comprises of a section for each of the following project life cycle phases:

- Pre-construction (Section 7.3);
- Construction activities (including rehabilitation) (Section 7.4);
- Operation (Section 7.5); and
- Closure (Section 7.6).

Where appropriate each section provides a description of the environmental aspects associated with that phase, the roles & responsibilities for implementation of the EMPr, timeframes, and monitoring requirements.

7.1 Roles and Responsibilities

The general roles and responsibilities of various parties associated with the proposed development are outlined below.

7.1.1 The Developer: Inyanda Energy Projects (Pty) Ltd

Inyanda shall ultimately be responsible for the implementation of the EMPr. They shall appoint a representative, the Responsible Person (RP), who shall:

a) Ensure that the contractor is duly informed of the EMPr and associated responsibilities and implications of this EMPr;

b) Monitor the contractor's activities with regard to the requirements outlined in the EMPr;

c) Act as a point of contact for local residents and community members;

d) Ensure that the contractor remedies problems in a timely manner and to the satisfaction of the authorities; and

e) Notify the authorities and the Environmental Control Officer (ECO) should problems arise that are not remedied effectively, or of any change in the development or changes in project specification that could significantly impact negatively on the environment.

7.1.2 The Contractor

The contractor(s) must ensure that all aspects of the contract comply with both this EMPr and other relevant environmental legislation. In addition to any other responsibilities, the contractor(s) shall be responsible for the following:

a) Appointing an Environmental Representative (on site), who irrespective of other duties, will also be responsible to oversee all activities associated with the contract;

b) Ensuring that the Environmental Representative has the means with which to carry out his/ her tasks;

c) Ensuring all activities on the site are undertaken in accordance with the EMPr;

d) Informing all employees and sub-contractors of their roles and responsibilities in terms of the EMPr;

e) Ensuring that all employees and sub-contractors comply with this EMPr; and

f) The contractor has a duty to demonstrate respect and care for the environment in which they are operating. They will be responsible for the cost of rehabilitation, to the satisfaction of the ECO, of any environmental damage that may result from non-compliance with the EMPr, environmental regulations and relevant legislation.

7.1.3 The Contractor's Environmental Representative

The Contractor's Environmental Representative (ER) shall be responsible for implementation of this EMPr and any other environmental requirements that may be identified by the ECO, and agreed to by Inyanda Energy, during the course of the contract. The ER shall have received basic environmental awareness training, either as part of this contract, or previously. In addition to any other responsibilities, the general duties of the ER are as follows:

a) Ensuring that all personnel (including sub-contractors) are duly informed of the requirements contained in this EMPr, and the associated responsibilities and implications of this EMPr;

b) Ensuring that all records needed to demonstrate compliance with the EMPr requirements are obtained, safely stored, and are readily available for inspection by the ECO and/ or Inyanda Energy. These records are detailed in this EMPr;

c) Consulting with the ECO regarding interpretation of the EMPr and any other aspects of the contract that may impact significantly on the environment;

d) Ensuring that all personnel (including sub-contracted personnel) demonstrate respect and care for the environment in which they are operating;

e) Acting as a point of contact for local residents and community members; and

f) Ensuring that a reporting system is in place and that community representatives can be informed of the correct procedures to lodge complaints.

It is anticipated that these ER duties would be assigned to a member of the on-site personnel that would ordinarily be appointed for the duration of construction related activities by the Contractor, and that these ER duties would be in addition to the other (possibly primary) responsibilities of that person.

7.1.4 The Environmental Control Officer

An Environmental Control Officer (ECO), who is a qualified environmental professional with the relevant environmental expertise, and independent of the developer, shall be appointed for the duration of the construction activities. The ECO's duties are as follows:

a) Being familiar with the environmental management requirements contained in this EMPr as well as the Environmental Authorisation;

b) Undertaking the pre-construction and post-construction site inspections, which may result in recommendations for additional clean-up and rehabilitation measures;

c) Monitoring the contractor's activities with regard to compliance with the requirements outlined in the EMPr, by way of monthly audits, and reporting on the findings of these audits to the developer and relevant authorities (if required in terms of the Environmental Authorisation);

d) Providing ad-hoc environmental advice, including environmental legal requirements, to Inyanda Energy and the Contractor(s) regarding issues that may arise during the Contract; and

e) Submit a post-construction Audit Report to the contractor for comment prior to submission to the relevant authorities' archives. Comments from the relevant parties will be included in the Final Audit Report.

7.2 Environmental Procedures and Specifications

The contractor(s) is deemed to have familiarised themselves with all legislation pertaining to the environment, including any provincial or local government ordinances applicable to the contract.

It should be kept in mind that good housekeeping goes beyond the employment of sensible construction methods to ensure safety on site, but includes care for and preservation of the environment.

7.2.1 Compliance Auditing

a) The appointed ECO and Contractor's ER shall conduct a pre-construction site inspection to identify sensitive environments (and protected vegetation, which should be avoided, or if this is not possible, permits obtained from the relevant authorities for its disturbance or removal), no-go areas, locations of site camps, etc.;

b) The ECO shall prepare a pre-construction audit report, which will include photographs of the general condition of the key features of the site. These photographs shall be used for comparison purposes on completion of the contract, i.e. after rehabilitation of construction areas;

c) The ECO shall conduct monthly site audits of all construction related activities;

d) On completion of construction activities, the ECO shall conduct a site inspection, together with the Contractor's ER. Any items requiring attention shall be included in an Post-Construction Audit Report; and

e) On completion of the defects liability period, the ECO shall accompany a Inyanda Energy representative and the Contractor with a view to determining whether outstanding matters from the Post-Construction Audit Report have been adequately addressed.

7.2.2 Community Liaison

a) The ER shall act as community liaison officer and his/ her contact details shall be displayed on the contractors board;

b) A complaints register (including the action taken in response to the complaint) shall be kept on site by the ER; and

c) All complaints received shall be forwarded to the ECO and Inyanda Energy. All issues raised should be appropriately addressed and recorded.

7.2.3 Environmental Incidents

a) The ER shall maintain a register of all environmental incidents occurring as a result of the activities associated with the contract. Environmental incidents that shall be recorded include (but are not limited to):

    a. Fires;

    b. Accidents;

    c. Spills of hazardous materials, contaminating soil or water resources;

    d. Non-compliances with applicable legislation; and

    e. Non-compliances with this EMPr

b) Each environmental incident shall be investigated by the ECO and an environmental incident report shall be forwarded to the Contractor(s) and Inyanda Energy. Such incident report shall be presented within five working days of the incident occurring;

c) Environmental incident reports shall include (as a minimum) a description of the incident, the actions taken to contain any damage to the environment, personnel, or the public, and the actions taken to repair/ remediate any such damage; and

d) Prescribe additional measures that may be required to remediate damage resulting from the incident and/ or to prevent similar incidents occurring in the future.

7.2.4 Training

The Contractor(s) is responsible for ensuring that the sentiments of the EMPr are conveyed to all personnel (including sub-contracted personnel). It is recommended that regular training sessions/toolbox talks (including basic environmental awareness training at induction) be conducted to fulfil this purpose. Training registers shall be kept as proof for auditing purposes. The environmental training should, as a minimum, include (but not be limited to) the following:

a) The importance of conformance with all environmental policies;

b) The environmental impacts, actual or potential, of the proposed activities;

c) The environmental benefits of improved personal performance;

d) Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with this EMPr, including associated procedures and emergency preparedness and response requirements;

e) The potential consequences of departure from specified operating procedures; and

f) The mitigation measures required to be implemented when carrying out their work activities.

7.2.5 Record Keeping

a) The engineer and the contractor shall continuously monitor the contractor's adherence to the approved impact prevention procedures and the engineer shall issue to the contractor a notice of non-compliance whenever transgressions are observed. The contractor must document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions. The non-compliance shall be documented and reported to the engineer in the monthly audit reports and to the relevant authority; and

b) Copies of the Environmental Authorisation and EMPr for the proposed development shall be kept on site and made available for inspection by visiting officials from the relevant environmental departments.

7.2.6 Compliance and Penalties

a) The contractor shall act immediately when a notice of non-compliance is received and correct the cause of the non-compliance. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and an oral report given at the monthly site meetings;

b) Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Therefore any avoidable non-compliance, dependant on severity, shall be considered sufficient grounds for contact to be made with relevant provincial or national authorities; and

c) The engineer's decision with regard to what is considered a violation, its seriousness and the action to be taken against the contractor shall be final. Failure to redress the cause shall be reported to the relevant authority. The responsible provincial or national authorities shall

ensure compliance and impose penalties relevant to the transgression as allowed for within their statutory powers.

7.3 Pre-construction Phase

7.3.1 Heritage

a) An archaeological walk-through must be conducted for the final power line route chosen out of the three alternatives when the positions of the pylons are known;

b) A phase 1 archaeological impact assessment must be conducted for the upgrade of the gravel roads; and

c) A destruction permit for Turbine Site Laydown Area, staff accommodation, plant storage, and concrete batching area and the control office and camp site must be applied for before any development may continue within these areas.

7.3.2 Visual

a) Access roads must be carefully planned to minimise road cuttings where high slopes require them and to eliminate them from highly visible areas;

b) Ancillary buildings and structures to be located in low visibility areas;

c) Lighting of ancillary buildings and structures should be designed to minimise light pollution without compromising safety;

d) Locate transmission towers in such a way as to maximise the screening effect of existing topography;

e) Use wooden towers where available and practical, similar to those used for the existing transmission lines adjacent to the R75 since these have a more rural feel to them than lattice towers; and

f) Minimise the use of strain towers (used where the power line changes direction of more than 3°) since these towers are larger and more visually intrusive than normal towers.

