ENVIRONMENTAL IMPACT ASSESSMENT PROCESS
DRAFT SCOPING REPORT

PROPOSED STORMBERG WIND ENERGY FACILITY, EASTERN CAPE PROVINCE

DEA Ref. No: 14/12/16/3/3/2/394

DRAFT SCOPING REPORT FOR PUBLIC REVIEW

9 April 2014 - 15 May 2014

Prepared for:

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PROJECT DETAILS

Title	**:**	Environmental Impact Assessment Process Draft Scoping Report for the Proposed Stormberg Wind Energy Facility, Eastern Cape
DEA Reference No.	**:**	Wind Energy Facility - 14/12/16/3/3/2/394
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Applicant	**:**	Networx Eolos Renewables (Pty) Ltd
Report Status	**:**	Draft Scoping Report for public review and comment
Review period	**:**	9 April 2014 – 15 May 2014

When used as a reference this report should be cited as: Savannah Environmental (2014) Draft Scoping Report for the Proposed Stormberg Wind Energy Facility, Eastern Cape

PURPOSE OF THE DRAFT SCOPING REPORT

Networx Eolos Renewables (Pty) Ltd is proposing to establish a commercial renewable energy facility (comprising of both wind and solar energy facilities) and associated infrastructure over several farm portions in the Stormberg region, approximately 18 km east of Sterkstroom and 25km east of Molteno in the Eastern Cape Province and appointed Savannah Environmental, as independent environmental consultants, to undertake the requisite Environmental Impact Assessment (EIA) Process. The EIA process is being undertaken in accordance with the requirements of the National Environmental Management Act (NEMA; Act No. 107 of 1998).

This Scoping Report addresses the proposed establishment of the **wind energy facility**. A separate scoping report has been prepared with respect to the proposed solar energy facility while the proposed power lines required to evacuate the electricity generated by the projects to the national grid will be subjected to a Basic Assessment Process.

Scoping is an important part of the EIA process, as it helps to ensure that the impact assessment is appropriately focussed. The main objectives of the Scoping process are:

» To engage with stakeholders at an early stage of the development so that they may contribute their views with regards to the proposed project;
» To identify potential issues and impacts associated with the proposed development;
» To define the scope of the Environmental Impact Assessment (EIA);
» To define the methodology that is required for the EIA; and
» To describe the plan of study for the EIA.

In terms of NEMA, the Scoping Report is submitted to the competent authority (i.e. the National Department of Environmental Affairs (DEA)) as part of the decision-making process with regard to the proposed wind farm. The Scoping Report is also intended to provide sufficient background information to other Organs of State, non-statutory bodies, the general public, organisations and local communities in order to obtain their commentary and input on the proposed development. The Scoping Phase of the EIA process identifies and describes potential issues associated with the proposed project, and defines the extent of the studies required within the EIA Phase of the process. The EIA Phase will assess those identified potential environmental impacts and benefits associated with all phases of the project including design, construction, operation and decommissioning, and will recommend appropriate mitigation measures for potentially significant environmental impacts.

The Scoping Report consists of eight chapters:

» **Chapter 1** provided background to the proposed project and the environmental impact assessment.
» **Chapter 2** describes the activities associated with the project (project scope). This chapter also describes wind energy as a power generation option and provides insight of the available technologies.
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
» **Chapter 4** describes the existing biophysical and socio-economic environment.
» **Chapter 5** provides an identification and evaluation of the potential issues associated with the proposed Wind Energy Facility.
» **Chapter 6** presents the conclusions of the scoping evaluation for the proposed Wind Energy Facility.
» **Chapter 7** describes the Plan of Study for EIA.
» **Chapter 8** provides references used to compile the Scoping Report.

The Draft Scoping Report provides the public with an opportunity to verify that all potential issues associated with the proposed project have been identified through this scoping study, and provides an opportunity for additional key issues for consideration to be raised. The Final Scoping Report will incorporate all comments received prior to submission to the National Department of Environmental Affairs (DEA).

INVITATION TO COMMENT ON THE DRAFT SCOPING REPORT

Interested and Affected Parties are invited to review this draft Scoping Report between **9 April 2014** and **15 May 2014** at the following locations**:**

» www.savannahSA.com
» Molteno Public Library
» Sterkstroom Public Library

Comments are to be submitted in writing to the contact person below before or on **15 May 2014**.