7.3.3 Indigenous Plant protection

Refer to the Plant rescue and protection Plan in Appendix G4 of the DEIR

7.3.4 Ecological

a) A comprehensive herpetological study, of the WEF site focusing on the presence of SSC in this group;

b) A comprehensive small mammal survey of the WEF site, focusing on the presence of SSC in this group;

c) A flora and fauna study on the three power line alternatives including a field visit and vegetation community mapping;

d) A ground-truthing site visit of both the WEF study site and the powerline alternatives to identify all species of special concern and map these where appropriate within the footprint of the proposed development. This study will inform the permitting process for removal or destruction of these plants, depending on the species;

e) The set up and running of a nursery to house plants for rehabilitation and housing for rescued plants or propagation of other plants;

f) An offset plan should be developed should the proponent wish to demonstrate a net gain of biodiversity for the proposed project;

g) A search and rescue operation for fauna (particularly reptiles) must be initiated prior to the commencement of any construction once the required permits are in place. Refer to the Plant Rescue & Protection Management Plan in Appendix G4 of the DEIR;

h) Ensure that as far as possible power line servitudes are placed in areas of already existing disturbance, for example along the edges of roads;

i) Keep the footprint of the development as small as possible and ensure that the maximum road width (15m) or servitude width (31m) is not exceeded; and

j) It is recommended that all management plans (alien invasive, search and rescue, rehabilitation & offset plans) be included in an overall Biodiversity Action Plan or BAP to meet international best practice.

7.3.5 Avifauna

a) Leave a turbine-free buffer around nest sites. 2.5km buffer for Martial Eagle and a 1.5km buffer for Verreaux's Eagle should be applied; and

b) A Construction Method Statement to be developed to the satisfaction of BLSA and other relevant stakeholders;

7.3.6 Bats

a) Adhere to the sensitivity map during placement of turbines. No turbines should be placed in areas of High bat sensitivity and their buffers as well as preferably avoid areas of Moderate bat sensitivity and their buffers for turbine layout.

7.3.7 Aquatic

a) A detailed fish assessment be conducted to establish a baseline monitoring programme for all the affected water courses in terms of present day water quality, fish population structures and available habitat;

b) A comprehensive rehabilitation plan be implemented form the project onset within these areas (inclusive of buffers) to ensure a net benefit to the aquatic environment; and

c) Emergency plans must be in place in case of spillages onto road surfaces and water courses.

7.3.8 Socio-economic

a) Organise local community meetings to advise the local labour on the project that is planned to be established and the jobs that can potentially be applied for;

b) Engage communities with respect to their possible involvement during construction in providing supporting services such as catering, temporary housing of workers, transportation, etc;

c) Establish a local skills desk (in Jansenville and Kirkwood) to determine the potential skills that could be sourced in the area;

d) Set up a recruitment office in the nearby towns (i.e. Jansenville and Kirkwood) and adhere to strict labour recruitment practices that would reduce the desire of potential job seekers to loiter around the properties in hope to find temporary employment

e) Recruit local labour as far as feasible, with a minimum of 20% of employment created for local communities;

f) Sub-contract to local construction companies where possible;

g) Adhere to strict labour recruitment practices that would increase the use of local labour;

h) Engage with local authorities and inform them of the development as well as discuss with them the ability of the municipality to meet the demands for social and basic services created by the migrant construction workers;

i) Facilitate knowledge and skills transfer between foreign technical experts and South African professionals during the pre-establishment and construction phases focusing on turbine component assembly and tower manufacturing

7.4 Construction Phase

7.4.1 Scope of construction EMPr

The Construction EMPr is intended for use by the appointed Contractor(s), the developer, and the ECO, during the construction phase of the project. Construction related activities include the following:

7.4.2 General Environmental Specifications

7.4.3 Site Demarcation and Vegetation Clearing

a) Construction activities should be limited to the area to be developed, which should be clearly demarcated. Any remaining undisturbed patches of indigenous vegetation must be identified as No-Go areas;

b) No-Go/ open space areas must be clearly demarcated/ clearly marked (i.e. with danger tape) before any construction activities commence on site and appropriate measures implemented to ensure compliance;

c) Vehicles and/ or plant and personnel shall only be permitted within the demarcated construction areas, or on existing roads and/ or access tracks between demarcated areas.

No clearing of vegetation, abstraction, storage, disposal or mixing of any substance (e.g. water, cement, petroleum etc.) may take place outside the demarcated construction area without prior approval of the ECO;

d) Clearing of vegetation should be kept to a minimum, keeping the width and length of the earth works to a minimum;

e) Clearing must take place in a phased manner (i.e. the entire area to be developed should not be cleared all at once);

f) Where feasible, the clearing of indigenous vegetation shall be avoided and site construction areas shall be located where the natural habitat has been previously transformed;

g) Indigenous and rescued flora should be preserved for use during rehabilitation, landscaping and open space management plans; and

h) Harvesting or removal of any plant material, other than for rescue purposes and for the clearing of vegetation for construction, is strictly prohibited. Staff shall only assist with the (necessary) removal of important plant species if requested to do so, under supervision.

7.4.4 Access

a) Construction workers shall be prohibited from entering areas of the site that fall outside the work area; and

b) No indiscriminate driving shall occur around access roads and construction areas or areas outside the boundary of the site.

7.4.5 Construction Camp

a) The construction camp and staff accommodation will be sited as per the layout map; and

b) The construction camp and laydown areas must be beyond the 32m buffer around rivers/streams.

7.4.6 Ablution Facilities

a) The necessary ablution facilities meant for construction workers must be beyond the 32m buffer of any rivers and streams;

a) The use of natural areas as toilets is prohibited. Adequate ablution facilities must be provided;

b) Toilets are to be provided by the contractor for workers at a ratio of at least 1 toilet per 20 workers or as per specifications of the supplier, and must be situated in close proximity to all work areas;

c) Toilets shall be maintained and properly equipped and shall be serviced regularly by a reputable contractor and the contents shall be removed to a licensed disposal facility; and

d) Service certificates (confirming proper disposal of chemical toilet waste/emptying of conservancy tanks) must be filed by the contractor for inclusion in the audit reports.

7.4.7 Eating/Break Areas

a) Designated areas should be identified for workers to assemble during breaks where conditions are safe and waste facilities and drinking water are available.

7.4.8 Materials Handling

Delivery

a) The contractor shall inform sub-contractors and delivery drivers (e.g. of concrete, sand etc.) of procedures and restrictions in terms of the EMPr (including “no-go” areas), and shall only use designated access roads;

b) All loads shall be secured/ enclosed to prevent spillage during transport;

c) All manufactures and/or imported material shall be stored within the Contractors camp, all lay down areas outside of the construction camp shall be subject to the Engineer’s approval; and

d) The contractor shall be responsible for clean-up resulting from failure of sub-contractors to properly contain materials.

Stockpiling

a) Any stockpiling of gravel, cut, fill or any other material including spoil shall be in areas approved by the Engineer within the defined working area;

b) The Contractor shall ensure that the material does not blow or wash away;

c) No stockpiling shall take place within a watercourse;

d) All stockpiles shall be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds; and

e) The shallow topsoil layer shall be stockpiled separately from the subsoil layers, should the excavation exceed 0.5 m.

Fuel Storage and Dispensing

a) The contractor shall take all reasonable steps to prevent the pollution of soil and/ or water resources by fuels and oils as a result of his activities;

b) Hydraulic oil and temporary fuel supply shall be dispensed over drip-trays which rest on sand in order to prevent spills from making direct contact with the soil;

c) In the event of spillage, the contaminated soil shall be removed and disposed of, timeously, at a registered waste landfill site at the contractor’s cost. Proof of disposal shall be kept for auditing purposes;

d) In the event that storage of fuels or oils in quantities greater than 1,000 L be required, then these storage areas shall be surfaced with impermeable material and include secondary containment (bunding) capable of holding 110% of the maximum storage capacity;

e) The bunded areas will drain to a water tight sump and/or oil trap from where it can be removed off-site for disposal;

f) All hydrocarbon storage facilities will not be permanent and will be removed on completion of the construction phase;

g) Fuel should be stored in an isolated area, downhill and downwind from any buildings or construction activities;

h) Liquid fuel tanks should be stored in a well-ventilated building or open gravel area. Fuel tanks must be positioned safe from everything, including buildings, overhead cables and dense vegetation to prevent any damage of bushfire in the event of an incident;

i) Electrical fuel pumps should have a heat sensitive shutoff to stop the pump in the event of fire;

j) Always shut down the engine of the machine / construction plant being fuelled;

k) Use only the equipment and pumps that is approved for the fuel in question, eg diesel vs petrol;

l) All LP gas cylinders should be sealed on arrival to site (by a certified commercial supplier), and should remain seal until being used;

m) Gas cylinders should be stored upright in a lockable area and must be supported with brackets or chained to another to ensure that cylinders will not fall over causing seals to break and cause incidental gas leaks etc;

n) Bulk petrol and diesel containers / tanks should be available on site for ease of filling the construction plant;

o) Drip trays shall be in place under all fuel bowsers and leaking equipment/vehicles;

p) Storage drums should be clearly marked for the correct fuel types and should properly secure to an elevated structure; and

q) A cut-off berm or lined collection pond at the downstream side is recommended to contain any possible unforeseen fuel spillage and preventing any environmental contamination.

7.4.9 Control of Environmentally Hazardous Materials

a) Temporary storage of wastes (e.g. at a waste transfer station or waste storage yards) must be stored on a surface where infiltration into groundwater is minimised or not possible. Waste must be removed frequently and taken to a landfill site;

b) All hazardous materials shall be stored away from watercourses and drains, and be handled over an impermeable surface at all times;

c) Hazardous liquids (such as paints and fuels) shall be stored over a bunded area to contain any leaks, and drip trays shall be in place under all fuel bowsers and stationary plant/ vehicles;

d) Solvents and chemicals should be stored in accordance with regulations/ guidelines;

e) Appropriate spill kits should be available in areas in the proximity of watercourses and drains;

f) Should any spills of hazardous materials (including petrochemicals) occur, all contaminated soil shall be removed (at the contractor's expense) and disposed of as hazardous waste and the area suitably rehabilitated. Proof of disposal shall be retained for auditing purposes;

g) Any material that is used to soak up spills (and is therefore contaminated) must be disposed of at a registered waste disposal facility, and the proof of disposal be retained for auditing purposes;

h) Spilled hazardous material within the bunded area shall either be recovered (if possible), or disposed of at a suitable hazardous waste disposal facility, and the proof of disposal be retained for auditing purposes;

i) All wastewater that is contaminated with hazardous substances shall be collected in a container and disposed of as hazardous waste. Under no circumstances shall it be allowed to enter surface or groundwater resources, including stormwater;

j) Transport and disposal of hazardous waste shall be comply with the relevant legislation, including (but not limited to) the use of authorised waste transporters;

k) All personnel shall be trained and educated during induction on the handling of hazardous substances on site, and dealing with spills or leaks;

l) A leak detection system is to be in place;

m) Where potentially hazardous substances are to be disposed of, a safe disposal slip shall be kept on record as proof of final disposal;

n) A dry chemical or CO_2 fire extinguisher should be present / hung on the outside of the building or near the pump of the fuel tanks; and

o) Any electrical fixtures should be "explosion proof" (sealed) and wired in sealed conduit to prevent fuel vapours from coming into contact with electrical sparks.

7.4.10 Concrete and Cement Batching

a) All cement mixing shall take place at the concrete batching plant; and

b) Mixing of cement shall be conducted on an impervious surface.

7.4.11 Equipment Maintenance

a) The optimum functioning of all vehicles, equipment, tanks and machinery shall be ensured through the implementation of a programme of scheduled maintenance;

b) No routine maintenance of earth moving equipment and vehicles shall occur on site;

c) Should on-site emergency repair work be required to remove immovable equipment or vehicles, this should be conducted over an impermeable surface to collect any liquid spillage;

d) Leakage from equipment shall be prevented by regular inspection and repair; and

e) Should a leak or equipment malfunction be detected, the appropriate personnel shall immediately be informed and every effort made to prevent further leakage.

7.4.12 Waste Management

a) Excess excavated material that cannot be used for backfill should not be allowed to accumulate on site and should be disposed of at a formal landfill site or suitable spoil site identified in conjunction with the ECO;

b) Sufficient weather and scavenger-proof bins (with lids, to prevent the escape of litter) shall be provided, and be easily accessible at all points where wastes are generated;

c) The site shall be kept clean and free of litter, and no litter from the site shall be allowed to disperse to surrounding areas;

d) All personnel shall be instructed to dispose of all waste in the proper manner;

e) No on-site burning, burying or dumping of any waste materials, litter or refuse shall occur;

f) The Contractor shall identify and separate materials that can be re-used or recycled to minimise waste e.g. metals, packaging and plastics, and provide separate marked bins for these items;

g) A dedicated waste management area must be established for the segregation of waste during the construction phase;

h) All construction materials (e.g. bags of cement) must be suitably stored and protected, so that they do not become damaged and unusable;

i) The Contractor shall be responsible for the regular disposal (at suitable and licensed municipal waste disposal facilities) of all waste generated as a result of the construction. Waste disposal slips shall be kept for auditing purposes;

j) No dumping within the surrounding area shall be permitted, and no waste may be buried or burned on site;

k) Where potentially hazardous substances are to be disposed of, a safe disposal slip shall be kept on record as proof of final disposal;

l) General waste is to be collected either by the Municipality or via a municipal approved waste transporting contractor. The frequency of collections will be such that waste containment receptacles do not unduly accumulate or overflow;

m) Waste should not be allowed to accumulate on site. The frequency of collections will be such that waste containment receptacles do not unduly accumulate or overflow; and

n) Waste material should be removed entirely from the development area and disposed of at a formal disposal facility.

7.4.13 Wastewater

a) No wastewater shall be disposed of to the surrounding soil or natural water resources;

b) All effluent water from the camp/ office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, dams etc.);

c) All wastewater that is contaminated with hazardous substances shall be collected in a container and disposed of as hazardous waste. Under no circumstances shall it be allowed to enter surface or groundwater resources, including stormwater;

d) All cement wastewater shall be collected in a container, allowed to evaporate, and the sludge disposed of as hazardous waste. Under no circumstances shall it be allowed to enter soil, surface or groundwater resources, including stormwater;

e) Wastewater that is contaminated with soaps, detergents, grease, oils, paints and other undesirable materials shall be collected in conservancy tanks and disposed of safely into a wastewater treatment facility; and

f) Accidental spills shall be cleared and rehabilitated as soon as possible.

7.4.14 Fire Control

Refer to the Section 7.7 of the EMPr.

7.4.15 Dust Control

a) To minimise dust impacts, areas to be cleared of vegetation or topsoil shall be cleared only when required, and shall be rehabilitated immediately on completion of the construction activity in that area;

b) Access roads should be kept to a minimum and their length and width should be minimised to reduce the surface area from which dust can be generated;

c) When necessary, appropriate dust control measures (such as wetting of soil) shall be implemented;

d) Store aggregates 5 mm or less in size in enclosed structures;

e) When transporting fine materials, dust tarps should be installed on vehicles; and

f) Limit speeds on access and internal roads to 40kmph.

7.4.16 Noise Control

a) All construction operations should only occur during daylight hours if possible;

b) No construction piling should occur at night where possible. Piling should only occur during the day to take advantage of unstable atmospheric conditions;

c) Construction staff should receive "noise sensitivity" training; and

d) An ambient noise survey should be conducted during the construction phase.

7.4.17 Aquatic Ecosystems

a) Chemicals used for construction must be stored safely on site and surrounded by bunds. Chemical storage containers must be regularly inspected so that any leaks are detected early;

b) All construction materials including fuels and oil should be stored in demarcated areas that are contained within berms / bunds to avoid spread of any contamination. Washing and cleaning of equipment should also be done in berms or bunds, in order to trap any cement and prevent excessive soil erosion. Mechanical plant and bowsers must not be refuelled or serviced within or directly adjacent to any channel. It is therefore suggested that all construction camps, lay down areas, batching plants or areas and any stores should be more than 50m from any demarcated water courses;

c) No vehicles to refuel within drainage lines/ riparian vegetation;

d) Littering and contamination of water sources during construction must be prevented by effective construction camp management;

e) No stockpiling should take place within a water course;

f) All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;

g) Stockpiles must be located away from river channels;

h) Erosion and sedimentation into channels must be minimised through the effective stabilisation (gabions and Reno mattresses) and the re-vegetation of any disturbed riverbanks;

i) It is suggested that no alien regrowth be allowed in the river buffers (32m).

j) Any road crossing embankments are to be outside of the floodline areas or the 32m buffer;

k) Only box culverts should be used in the crossing upgrades, with their bases level with the natural riverbed height;

l) Old structures with elevated / sing pipe culverts should be removed;

m) Where water course crossings need to be upgraded, the engineering team must provide an effective means to minimise the potential upstream and downstream effects of sedimentation and erosion (erosion protection) as well minimise the loss of riparian vegetation (small footprint);

n) No transmission line towers must be placed within any water courses or their 32m buffer

o) Where possible culvert bases must be placed as close as possible with natural levels in mind so that these don't form additional steps / barriers;

p) No flows within any of the water courses should be altered by any of the proposed access roads;

q) Vegetation clearing should occur in in a phased manner in accordance with the construction programme to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment;

r) It is also advised that an Environmental Control Officer, with a good understanding of the local flora be appointed during the construction phase. The ECO should be able to make clear recommendations with regards to the re-vegetation of the newly completed / disturbed areas, using selected species detailed in this report; and

s) All alien plant re-growth must be monitored and should it occur these plants should be eradicated. The scale of the operation does however not warrant the use of a Landscape Architect and / or Landscape Contractor.

7.4.18 Heritage Considerations

a) If concentrations of historical and pre-colonial archaeological heritage material and/or human remains (including graves and burials) are uncovered during construction, all work must cease immediately and be reported to the Albany Museum and/or the Eastern Cape Provincial Heritage Resources Agency (ECPHRA). Phase 2 mitigation in the form of test-pitting/sampling or systematic excavations and collections of the pre-colonial shell middens and associated artefacts will then be conducted to establish the contextual status of the sites and possibly remove the archaeological deposit before development activities continue;

b) A person must be trained as a site monitor to report any archaeological sites found during the development. Construction managers/foremen and/or the Environmental Control Officer (ECO) should be informed before construction starts on the possible types of heritage sites and cultural material they may encounter and the procedures to follow when they find sites;

c) As the possible upgrading, resurfacing, and/or rehabilitation of these gravel roads and associated borrow pits were not included within the scope of this study a phase 1 archaeological impact assessment must be conducted for the upgrade of the roads and associated borrow pits;

d) Excavations for wind tower positions situated close to the contact line between the Peninsular and Goudini Formations should be checked by a palaeontologist before being filled;

e) The ECO is to look out for palaeontological material where pylon footings are excavated in the Bokkeveld group strata and Kirkwood Formation (all powerline routes) and should report any observed fossils to a professional palaeontologist;

f) A palaeontologist should be appointed to inspect pylon holes in the vicinity of point 8 (Refer to PIA) along powerline route 1 and the preferred route within the Tra -Tra formation; and

g) A palaeontologist is to carry out fortnightly sampling of the borrow pit at point 7 (Refer to PIA) along the preferred powerline route during the period of utilisation for this project.