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EXECUTIVE SUMMARY

Project overview

Networx Eolos Renewables (Pty) Ltd, is proposing to establish a commercial Wind Energy Facility with a generating capacity of up to 420 MW and associated infrastructure approximately 25km east of Molteno and 18km east of Sterkstroom in the Stormberg region of the Eastern Cape. The proposed project is to be known as the Stormberg Wind Energy Facility, identified to be feasible by the developer due to favourable exposure to the wind resource.

The project study area is approximately 15 000ha in extent and situated along the N6 national road, with the R344 and R56 arterial roads respectively traversing south and north of the site. The study area ranges in elevation from approximately 1 250m above sea level in the south of the escarpment, to 2 200m above sea level to the north of the escarpment. The study area is situated within 15km from the Dorper Wind Farm currently under construction.

The proposed Stormberg wind energy facility will comprise of up to 150 turbines with a hub height of up to 120m and a rotor diameter of up to 130m and will have a capacity of up to 420MW, to be developed in progressive stages/phases. Infrastructure associated with the wind energy facility is proposed to include:

» Wind turbines up to 3.5MW in capacity;
» Concrete foundations to support the turbines;
» Cabling between the turbines, to be laid underground where practical, to connect to an on-site substation;
» An on-site substation to facilitate the connection between the wind energy facility and the electricity grid, including a control building and storage facilities;
» Internal access roads to each turbine linking the wind turbines and other infrastructure on the site.

The solar energy facility also proposed to occur on the project site study area and the power lines required to evacuate the generated electricity will be subjected to separate environmental assessment processes under the following reference numbers, as issued by the DEA:

» Solar Energy Facility - 14/12/16/3/3/2/398 – Scoping and EIA Process
» Power Lines – 14/12/16/3/3/1/912 – Basic Assessment Process

Scoping framework

This scoping report addresses the establishment of the wind energy facility and associated infrastructure only. The proposed construction of a solar energy facility also proposed to occur within the study area, as well as the associated grid connection infrastructure will be described and evaluated separately in accordance with the requirements of the Department of Environmental Affairs.

The Scoping Report has been prepared in accordance with the EIA Regulations published in Government Notice 33306 of GN R543, R544, R545 and R546 (18 June 2010), in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). The nature and extent of the wind component of the proposed renewable energy project, as well as potential environmental impacts associated with the construction of the wind energy facility is explored in more detail in this Scoping Report. This Scoping Report aims to identify potential issues associated with the proposed project, and define the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders that includes both relevant government authorities and interested and affected parties (I&APs).

Based on the nature of the proposed renewable energy facility, several specialist scoping studies were conducted in order to describe the receiving environment and to identify potential impacts associated with the project.

Potential environmental impacts identified

Land use and agriculture: The proposed facility could have an impact on agricultural activities occurring in the study area due to temporary and permanent loss of agricultural land. The overall operational footprint to be occupied by the wind energy facility is 60ha or approximately 0.4% of the 15 000ha study area. Small pockets of cultivation occur in the study area however the predominant land use is grazing due to the marginal to low arable potential. The grazing capacity of the study area is between 5 and 30 hectares per stock unit.

Flora and sensitive ecological features: The proposed facility could have an impact on sensitive flora species and sensitive environments due impacts the occurrence of construction activities. Ecologically sensitive areas within the study area include surface water features, steep topography and sensitive grasslands. 796 plant species have been recorded within the region, only one of which is of high conservation concern and another 12 of which are of moderate concern. There are, however, no species listed as Critically Endangered or Endangered by the South

African Red List of Plants which are known from the area. Ecologically sensitive areas include surface water features, steep topography and sensitive grasslands.

Fauna: The proposed facility could have an impact on sensitive faunal species due impacts the occurrence of construction activities and final placement of the facility. The only species of conservation concern which is fairly likely to occur within the study area is the Giant Bullfrog which is listed as Near Threatened.

Avifauna: The proposed project could have an impact on sensitive bird habitat during construction and the operation of wind turbines presents a collision risk to collision prone bird species. Approximately 218 bird species could occur in the study area, of which 22 Red Listed species are considered likely to occur and which are included in the target list for monitoring purposes. These include the Rudd's Lark, Bearded Vulture, Cape Vulture, Martial Eagle, African Marsh-Harrier, Lesser Kestrel, Blue Crane, Grey Crowned Crane, Striped Flufftail, Denham's Bustard, Ludwig's Bustard, African Grass Owl, Yellow-breasted Pipit, Secretarybird, Black Harrier, Peregrine Falcon, Lanner Falcon, Blue Korhaan and Melodious Lark as well as several non-listed species. The avifaunal scoping studies were supplemented by field studies by the specialists involved in order to provide inputs to the 12-month monitoring programme currently in process.

Bats: The proposed project could have an impact on bat habitat during construction and the operation of wind turbines presents a potential collision risk. Of the 14 bat species identified as potentially occurring in the study area, one is Vulnerable, 4 Near Threatened and 9 of Least Concern. 7 of the identified species are considered highly likely to occur in the study area, 3 considered moderately likely, and 4 are considered unlikely but possible to occur. A 12-month monitoring programme is currently in process to determine the impact of the wind energy facility on bats.

Visual description: The study area is distinctly rural in character and defined by the absence of other electrical or industrial infrastructure in the immediate vicinity of the site. It is envisaged that the wind turbines with hub heights of up to 130m would constitute a high visual prominence (where visible from shorter distances).

Noise: The proposed wind energy facility would have a potential noise impact during the construction phase with operational noise impacts anticipated due to the spinning of the rotor blades. Noise levels in the area have a suburban character at dwellings close to the N6 and R56 public roads and more of a rural character further from the road infrastructure. 29 potential noise sensitive developments have been identified in the study area for scrutiny and impact assessment during the EIA phase.

Heritage: The archaeological background and timeframe of the study area is characterised by remains dating to the Stone Age including Rock Art, historical structures older than 60 years and graves/cemeteries. Several ruins, kraals and grave sites were identified during the Scoping phase. Some of these sites are probably older than 60 years and protected by heritage legislation. 27 potential heritage sites have been identified for scrutiny and impact assessment during the EIA phase.

Palaeontology: The study area is underlain by the Molteno, Elliot and Clarens Formations of the Karoo Supergroup and dolerite igneous intrusive rocks of the Karoo Dolerite Suite, each of which offers differing probability of paleontological potential.

Social situation: The social impacts relating to the project are largely linked to the creation of employment and skills development opportunities during the construction phase which could result in various positive and negative impacts.

Public participation process

Public participation was initiated in May 2013 during which time a public meeting and focus group meetings were held with interested and affected parties and other stakeholders including:

- Chris Hani District Municipality
- Maletswai Local Municipality
- The Molteno Farmers Association
- Cape Vultures in Crisis

These meetings served to highlight concerns from the stakeholders in particular regarding how the municipalities stand to benefit from the generated electricity, how the project will respond to landowner issues and how it will impact on endangered and sensitive avifaunal species occurring within the study area.

Conclusion

Based on the information contained in this Scoping Report, no environmental fatal flaws have been identified to be associated with the proposed project and it is recommended that the project continue to the EIA Phase. Through the specialist studies conducted, large portions of the Stormberg project study area have emerged as being of medium to high or high sensitivity from an ecological and avifaunal perspective. It is recommended that these avifaunal buffer zones and preliminary ecological sensitivities (refer to Figure 1) determined at Scoping level be ground-truthed and scrutinised through the EIA Phase field studies and bird and bat monitoring programmes which have commenced.

Local level environmental and planning issues will now be considered within site-specific studies to be undertaken as part of the EIA for the project. The assessments through the EIA process will assist in delineating areas of environmental sensitivity within the broader site and ultimately inform the placement of the wind turbines and associated infrastructure on the site in order to minimise impacts on the environment.