7.4.19 Socio-Economic Considerations

a) Control the movement of workers between the site and areas of residence to minimise loitering around the proposed facility by providing scheduled transportation services between the urban areas and the construction site;

b) Employ labour intensive methods in construction where feasible;

c) Sub-contract to local construction companies where possible;

d) Use local suppliers where feasible and arrange with local SMMEs and BBBEE compliant enterprises to provide transport, catering and other services to the construction crews;

e) Provide adequate signage along the roads in the area to warn motorists of the construction activities taking place on the site; and

f) Formalise trading and service provision on the site, by providing a dedicate area for such services and signing contracts with service providers.

g) Ensure that any damages or losses that nearby farms experience, and which can be linked to the conduct of the construction workers, are adequately reimbursed

h) Assign a person(s) to deal with the complaints and concerns of affected parties

i) Where feasible, assist the municipality in ensuring that the quality of the local social and economic infrastructure does not deteriorate through the use of social responsibility allocations.

j) Set up apprenticeship programmes for construction workers to build on existing skills or develop new skills, especially those coming from local communities

k) Employ labour-intensive methods in construction where feasible;

Impacts on tourism and game farming in the area are to be managed using the following measures:

l) Mitigation proposed by the visual specialists should be implemented during the beginning of the construction period to screen off visual disturbances as soon into the development phase as feasible;

m) Heavy vehicles travelling on secondary roads should adhere to low speed limits to minimise noise and dust pollution; and

n) If feasible, no construction activities should be carried out during weekends and outside day time working hours.

7.4.20 Ecological Considerations

a) The speed limit on roads within the proposed development should not exceed 40km/h to avoid road fatalities. Any road fatalities should be monitored and mitigation measures adapted to reduce these;

b) Workers must not be allowed to trap any animals on site and must be trained in the value of biodiversity;

c) Collect and propagate species other than the SSC for use in rehabilitation;

d) Removal and control of all alien species continually throughout the lifespan of the proposed development;

e) Ensure trucks entering the site do not bring alien invasive species in. This can be done by visually scanning each vehicle and ensuring no jointed cactus or prickly pear are attached;

f) Dust suppression options must be researched and the best method both functionally and cost-effectively should be chosen for the site to ensure reduction of dust generation as well as the reduction of the erosion potential of roads on the site;

g) The majority of the large earthworks involved in construction should take place in a season where faunal SSC are not active (such as the dry season) to avoid fatalities;

h) Fence mesh sizes should allow for the passage of small animals;

i) Electrical bottom-wire fences should be avoided as these can lead to the death of small animals, in particular tortoises;

j) Flags and other methods of ensuring fence visibility to animals such as Kudu should be employed where fences are erected to avoid animals being caught in fences;

k) Fences not required should be removed to allow for free movement of animals; and

l) Use of metaphorical fences where appropriate – some research may need to be done depending on which animal species need to be excluded from certain areas.

7.4.21 Invasive Plant Management

Refer to Alien Invasive Management Plan in Appendix G2 of the DEIR

7.4.22 Fauna on Site

a) Under no circumstance may any fauna, including snakes or other reptiles, be harmed or killed if found during clearing or construction. Every effort should be taken to herd fauna into the undeveloped areas or safely relocate any animal found to construction areas. This might include, for example, the presence of a specialist with expertise in handling reptiles on site during the removal of dead vegetation;

b) No wildlife may be removed from the site or surrounding areas unless approved by the ECO in conjunction with the appropriate permits from DEDEAT. Any snakes found on site shall be left unhindered or, if necessary, captured and relocated by a reptile expert; and

c) No hunting, killing, capturing or snaring of wildlife to occur on the site or the surroundings. The contractor shall assume responsibility in this regard for all his employees and sub-contractors.

7.4.23 Avifauna

a) The proposed construction works is to be phased so that access tracks are constructed early in the construction programme. Vehicular access is to be restricted to designated

routes throughout construction as far as possible, thereby minimising potential disturbance of birds;

b) If any key bird species are found during breeding then potentially disturbing construction activities are to be suspended until the breeding had been completed within an appropriate zone (dependent on the location of the birds and the species involved, to be agreed with BLSA). This would form part of a Breeding Bird Protection Plan;

c) Remove the vegetation within the footprint for the Development, i.e. turbine foundations, access tracks etc., outside of the bird breeding period;

d) Where a disturbance impact on nesting birds is possible, site ground-works (i.e. laying of site tracks, laying out of the temporary construction compound and excavation of the turbine foundations and footings for the substation and meteorological mast) will be scheduled to take place where possible outside the breeding period;

e) Where works affecting habitats that could be used by nesting birds must take place during the breeding season, they will only be carried out following an on-site check for nesting birds by an experienced ecologist. If this indicates that no nesting birds are likely to be harmed by the works, then the works will proceed;

f) If nesting birds are found to be present, work will not take place in that area until the adult birds and young have left the nest. A protection zone will be clearly marked around the nest site to prevent accidental disturbance or damage;

g) Clearly mark the extent of the working area to minimise the risk of machinery encroaching onto adjacent habitat. It is important to protect habitats adjacent to the working area, since they might be used by nesting birds;

h) All overhead power line to be on ‘bird friendly’ pole design as per Eskom Standard, and high risk sections (identified via further surveys of the chosen route) to be marked with ‘bird flappers’.

7.4.24 Bats

a) Keep to designated areas when storing building materials, resources, turbine components and/or construction vehicles and keep to designated roads with all construction vehicles;

b) Avoid activities in bat sensitive areas and associated buffers identified by the specialist;

c) Damaged areas not required after construction should be rehabilitated by an experienced vegetation succession specialist.

7.4.25 Soils, Stormwater & erosion

Refer to Stormwater Management Plan in Appendix G6 of the DEIR

a) Implement an effective system of run-off control, where it is required (for example on roads and hard standing areas), that collects and safely disseminates run-off water from all hardened surfaces;

b) Include periodical site inspection in environmental performance reporting that inspects the effectiveness of the run-off control system and specifically records occurrence of erosion on site or downstream;

c) If an activity will mechanically disturb below the surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. Topsoil stockpiles must be conserved against losses through erosion by establishing vegetation cover on them;

d) Dispose of all subsurface spoils from excavations where they will not impact on undisturbed land;

e) During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface;

f) Erosion must be controlled where necessary on topsoiled areas;

g) Establish an effective record keeping system for each area where soil is disturbed below surface for constructional purposes. These records should be included in environmental performance reports, and should include all the records below:

- Record the GPS coordinates of each area.
- Record the date of topsoil stripping.
- Record the GPS coordinates of where the topsoil is stockpiled.
- Record the date of cessation of constructional (or operational) activities at the particular site.
- Photograph the area on cessation of constructional activities.
- Record date and depth of re-spreading of topsoil.
- Photograph the area on completion of rehabilitation and on an annual basis thereafter to show vegetation establishment and evaluate progress of restoration over time.

7.4.26 Existing Infrastructure and services

a) Existing services infrastructure should not be damaged in any way;

b) Care should be taken when construction activities approach any services; and

c) If for any reason services do need to be interrupted, the relevant landowners/ affected parties should be notified in advance.

7.4.27 Traffic

Refer to Transportation Plan and Traffic Management Plan in Appendix G1 of the DEIR

7.4.28 Rehabilitation

a) Refer to the Re-vegetation and Habitat Rehabilitation Plan in Appendix G5 of the DEIR

b) Refer to the Open Space Management Plan in Appendix G3 of the DEIR

c) Refer to the Erosion Management plan in Appendix G6 of the DEIR

d) Refer to the Alien Invasive Management Plan in Appendix G2 of the DEIR

7.5 Operational Phase

7.5.1 Aquatic Ecosystems

a) Monitor culverts and stormwater management features to see if erosion issues arise and if any additional erosion control is required; and

b) During the operational phase, monitor culverts and stormwater management features to see if erosion issues arise and if any additional erosion control is required.

7.5.2 Invasive Plant Management

Refer to Alien Invasive Management Plan in Appendix G2 of the DEIR

7.5.3 Stormwater Management

Refer to the Storm Water Management Plan in Appendix G6 of the DEIR

7.5.4 Socio-Economic

a) As far as possible, the operator of the wind energy facility should be encourage to procure material, goods and products required for the operation of the facility from local suppliers to increase the positive impact in the local economy;

b) Where possible, local labour should be considered for employment to increase the positive impact on the local economy;

c) Local SME's should be approached to investigate the opportunities for supplying the inputs required for the maintenance and operation of the facility where possible;

d) A three-year social development and economic development programme should be devised by the developer throughout the project's lifespan, in consultation with local authorities as well as the community in order to identify community projects that would result in the greatest social impact. The plan should be reviewed on an annual basis and where necessary updated;

e) When devising enterprise development initiatives, the focus should be on creating sustainable and self-sufficient enterprises;

f) In devising the programmes to be implemented through the Enterprise Development Funds and Community Trust allocations, the developer should take into account the IDP for the Sundays River Valley Local Municipality;

g) The developer should establish vocational training programmes for the local labour force to promote the development of skills required by the wind energy industry and thereby provide opportunities for the local community to be employed in other similar facilities elsewhere around the province and the country;

h) In the case when employees of the nearby farms are retrenched and that there is a strong causal link between these retrenchments and the project's activities, the developer should assist the retrenched workers to find alternative employment by either recruiting them to work at the facility, through the enterprise development programme or through social development funding allocations prescribed by government; and

i) In order to avoid exerting the negative impact on the families dependent on the local tourism and game farming industry, the developer should seek to partner with these industries in order to support these families and ensure that the aid given to them is retained at the same level.

j) A plan should be developed in consultation with local authorities and local communities to identify community projects that would result in the greatest social benefits;

7.5.5 Fire Management

Refer to the Section 7.7 of the EMPr.

7.5.6 Socio-Economic Considerations

The impact on tourism and game farming to be mitigated by the following;

a) The mitigation measures proposed by the visual and noise specialists should be adhered to;

b) Natural areas that are not affected by the footprint should remain as such. Efforts should also be made to avoid disturbing such sites during construction;

e) In the case when employees of nearby farms are retrenched and a strong causal link can be established between the retrenchments and the project activities, the developer should assist the retrenched workers to find alternative employment by either recruiting them to work at the facility or assisting them through the enterprise development programme and/or social development funding allocations prescribed by government; and

f) In order to avoid exerting a negative impact on the families dependent on local game farms and any other household that could be effected by the project, the developer should seek to partner with the various game farms to support affect families and ensure that the aid given to them is retained.