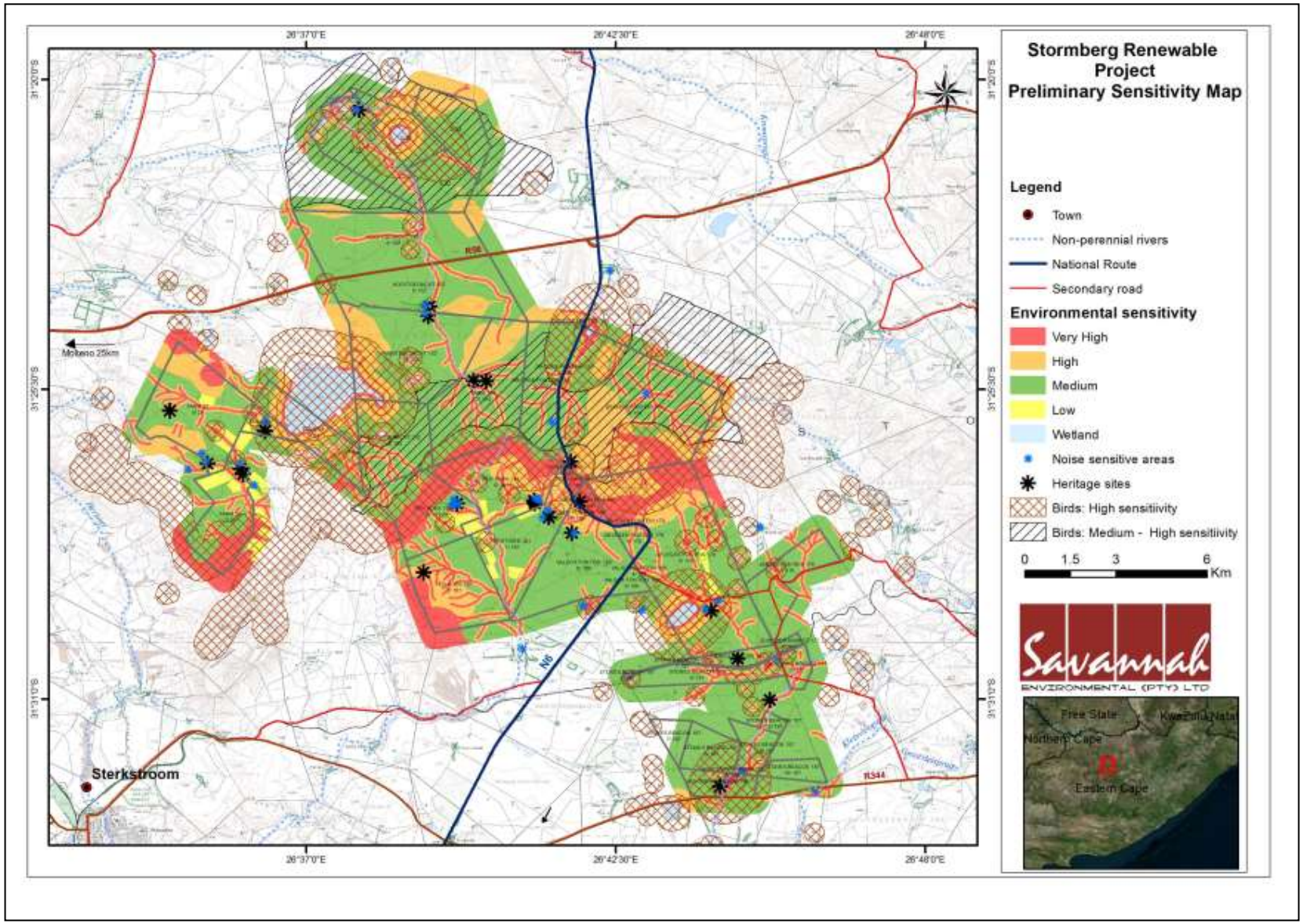

Figure 1: Potential environmental sensitivity based on overlay of environmental sensitivities identified at Scoping

TABLE OF CONTENTS

APPENDICES

Appendix A: EIA Project Consulting Team CVs
Appendix B: Correspondence with Authorities
Appendix C: Stakeholder Database
Appendix D: Site Notice & Advertisements
Appendix E: Public Participation Information
Appendix E1: Stakeholder Letter
Appendix E2: BID & Reply Form
Appendix E3: Stakeholder Consultation
Appendix E4: Minutes of meetings
Appendix F: Ecology Scoping Study
Appendix G: Birds Scoping Study (John Smallie)
Appendix H: Birds Scoping Study (Dr Ian Whyte)
Appendix I: Bats Scoping Study
Appendix J: Soil & Agricultural Potential Scoping Study
Appendix K: Visual Scoping Study
Appendix L: Heritage Scoping Study
Appendix M: Paleontological Scoping Study
Appendix N: Noise Scoping Study
Appendix O: Social Scoping Study

DEFINITIONS AND TERMINOLOGY

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Betz Limit: It is the flow of air over the blades and through the rotor area that makes a wind turbine function. The wind turbine extracts energy by slowing the wind down. The theoretical maximum amount of energy in the wind that can be collected by a wind turbine's rotor is approximately 59%. This value is known as the Betz Limit

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time and can include both direct and indirect impacts.

Cut-in speed: The minimum wind speed at which the wind turbine will generate usable power.

Cut-out speed: The wind speed at which shut down occurs.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:

i. the land, water and atmosphere of the earth;
ii. micro-organisms, plant and animal life;
iii. any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management plan: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Generator: The generator is what converts the turning motion of a wind turbine's blades into electricity

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800

Indirect impacts: Indirect or induced changes that may occur as a result of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place as a result of the activity.

Interested and Affected Party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups and the general public.

Nacelle: The nacelle contains the generator, control equipment, gearbox and anemometer for monitoring the wind speed and direction.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare".

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Regional Methodology: The Western Cape Department of Environmental Affairs and Development Planning (DEA&DP) have developed a guideline document entitled *Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape - Towards a Regional Methodology for Wind Energy Site Selection* (Western Cape Provincial Government, May 2006). The methodology proposed within this guideline document is intended to be a regional level planning tool to guide planners and decision-makers with regards to appropriate areas for wind energy development (on the basis of planning, environmental, infrastructural and landscape parameters).

Rotor: The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor has three blades that rotate at a constant speed of about 15 to 28 revolutions per minute (rpm).

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Tower: The tower, which supports the rotor, is constructed from tubular steel. It is approximately 80 m tall. The nacelle and the rotor are attached to the top of the tower. The tower on which a wind turbine is mounted is not just a support structure. It also raises the wind turbine so that its blades safely clear the ground and so it can reach the stronger winds at higher elevations. Larger wind turbines are usually mounted on towers ranging from 40 to 80 m tall. The tower must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine.

Wind power: A measure of the energy available in the wind.

Wind rose: The term given to the diagrammatic representation of joint wind speed and direction distribution at a particular location. The length of time that the wind comes from a particular sector is shown by the length of the spoke, and the speed is shown by the thickness of the spoke.

Wind speed: The rate at which air flows past a point above the earth's surface.

ABBREVIATIONS AND ACRONYMS

BID	Background Information Document
CBA	Critical Biodiversity Area
CBOs	Community Based Organisations
CDM	Clean Development Mechanism
CSIR	Council for Scientific and Industrial Research
CO_2	Carbon dioxide
D	Diameter of the rotor blades
DAFF	Department of Forestry and Fishery
DEA	National Department of Environmental Affairs
DMR	Department of Mineral Resources
DOT	Department of Transport
DWA	Department of Water Affairs
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GIS	Geographical Information Systems
GG	Government Gazette
GN	Government Notice
GWh	Giga Watt Hour
Ha	Hectare
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEP	Integrated Energy Planning
km^2	Square kilometres
km/hr	Kilometres per hour
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NGOs	Non-Governmental Organisations
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework

INTRODUCTION CHAPTER 1

1.1. Project Overview

Networx Eolos Renewables (Pty) Ltd, an Independent Power Producer (IPP), is proposing to establish a commercial wind energy facility and associated infrastructure over several farm portions located approximately 18 km east of Sterkstroom and 25km east of Molteno in the Stormberg region of the Eastern Cape.

The proposed project is to be known as the **Stormberg Wind Energy Facility** will have a total generation capacity of up to 420 megawatts (MW). The project would be developed in phases as part of the Renewable Energy Independent Power Producers Procurement Programme. This programme has been introduced by the Department of Energy (DoE) to promote the development of renewable power generation facilities by IPPs.

A Solar Energy Facility with a generating capacity of up to 150MW is also proposed to be constructed in the study area. The solar energy project and power lines required in order to evacuate the generated capacity of both the wind and solar energy facilities into the Eskom energy grid will be covered in separate applications/reports as follows:

- Solar Energy Facility - 14/12/16/3/3/2/398
- Power Lines – 14/12/16/3/3/1/912

1.2. Locality and access

The study area incorporates several farm portions (discussed in further detail in Section 1.3) located in the Eastern Cape. A portion of the northern section of the study area falls within the Maletswai Local Municipality (within the jurisdiction of the Joe Gqabi District Municipality), while the majority of the study area falls within the Inkwanca Local Municipality (under the jurisdiction of the Chris Hani District Municipality).