7.5.7 Visual

a) Maintenance of the turbines is important. Stationary rotors should be avoided as they create a negative impression – a stationary rotor is seen as not fulfilling its purpose; and

b) Using light fixtures that shield the light and focus illumination on the ground (or only where light is required);

c) Using minimum lamp wattage within safety/security requirements;

d) Avoiding elevated lights within safety/security requirements;

e) Where possible, using timer switches or motion detectors to control lighting in areas that are not occupied continuously (if permissible and in line with minimum security requirements); and

f) Switching off lights when not in use in line with safety and security

7.5.8 Noise

a) Re-modelling of the noise impacts will need to conducted on the final layout;

b) The noise impact from the wind turbine generators should be measured during the operational phase, to ensure that the impact is within the required legal limits;

c) Turbines should be maintained to ensure optimal functioning with regard to noise emissions

7.5.9 Ecological Considerations

a) Refer to the Open Space Management Plan in Appendix G3 of the DEIR

b) Flags and other methods of ensuring fence visibility to animals such as Kudu should be employed where fences are erected to avoid animals being caught in fences;

c) Fences not required should be removed to allow for free movement of animals;

d) The speed limit on roads within the proposed development should not exceed 40km/h to avoid road fatalities;

e) Removal and control of all alien species continually throughout the lifespan of the proposed development – refer to Alien Invasive Management Plan in Appendix G2 of the DEIR; and

f) An offset plan should be developed should the proponent wish to demonstrate a net gain of biodiversity for the proposed project.

7.5.10 Avifauna

a) Implement turbine shutdown on demand if the number of collisions approach the worst case predictions. This can be done by direct human observers at key risk periods and/or automated detection systems based on radar or video monitoring;

b) Avoid increasing attractive habitat for Rock Hyrax by removing all mounds of aggregate or rock created during construction, prior to operation;

c) Avoid creating habitat for potential raptor prey species in the turbine bases;

d) Management of the remaining parts of the site for conservation, in terms of a stewardship agreement and management plan integrating the ecological requirements of the raptors on the site.

e) The proposed turbine bases should not serve as a refuge for small mammals;

f) Review the need for a programme of carrion removal from the wind site in light of the post-construction monitoring programme results;

g) A management programme is to be implemented within the Verreaux's Eagle nest buffers to enhance the food resources away from the wind farm; and

h) A specific management plan is to be drawn up and implemented to integrate the ecological requirements of the local raptors into the management of this area.

7.5.11 Bats

a) Avoid activities in bat sensitive areas and associated buffers identified by the specialist;

b) Utilise lights with wavelengths that attract less insects (low thermal/infrared signature);

c) Any lights at turbine bases must be equipped with passive motion sensors as to only switch on when a person is nearby. If not required for safety or security purposes, lights should be switched off when not in use;

d) Utilize mitigation options such as curtailment, blade feathering, blade lock, acoustic deterrents or light lures;

i) Implement mitigation measures during the high activity/ key risk periods given in Section 6 of the Bat Impact Assessment Report;

e) Implement a two year operational monitoring programme

7.6 Decommissioning

Current wind turbines are designed to last for over 25 years. Should the re-powering of the wind farm be financially, environmental and socially viable, the life span can be extended by another 20-25 years. Should the wind farm be decommissioned, Inyanda Energy undertakes to dismantle all wind turbines and foundations in line with all relevant legislation. The impacts of decommissioning will be very similar to those of construction and the same mitigation measures will therefore apply.

7.6.1 General mitigation measures:

a) The site must be appropriately re-vegetated with indigenous plant species to prevent erosion, and kept free of alien invasive species;

b) No construction equipment, vehicles or unauthorised personnel shall be allowed onto rehabilitated areas;

c) Only persons or equipment for the preparation of areas and spreading of top material shall be allowed to operate on rehabilitated areas;

d) Dust suppression techniques, such as wetting or covering potential dust sources should be implemented to minimise the impact of dust.

7.7 Fire Management Plan

The ecological specialist (Leigh-ann De Wet) has provided the following brief comment and recommendations regarding management of fires on the site.

Fire is a part of the ecology of the study site, with the site burning on average once a year in sections through uncontrolled means (they were not set as part of a management plan). Regular fires may

change vegetation composition. Evidence of fires at the site was found, with areas recently burnt allowing for little elucidation of vegetation communities. These areas tend to be dominated by grass species, which form a short sparse grassy fynbos community.

It is clear that fires play a role in the development of the vegetation communities on site, and may be a driving factor in the different fynbos community types – producing grassy fynbos where there are regular fires, and proteaceous fynbos where there are not such regular fires. However, this theory should be tested. It is recommended that a fire monitoring protocol be put into place to try to understand the effect of fire in the vegetation and habitats of the site. Fire will certainly affect slow-moving animals that may not be able to move out of the way in time such as tortoises and chameleons. These taxa and the vegetation should be monitored to determine the impacts of fire on the site. Care should be taken that the development does not result in the starting of any fires.

The ECPTA has recommended that the area is allowed to burn naturally, however it is also recognised that the increased anthropogenic activity on the site may increase the risk of fires of non-natural origin, and that measures should be in place to manage this, as well as to protect project infrastructure from fires. The following management measures shall be implemented, both during construction and operation:

- The regulatory requirements with regard to fire-fighting equipment, storage and handling of flammable materials, training, reporting and fire management procedures will be adhered to, including membership of the local fire protection association if required;
- The ECPTA's fire management requirements for the area, as well as any requirements stipulated in the Stewardship agreement for the site, shall also be taken into account. This may include stipulations relating to fire breaks (width, locations, and frequency and procedure for burning); and
- Anthropogenic causes of fires shall be minimised through implementation of control measures relating to smoking, littering, storage and handling of flammable materials, and burning on site; and
- Records shall be kept of any fires on or close to the site.

7.8 Health & Safety

It is noted here that this EMPr is not a Health and Safety Plan. It is the contractor's responsibility to ensure that a Health and Safety Plan, as per the requirements of the Occupational Health and Safety Act, is prepared prior to any physical work occurring on site. The contractor shall at all times observe proper and adequate safety precautions on site and shall be deemed responsible for security of the site. The proper health and safety regulations will be applied to all sub-contractors and staff.

8 The Way Forward

The public participation process so far has given IAPs the opportunity to assist with identification of issues and potential impacts.

The Executive Summary of this Draft EIR has been distributed to registered IAPs. Printed copies of this report will be available for public review at:

- Uitenhage Public Subscription Library (Caledon Street, Uitenhage); and
- Kirkwood Public Library (Jefferson Ave, Kirkwood).

The report can also be accessed as an electronic copy on SRK Consulting's webpage via the 'Public Documents' link http://www.srk.co.za/en/page/za-public-documents

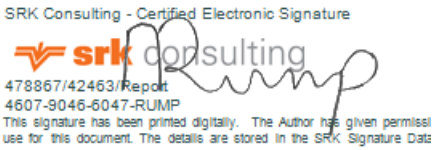
Written comment on this Draft EIR should be sent by **17h00 on 20 May 2016** to:

Wanda Marais
SRK Consulting
PO Box 21842, Port Elizabeth, 6000
Email: wmarais@srk.co.za
Fax: (041) 509 4850

The Draft Environmental Impact Report (this report) has been submitted to DEA and the other relevant authorities, for comment before compilation of the Final Environmental Impact Report.

Once IAPs have commented on the information presented in the DEIR, the Final Environmental Impact Report (FEIR) will be produced and submitted to DEA to use in order to take a decision about the proposed development. The public is therefore urged to submit comments, as the comments will affect the FEIR and the decision taken by DEA.

Prepared by:



Nicola Rump MSc, CEAPSA

Principal Environmental Scientist

Tanya Speyers BSc (Hons)

Environmental Scientist

Reviewed by:

Rob Gardiner MSc, Pr Sci Nat

Partner, Principal Environmental Scientist

All data used as source material plus the text, tables, figures, and attachments of this document have been reviewed and prepared in accordance with generally accepted professional engineering and environmental practices.

9 References

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Appendices

Appendix A: Amended EIA Application Form

Appendix B: DEA Acceptance of FSR

Appendix C: Title Deeds

Appendix D: Register of IAPs

Appendix E: Public Participation material

Appendix E1: Copies of IAP correspondence on the FSR

Appendix E2: Minutes of focus group meeting on the FSR

Appendix E3: Proof of distribution of the FSR to authorities

Appendix F: Site Maps & Design Drawings

Appendix G: Management Plans

Appendix G1: Transport Routes & Traffic Management Plan

Appendix G2: Alien Vegetation Management Plan

Appendix G3: Open Space Management Plan

Appendix G4: Plant Rescue & Protection Management Plan

Appendix G5: Revegetation & Habitat Rehabilitation Management Plan

Appendix G6: Stormwater Management & Erosion Control Management Plan

Appendix H: Coordinates

Table 9-1: Study Area Coordinates

Label	X_DMS	Y_DMS	Label	X_DMS	Y_DMS
S1	25° 2' 32.777" E	33° 29' 42.257" S	**S2**	25° 3' 32.214" E	33° 30' 15.886" S
S3	25° 3' 42.685" E	33° 30' 34.853" S	**S4**	25° 3' 45.983" E	33° 30' 33.546" S
S5	25° 3' 40.324" E	33° 31' 6.252" S	**S6**	25° 3' 56.104" E	33° 31' 7.565" S
S7	25° 3' 59.427" E	33° 31' 19.835" S	**S8**	25° 4' 19.989" E	33° 31' 40.291" S
S9	25° 6' 30.397" E	33° 31' 42.101" S	**S10**	25° 6' 47.486" E	33° 32' 23.401" S
S11	25° 4' 59.296" E	33° 32' 24.417" S	**S12**	25° 4' 34.028" E	33° 34' 29.828" S
S13	25° 4' 27.911" E	33° 34' 48.558" S	**S14**	25° 4' 57.885" E	33° 35' 7.381" S
S15	25° 5' 16.365" E	33° 34' 43.424" S	**S16**	25° 5' 57.403" E	33° 34' 56.599" S
S17	25° 6' 10.363" E	33° 36' 21.803" S	**S18**	25° 5' 36.971" E	33° 36' 24.007" S
S19	25° 5' 49.413" E	33° 37' 21.594" S	**S20**	25° 6' 25.299" E	33° 37' 42.409" S
S21	25° 6' 51.470" E	33° 38' 39.979" S	**S22**	25° 7' 29.138" E	33° 38' 43.852" S
S23	25° 6' 20.147" E	33° 41' 20.207" S	**S24**	25° 5' 2.708" E	33° 40' 17.902" S
S25	25° 5' 28.085" E	33° 38' 28.031" S	**S26**	25° 4' 17.933" E	33° 37' 44.009" S
S27	25° 4' 11.611" E	33° 38' 40.838" S	**S28**	25° 3' 21.822" E	33° 38' 26.632" S
S29	25° 2' 41.595" E	33° 40' 23.216" S	**S30**	25° 2' 31.698" E	33° 40' 19.020" S
S31	25° 1' 31.319" E	33° 41' 13.179" S	**S32**	25° 0' 40.114" E	33° 40' 40.142" S
S33	25° 0' 48.013" E	33° 40' 17.283" S	**S34**	25° 0' 27.030" E	33° 40' 6.200" S
S35	25° 0' 32.750" E	33° 40' 2.489" S	**S36**	25° 0' 42.925" E	33° 40' 1.367" S
S37	25° 1' 30.885" E	33° 38' 45.333" S	**S38**	25° 2' 15.612" E	33° 38' 12.769" S
S39	25° 2' 5.243" E	33° 38' 15.929" S	**S40**	25° 1' 44.702" E	33° 37' 52.664" S
S41	25° 0' 34.438" E	33° 37' 37.632" S	**S42**	25° 0' 18.989" E	33° 35' 16.983" S
S43	25° 1' 28.219" E	33° 33' 39.809" S	**S44**	25° 1' 5.192" E	33° 33' 35.777" S
S45	25° 1' 18.466" E	33° 32' 15.790" S	**S46**	25° 1' 47.263" E	33° 32' 17.729" S
S47	25° 2' 5.665" E	33° 30' 58.350" S	**S48**	25° 2' 1.600" E	33° 30' 57.637" S
S49	25° 2' 13.854" E	33° 30' 33.132" S	**S50**	25° 2' 22.468" E	33° 30' 27.585" S
S51	25° 2' 21.679" E	33° 30' 25.822" S			

Table 9-2: Preferred Powerline Route Coordinates

Label	X_DMS	Y_DMS	Label	X_DMS	Y_DMS
P1	25° 19' 36.501" E	33° 28' 51.518" S	**P2**	25° 19' 34.958" E	33° 28' 52.289" S
P3	25° 19' 35.730" E	33° 28' 53.161" S	**P4**	25° 19' 5.247" E	33° 29' 7.746" S
P5	25° 19' 16.028" E	33° 29' 17.231" S	**P6**	25° 17' 22.483" E	33° 31' 21.653" S
P7	25° 16' 55.790" E	33° 31' 19.975" S	**P8**	25° 15' 55.589" E	33° 33' 26.275" S
P9	25° 10' 34.853" E	33° 32' 29.344" S	**P10**	25° 8' 10.955" E	33° 32' 34.056" S
P11	25° 7' 21.443" E	33° 32' 41.399" S	**P12**	25° 6' 54.284" E	33° 32' 22.845" S
P13	25° 4' 59.296" E	33° 32' 24.417" S	**P14**	25° 4' 7.103" E	33° 35' 50.953" S
P15	25° 4' 1.118" E	33° 35' 48.284" S			

Table 9-3: Alternative Route 1 Powerline Coordinates

Label	X_DMS	Y_DMS	Label	X_DMS	Y_DMS
RA1	25° 19' 38.713" E	33° 28' 48.490" S	**RA2**	25° 20' 42.552" E	33° 29' 36.557" S
RA3	25° 21' 14.296" E	33° 30' 11.232" S	**RA4**	25° 21' 42.318" E	33° 30' 54.620" S
RA5	25° 21' 47.404" E	33° 31' 12.973" S	**RA6**	25° 21' 37.474" E	33° 32' 0.445" S
RA7	25° 21' 27.033" E	33° 32' 18.418" S	**RA8**	25° 21' 27.597" E	33° 32' 42.403" S
RA9	25° 21' 15.464" E	33° 32' 58.291" S	**RA10**	25° 20' 42.810" E	33° 33' 21.719" S
RA11	25° 20' 9.859" E	33° 34' 23.219" S	**RA12**	25° 17' 51.722" E	33° 33' 52.910" S
RA13	25° 17' 22.172" E	33° 33' 40.198" S	**RA14**	25° 15' 55.589" E	33° 33' 26.275" S
RA15	25° 12' 24.885" E	33° 32' 51.183" S	**RA16**	25° 12' 8.430" E	33° 32' 44.687" S
RA17	25° 12' 0.153" E	33° 32' 45.776" S	**RA18**	25° 11' 46.083" E	33° 32' 40.139" S
RA19	25° 11' 36.638" E	33° 32' 40.639" S	**RA20**	25° 11' 25.213" E	33° 32' 37.749" S
RA21	25° 11' 1.960" E	33° 32' 36.442" S	**RA22**	25° 10' 32.067" E	33° 32' 31.148" S
RA23	25° 8' 5.288" E	33° 32' 34.939" S	**RA24**	25° 7' 32.131" E	33° 32' 39.997" S
RA25	25° 7' 9.612" E	33° 32' 33.353" S	**RA26**	25° 6' 56.022" E	33° 32' 40.131" S
RA27	25° 6' 44.398" E	33° 32' 54.787" S	**RA28**	25° 6' 39.724" E	33° 32' 54.489" S
RA29	25° 6' 34.664" E	33° 32' 58.123" S	**RA30**	25° 6' 34.836" E	33° 33' 10.367" S
RA31	25° 6' 22.261" E	33° 33' 19.986" S	**RA32**	25° 6' 21.686" E	33° 33' 39.534" S
RA33	25° 6' 17.161" E	33° 33' 51.399" S	**RA34**	25° 5' 56.667" E	33° 33' 54.015" S
RA35	25° 5' 46.563" E	33° 33' 52.810" S	**RA36**	25° 5' 38.727" E	33° 33' 55.392" S
RA37	25° 5' 35.004" E	33° 33' 59.454" S	**RA38**	25° 5' 27.845" E	33° 34' 1.468" S
RA39	25° 5' 20.554" E	33° 34' 1.272" S	**RA40**	25° 5' 12.842" E	33° 34' 3.885" S
RA41	25° 5' 6.547" E	33° 34' 7.539" S	**RA42**	25° 4' 58.539" E	33° 34' 7.868" S
RA43	25° 3' 42.619" E	33° 35' 29.537" S			

Table 9-4: Alternative Route 2 Powerline Coordinates

Label	X_DMS	Y_DMS	Label	X_DMS	Y_DMS
RB1	25° 19' 36.501" E	33° 28' 51.518" S	**RB2**	25° 14' 31.256" E	33° 25' 22.652" S
RB3	25° 11' 21.367" E	33° 25' 2.065" S	**RB4**	25° 9' 16.622" E	33° 24' 29.207" S
RB5	25° 7' 9.981" E	33° 25' 14.062" S	**RB6**	25° 6' 53.667" E	33° 25' 36.877" S
RB7	25° 5' 40.893" E	33° 26' 46.101" S	**RB8**	25° 4' 31.789" E	33° 29' 45.881" S
RB9	25° 4' 40.889" E	33° 30' 1.896" S	**RB10**	25° 4' 40.731" E	33° 30' 12.257" S
RB11	25° 4' 31.021" E	33° 30' 21.273" S	**RB12**	25° 4' 32.979" E	33° 30' 25.042" S
RB13	25° 4' 36.818" E	33° 30' 30.799" S	**RB14**	25° 4' 37.559" E	33° 30' 37.749" S
RB15	25° 4' 39.608" E	33° 30' 42.564" S	**RB16**	25° 4' 41.339" E	33° 31' 10.285" S
RB17	25° 4' 40.176" E	33° 31' 21.491" S	**RB18**	25° 4' 40.618" E	33° 31' 38.277" S
RB19	25° 4' 2.197" E	33° 31' 40.183" S	**RB20**	25° 3' 55.371" E	33° 31' 47.710" S
RB21	25° 3' 21.184" E	33° 32' 9.466" S	**RB22**	25° 3' 19.767" E	33° 32' 16.648" S
RB23	25° 3' 22.791" E	33° 32' 19.082" S	**RB24**	25° 3' 26.492" E	33° 32' 28.329" S
RB25	25° 3' 42.499" E	33° 32' 40.153" S	**RB26**	25° 3' 42.499" E	33° 32' 40.153" S

RB27	25° 3' 53.084" E	33° 32' 52.112" S	**RB28**	25° 3' 59.449" E	33° 33' 2.267" S
RB29	25° 4' 46.906" E	33° 33' 48.110" S	**RB30**	25° 4' 58.539" E	33° 34' 7.868" S
RB31	25° 3' 42.619" E	33° 35' 29.537" S			