The study area is located to the north and south of the R56 and east and west of a section of the N6 known as the "Penhoek Pass". The R344 forms the southern-most boundary of the study area. The study area is accessed directly from the R56 in the north (via the farm Nooitgedacht), with access to the southern parts of the study area provided via gravel roads extending off the N6.

The site extends for approximately 27km from north to south and for approximately 16.5km from east to west (tip to tip). The approximate coordinates of the site are as follows:

Northern-most extent:	31°19'44" S	26° 38' 51" E
Eastern-most extent:	31°28'31" S	26° 46' 27" E
Southern-most extent:	31°32'46" S	26° 44' 41" E

Western-most extent:	31°26'12" S	26° 34' 00" E
Centre point:	31°27'37" S	26° 41' 18" E

1.3. Description of the study area

The topography of the study area is made up of two planar regions separated by an escarpment running through the centre of the study area. The areas lying to the north and west of the escarpment are plains (between 1700m and 1800m ASL), before dropping down to the southern planes at lower altitudes (between 1500m and 1600m ASL). A number of prominent hills are located along the northern margin of the site and another is located within the south-western extent of the area.

The study area is approximately 15 770ha in extent comprising of several privately-owned farm portions (refer to Figure 1.1) as follows:

» Portions 0, 1, 2, 3 and 5 of the farm Klip Plaat 22
» Portion 5 of the farm Leeuwe Fontein 24
» Portion 5 (Langlaagte), Portion 9 and remainder of Portion 1 of the Farm Nooitgedacht 25
» Remainder of the farm Nooitgedacht 152
» Portion 2 of the farm Nooitgedacht 154
» Remainder of Portion 1 of the farm Drooge Fontein 155
» Remainder of the Farm Drooge Fontein 151
» Portions 5 and 6 of the farm Schilder Krantz 177
» Portion 3 of the farm Jansen Fontein 178
» the farm Gelegen Fontein 179
» Remainder of the farm Valsch Fontein 180
» Portions 0, 1, 2, 3 and remainder of the farm Pen Hoek 181
» Portions 6, 9, 10, 11, 12 and remainder of the farm Stones Beacon 187
» Portion 2 of the farm Schoemans Kraal 188
» Portion 6 of the farm De Boulogne 176

The predominant land use is grazing (sheep) with limited crop cultivation occurring within the study area (localised areas of the farms Pen Hoek and Nooitgedacht). Farm settlements or residences occur at irregular intervals throughout the study area. The population density of the region is less than 10 people per km², predominantly concentrated within the town of Sterkstroom.

There are no power lines traversing the study area and existing power line and substation infrastructure in the project vicinity is limited to the Carrickmore 132kV Substation, located approximately 12.5km west of the study area. Large overhead power lines near this substation include the Beta-Delphi 1 400kV and Carrickmore-Putterskraal 1 132kV lines.

A railway line traverses the southern section of the study area over the farms Stones Beacon and Schilder Krantz.