Table 9-5: Gravel Road Coordinates

Label	X_DMS	Y_DMS	Label	X_DMS	Y_DMS
GR1	25° 4' 3.892" E	33° 31' 39.351" S	**GR2**	25° 3' 49.831" E	33° 31' 50.175" S
GR3	25° 3' 43.132" E	33° 31' 53.534" S	**GR4**	25° 3' 34.796" E	33° 31' 59.546" S
GR5	25° 3' 23.246" E	33° 32' 6.567" S	**GR6**	25° 3' 18.920" E	33° 32' 14.707" S
GR7	25° 3' 22.057" E	33° 32' 18.141" S	**GR8**	25° 3' 23.263" E	33° 32' 21.640" S
GR9	25° 3' 26.107" E	33° 32' 27.624" S	**GR10**	25° 3' 41.580" E	33° 32' 39.678" S
GR11	25° 3' 48.145" E	33° 32' 49.941" S	**GR12**	25° 3' 54.700" E	33° 32' 52.866" S
GR13	25° 3' 59.745" E	33° 33' 1.759" S	**GR14**	25° 3' 57.714" E	33° 33' 3.721" S
GR15	25° 3' 56.352" E	33° 33' 6.282" S	**GR16**	25° 3' 53.317" E	33° 33' 8.633" S
GR17	25° 3' 50.721" E	33° 33' 13.339" S	**GR18**	25° 3' 53.668" E	33° 33' 15.979" S
GR19	25° 3' 57.201" E	33° 33' 17.590" S	**GR20**	25° 3' 58.786" E	33° 33' 20.613" S
GR21	25° 3' 57.070" E	33° 33' 22.473" S	**GR22**	25° 3' 52.416" E	33° 33' 22.925" S
GR23	25° 3' 50.131" E	33° 33' 25.476" S	**GR24**	25° 3' 50.805" E	33° 33' 31.585" S
GR25	25° 3' 48.791" E	33° 33' 36.096" S	**GR26**	25° 3' 45.758" E	33° 33' 38.891" S
GR27	25° 3' 43.168" E	33° 33' 43.043" S	**GR28**	25° 3' 46.345" E	33° 33' 43.478" S
GR29	25° 3' 49.653" E	33° 33' 44.630" S	**GR30**	25° 3' 51.519" E	33° 33' 46.353" S
GR31	25° 4' 3.104" E	33° 33' 48.820" S	**GR32**	25° 4' 17.077" E	33° 33' 46.559" S
GR33	25° 4' 29.031" E	33° 33' 48.440" S	**GR34**	25° 4' 40.199" E	33° 33' 48.641" S
GR35	25° 4' 42.196" E	33° 33' 47.809" S	**GR36**	25° 4' 47.680" E	33° 33' 48.052" S
GR37	25° 4' 46.954" E	33° 33' 55.463" S	**GR38**	25° 4' 49.900" E	33° 33' 54.519" S
GR39	25° 4' 49.422" E	33° 33' 57.262" S	**GR40**	25° 4' 53.897" E	33° 33' 57.523" S
GR41	25° 4' 52.707" E	33° 34' 2.877" S	**GR42**	25° 4' 58.633" E	33° 34' 7.549" S
GR43	25° 4' 44.197" E	33° 34' 8.229" S	**GR44**	25° 4' 42.057" E	33° 34' 11.968" S
GR45	25° 4' 45.437" E	33° 34' 12.565" S	**GR46**	25° 4' 46.895" E	33° 34' 14.750" S
GR47	25° 4' 31.776" E	33° 34' 17.645" S	**GR48**	25° 4' 34.826" E	33° 34' 19.440" S
GR49	25° 4' 29.783" E	33° 34' 21.151" S	**GR50**	25° 4' 28.559" E	33° 34' 23.003" S
GR51	25° 4' 24.396" E	33° 34' 23.692" S	**GR52**	25° 4' 6.393" E	33° 34' 23.371" S
GR53	25° 3' 59.796" E	33° 34' 26.892" S	**GR54**	25° 3' 53.620" E	33° 34' 42.222" S
GR55	25° 3' 57.035" E	33° 34' 40.469" S	**GR56**	25° 3' 57.112" E	33° 34' 44.926" S
GR57	25° 3' 50.280" E	33° 34' 49.188" S	**GR58**	25° 3' 45.040" E	33° 34' 50.018" S
GR59	25° 3' 42.930" E	33° 34' 49.393" S	**GR60**	25° 3' 42.930" E	33° 34' 49.393" S
GR61	25° 3' 39.385" E	33° 34' 54.079" S	**GR62**	25° 3' 41.834" E	33° 34' 53.294" S
GR63	25° 3' 40.882" E	33° 34' 54.741" S	**GR64**	25° 3' 44.816" E	33° 34' 54.421" S
GR65	25° 3' 48.144" E	33° 34' 57.247" S	**GR66**	25° 3' 48.392" E	33° 35' 0.042" S
GR67	25° 3' 46.381" E	33° 35' 6.301" S	**GR68**	25° 3' 45.151" E	33° 35' 21.982" S
GR69	25° 3' 42.097" E	33° 35' 22.998" S	**GR70**	25° 3' 40.850" E	33° 35' 30.252" S

GR71	25° 3' 40.383" E	33° 35' 31.460" S	**GR72**	25° 3' 41.365" E	33° 35' 34.437" S
GR73	25° 3' 41.349" E	33° 35' 36.833" S	**GR74**	25° 3' 27.328" E	33° 35' 46.031" S
GR75	25° 3' 30.587" E	33° 35' 46.484" S	**GR76**	25° 3' 32.658" E	33° 35' 45.543" S
GR77	25° 3' 33.015" E	33° 35' 46.793" S	**GR78**	25° 3' 37.811" E	33° 35' 46.246" S
GR79	25° 3' 40.708" E	33° 35' 46.311" S	**GR80**	25° 3' 40.906" E	33° 35' 44.715" S
GR81	25° 3' 39.287" E	33° 35' 44.030" S	**GR82**	25° 3' 18.105" E	33° 35' 44.322" S
GR83	25° 3' 9.541" E	33° 35' 48.858" S	**GR84**	25° 3' 8.710" E	33° 35' 52.259" S
GR85	25° 3' 9.746" E	33° 35' 56.992" S	**GR86**	25° 3' 7.527" E	33° 35' 59.973" S
GR87	25° 2' 59.252" E	33° 36' 4.244" S	**GR88**	25° 3' 5.538" E	33° 36' 3.708" S
GR89	25° 3' 10.326" E	33° 36' 4.342" S	**GR90**	25° 3' 11.608" E	33° 36' 9.732" S
GR91	25° 3' 10.988" E	33° 36' 15.196" S	**GR92**	25° 3' 13.487" E	33° 36' 27.127" S

Table 9-6: Internal Roads Coordinates

Label	X_DMS	Y_DMS	Label	X_DMS	Y_DMS
IR1	25° 3' 44.363" E	33° 34' 51.998" S	**IR2**	25° 3' 43.248" E	33° 34' 51.339" S
IR3	25° 3' 41.483" E	33° 34' 50.142" S	**IR4**	25° 3' 40.882" E	33° 34' 54.741" S
IR5	25° 3' 34.942" E	33° 35' 0.938" S	**IR6**	25° 3' 31.846" E	33° 35' 1.174" S
IR7	25° 3' 28.428" E	33° 34' 59.784" S	**IR8**	25° 3' 25.701" E	33° 35' 0.608" S
IR9	25° 3' 27.633" E	33° 35' 3.388" S	**IR10**	25° 3' 26.180" E	33° 35' 4.950" S
IR11	25° 3' 31.188" E	33° 35' 3.266" S	**IR12**	25° 3' 48.740" E	33° 34' 57.759" S
IR13	25° 3' 50.779" E	33° 34' 56.828" S	**IR14**	25° 3' 53.731" E	33° 34' 57.107" S
IR15	25° 3' 56.453" E	33° 34' 56.676" S	**IR16**	25° 3' 55.838" E	33° 34' 55.506" S
IR17	25° 3' 57.568" E	33° 34' 57.475" S	**IR18**	25° 3' 46.173" E	33° 35' 15.469" S
IR19	25° 3' 49.480" E	33° 35' 15.530" S	**IR20**	25° 3' 40.562" E	33° 35' 27.608" S
IR21	25° 3' 41.682" E	33° 35' 30.589" S	**IR22**	25° 3' 41.309" E	33° 35' 34.202" S
IR23	25° 2' 10.914" E	33° 35' 39.919" S	**IR24**	25° 2' 9.292" E	33° 35' 36.658" S
IR25	25° 2' 4.873" E	33° 35' 35.441" S	**IR26**	25° 2' 8.328" E	33° 35' 34.979" S
IR27	25° 2' 10.314" E	33° 35' 30.644" S	**IR28**	25° 2' 19.436" E	33° 35' 28.349" S
IR29	25° 2' 14.720" E	33° 35' 26.812" S	**IR30**	25° 2' 11.806" E	33° 35' 26.877" S
IR31	25° 2' 17.786" E	33° 35' 25.606" S	**IR32**	25° 2' 22.595" E	33° 35' 29.037" S
IR33	25° 2' 26.859" E	33° 35' 28.809" S	**IR34**	25° 2' 28.887" E	33° 35' 23.213" S
IR35	25° 2' 32.113" E	33° 35' 18.473" S	**IR36**	25° 2' 34.285" E	33° 35' 16.348" S
IR37	25° 2' 38.253" E	33° 35' 14.260" S	**IR38**	25° 2' 42.778" E	33° 35' 12.054" S
IR39	25° 2' 46.102" E	33° 35' 13.179" S	**IR40**	25° 2' 39.874" E	33° 35' 15.401" S
IR41	25° 2' 29.928" E	33° 35' 32.246" S	**IR42**	25° 2' 30.276" E	33° 35' 30.311" S
IR43	25° 2' 38.743" E	33° 35' 33.269" S	**IR44**	25° 2' 40.848" E	33° 35' 35.454" S
IR45	25° 2' 43.418" E	33° 35' 36.240" S	**IR46**	25° 2' 45.285" E	33° 35' 36.489" S
IR47	25° 2' 47.142" E	33° 35' 37.209" S	**IR48**	25° 2' 48.868" E	33° 35' 38.676" S
IR49	25° 3' 0.585" E	33° 35' 41.840" S	**IR50**	25° 3' 2.528" E	33° 35' 41.820" S
IR51	25° 3' 6.343" E	33° 35' 42.621" S	**IR52**	25° 3' 9.750" E	33° 35' 42.625" S
IR53	25° 3' 11.865" E	33° 35' 45.181" S	**IR54**	25° 3' 12.207" E	33° 35' 42.428" S

IR55	25° 3' 14.691" E	33° 35' 43.961" S	**IR56**	25° 3' 17.148" E	33° 35' 44.606" S
IR57	25° 3' 8.430" E	33° 35' 52.281" S	**IR58**	25° 3' 5.311" E	33° 35' 57.327" S
IR59	25° 3' 7.308" E	33° 35' 58.531" S	**IR60**	25° 3' 3.823" E	33° 36' 0.098" S
IR61	25° 2' 59.906" E	33° 36' 3.635" S	**IR62**	25° 2' 59.822" E	33° 36' 1.482" S
IR63	25° 2' 53.308" E	33° 36' 3.838" S	**IR64**	25° 2' 50.512" E	33° 36' 4.616" S
IR65	25° 2' 46.686" E	33° 36' 5.183" S	**IR66**	25° 2' 59.587" E	33° 36' 4.688" S
IR67	25° 3' 11.879" E	33° 36' 11.081" S	**IR68**	25° 3' 12.309" E	33° 36' 8.789" S
IR69	25° 3' 13.197" E	33° 36' 18.124" S	**IR70**	25° 3' 10.057" E	33° 36' 19.027" S
IR71	25° 3' 40.384" E	33° 35' 38.480" S	**IR72**	25° 3' 44.900" E	33° 35' 43.596" S
IR73	25° 3' 52.147" E	33° 35' 47.368" S	**IR74**	25° 3' 50.603" E	33° 35' 50.186" S
IR75	25° 3' 46.605" E	33° 35' 50.489" S	**IR76**	25° 3' 42.826" E	33° 35' 58.886" S
IR77	25° 3' 42.277" E	33° 36' 4.040" S	**IR78**	25° 3' 45.167" E	33° 36' 4.296" S
IR79	25° 3' 41.414" E	33° 36' 13.724" S	**IR80**	25° 3' 57.955" E	33° 35' 49.726" S
IR81	25° 4' 2.051" E	33° 35' 50.217" S	**IR82**	25° 4' 9.912" E	33° 35' 51.336" S
IR83	25° 4' 12.004" E	33° 35' 55.136" S	**IR84**	25° 4' 17.244" E	33° 35' 49.856" S
IR85	25° 4' 19.175" E	33° 35' 42.090" S	**IR86**	25° 4' 19.881" E	33° 35' 38.004" S
IR87	25° 4' 22.599" E	33° 35' 33.657" S	**IR88**	25° 4' 21.084" E	33° 35' 29.861" S
IR89	25° 4' 22.273" E	33° 35' 26.894" S	**IR90**	25° 4' 26.466" E	33° 35' 20.909" S
IR91	25° 4' 28.920" E	33° 35' 18.509" S	**IR92**	25° 4' 31.945" E	33° 35' 16.256" S
IR93	25° 4' 36.898" E	33° 35' 11.409" S	**IR94**	25° 4' 42.657" E	33° 35' 6.225" S
IR95	25° 4' 31.890" E	33° 35' 4.059" S	**IR96**	25° 4' 49.200" E	33° 35' 7.319" S
IR97	25° 4' 44.905" E	33° 35' 4.024" S	**IR98**	25° 4' 47.537" E	33° 35' 0.883" S
IR99	25° 4' 12.618" E	33° 35' 57.544" S	**IR100**	25° 4' 27.003" E	33° 36' 5.492" S
IR101	25° 4' 27.583" E	33° 36' 8.738" S	**IR102**	25° 4' 24.097" E	33° 36' 14.718" S
IR103	25° 4' 24.083" E	33° 36' 17.345" S	**IR104**	25° 4' 24.470" E	33° 36' 21.239" S
IR105	25° 4' 20.980" E	33° 36' 24.565" S	**IR106**	25° 4' 22.673" E	33° 36' 33.206" S
IR107	25° 4' 25.744" E	33° 36' 33.465" S	**IR108**	25° 4' 21.450" E	33° 36' 50.581" S
IR109	25° 4' 21.685" E	33° 36' 53.029" S	**IR110**	25° 4' 15.505" E	33° 37' 23.096" S
IR111	25° 4' 12.073" E	33° 37' 23.058" S	**IR112**	25° 4' 14.666" E	33° 37' 28.368" S
IR113	25° 4' 38.005" E	33° 36' 11.131" S	**IR114**	25° 4' 45.092" E	33° 36' 13.218" S
IR115	25° 4' 50.779" E	33° 36' 12.079" S	**IR116**	25° 4' 55.198" E	33° 36' 14.705" S
IR117	25° 4' 58.425" E	33° 36' 18.426" S	**IR118**	25° 5' 5.268" E	33° 36' 18.073" S
IR119	25° 5' 11.261" E	33° 36' 20.695" S	**IR120**	25° 5' 15.569" E	33° 36' 19.926" S
IR121	25° 5' 21.719" E	33° 36' 27.849" S	**IR122**	25° 5' 23.496" E	33° 36' 29.036" S
IR123	25° 5' 19.605" E	33° 36' 37.640" S	**IR124**	25° 5' 16.595" E	33° 36' 37.272" S
IR125	25° 5' 13.047" E	33° 36' 45.159" S	**IR126**	25° 5' 18.496" E	33° 36' 20.163" S
IR127	25° 5' 20.390" E	33° 36' 21.100" S	**IR128**	25° 5' 19.195" E	33° 36' 18.825" S
IR129	25° 5' 18.838" E	33° 36' 17.443" S	**IR130**	25° 5' 19.690" E	33° 36' 12.536" S
IR131	25° 5' 22.286" E	33° 36' 11.078" S	**IR132**	25° 5' 20.316" E	33° 36' 14.221" S
IR133	25° 5' 21.739" E	33° 36' 17.461" S	**IR134**	25° 5' 25.958" E	33° 36' 18.857" S
IR135	25° 5' 31.538" E	33° 36' 20.544" S	**IR136**	25° 5' 38.308" E	33° 36' 17.978" S
IR137	25° 5' 41.604" E	33° 36' 19.459" S	**IR138**	25° 5' 46.832" E	33° 36' 19.078" S

IR139	25° 5' 53.453" E	33° 36' 20.166" S	**IR140**	25° 5' 58.167" E	33° 36' 19.905" S
IR141	25° 5' 24.779" E	33° 36' 7.188" S	**IR142**	25° 5' 23.884" E	33° 36' 2.702" S
IR143	25° 5' 21.666" E	33° 35' 59.664" S	**IR144**	25° 5' 16.687" E	33° 36' 6.190" S
IR145	25° 5' 12.577" E	33° 36' 9.046" S	**IR146**	25° 5' 7.174" E	33° 36' 11.418" S
IR147	25° 5' 2.765" E	33° 36' 12.735" S	**IR148**	25° 5' 4.900" E	33° 36' 14.338" S
IR149	25° 4' 55.041" E	33° 36' 7.912" S	**IR150**	25° 4' 48.738" E	33° 36' 6.877" S
IR151	25° 4' 44.854" E	33° 36' 5.095" S	**IR152**	25° 4' 44.215" E	33° 36' 7.828" S
IR153	25° 4' 35.300" E	33° 36' 3.971" S	**IR154**	25° 4' 33.223" E	33° 36' 6.080" S
IR155	25° 5' 2.593" E	33° 36' 9.434" S	**IR156**	25° 4' 59.163" E	33° 36' 5.624" S
IR157	25° 4' 52.237" E	33° 36' 1.074" S	**IR158**	25° 4' 48.807" E	33° 35' 54.797" S
IR159	25° 4' 45.900" E	33° 35' 54.529" S	**IR160**	25° 5' 24.468" E	33° 35' 56.301" S
IR161	25° 5' 24.687" E	33° 35' 54.511" S	**IR162**	25° 5' 24.633" E	33° 35' 51.128" S
IR163	25° 5' 26.011" E	33° 35' 49.226" S	**IR164**	25° 5' 29.376" E	33° 35' 46.833" S
IR165	25° 5' 25.781" E	33° 35' 46.442" S	**IR166**	25° 5' 24.668" E	33° 35' 44.645" S
IR167	25° 5' 21.442" E	33° 35' 43.031" S	**IR168**	25° 5' 18.915" E	33° 35' 39.045" S
IR169	25° 5' 17.895" E	33° 35' 41.123" S	**IR170**	25° 5' 13.974" E	33° 35' 39.276" S
IR171	25° 5' 31.983" E	33° 35' 44.674" S	**IR172**	25° 5' 33.671" E	33° 35' 44.913" S
IR173	25° 5' 36.107" E	33° 35' 44.111" S	**IR174**	25° 5' 39.428" E	33° 35' 46.199" S
IR175	25° 5' 44.382" E	33° 35' 45.734" S	**IR176**	25° 5' 38.871" E	33° 35' 42.705" S
IR177	25° 5' 40.129" E	33° 35' 40.684" S	**IR178**	25° 5' 44.738" E	33° 35' 39.068" S
IR179	25° 5' 47.872" E	33° 35' 36.073" S	**IR180**	25° 5' 46.050" E	33° 35' 32.975" S
IR181	25° 5' 47.484" E	33° 35' 33.857" S	**IR182**	25° 5' 46.755" E	33° 35' 26.263" S
IR183	25° 5' 51.581" E	33° 35' 24.075" S	**IR184**	25° 5' 55.357" E	33° 35' 20.855" S
IR185	25° 5' 51.560" E	33° 35' 21.824" S	**IR186**	25° 5' 47.881" E	33° 35' 19.606" S
IR187	25° 5' 41.962" E	33° 35' 21.533" S	**IR188**	25° 5' 40.252" E	33° 35' 21.401" S
IR189	25° 5' 37.510" E	33° 35' 22.105" S			

Appendix I: General

Appendix I1: Site Development Plan Areas

Appendix I2: Water Demand and SDP area details

Appendix I3: Eskom Letter

SRK Report Distribution Record

Report No. 478867/2

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