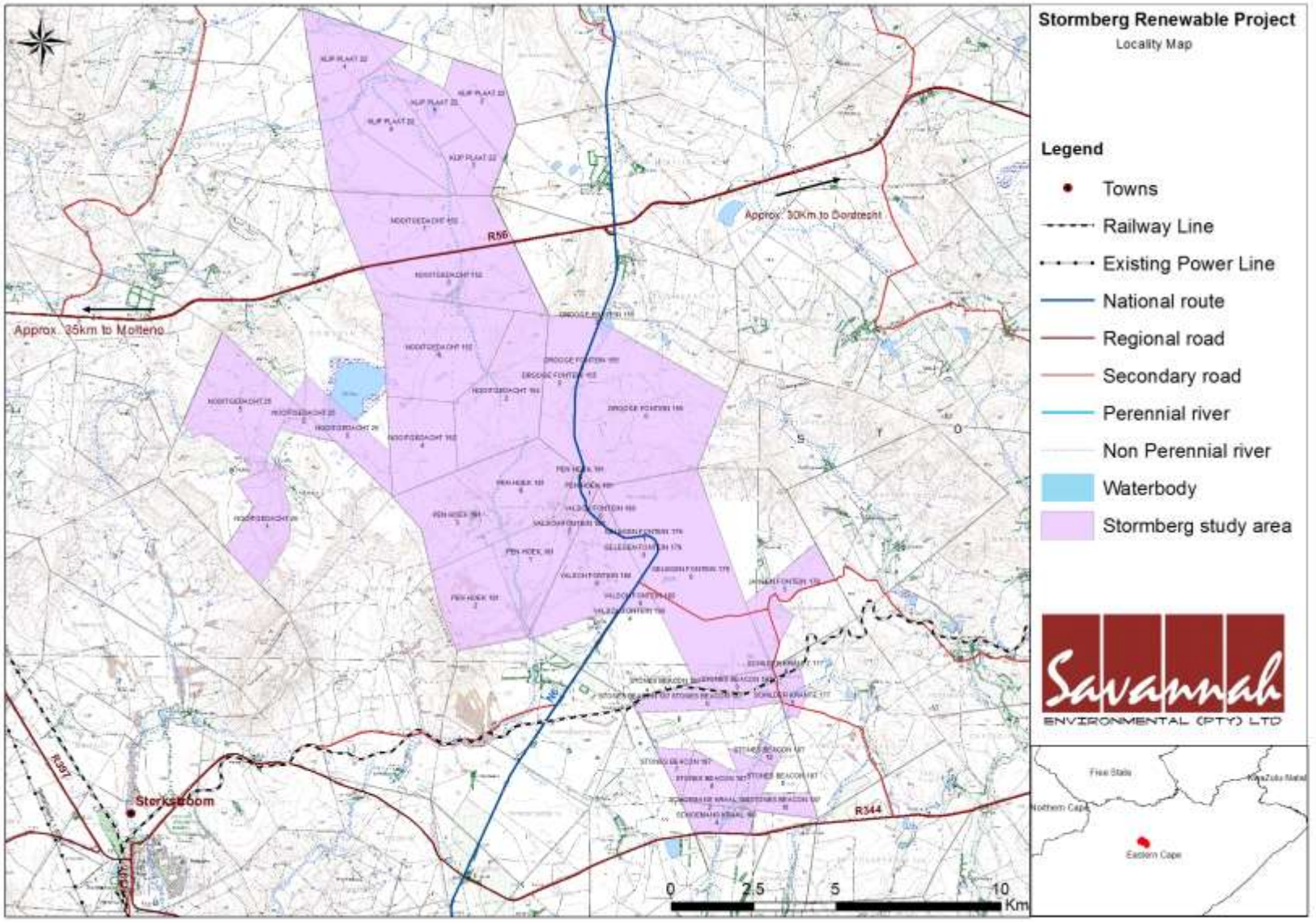

Figure 1.1: Locality map showing the location and study area of the proposed Stormberg Renewable (Wind and Solar) Energy Facility

1.4. Description of the Stormberg Wind Energy Facility

Based on a pre-feasibility analysis and an extensive site identification and landowner negotiation process undertaken by the applicant through an environmental screening study, as well as an analysis of the wind resource in the study area, it was decided to initiate the EIA process.

The facility will comprise of up to **150 turbines** with a hub height of up to 120m and a rotor diameter of up to 130m. The wind energy facility would have a **capacity of up to 420MW** and is to be developed in progressive stages/phases. Infrastructure associated with the wind energy facility is proposed to include:

» Wind turbines up to 3.5MW in capacity;
» Concrete foundations to support the turbines;
» Cabling between the turbines, to be laid underground where practical, to connect to an on-site substation;
» An on-site substation to facilitate the connection between the wind energy facility and the electricity grid, including a control building and storage facilities;
» Internal access roads to each turbine linking the wind turbines and other infrastructure on the site.

The wind turbines are to be constructed in phases within the study area and together with the associated infrastructure listed above will constitute a development footprint of less than 0.5% of the total study area. The optimal position for each turbine will be determined using specialist software and the turbines will be appropriately spaced to optimise the energy generating potential of the wind resource, taking into consideration any environmental sensitivities which might be identified through the EIA process. A more accurate understanding of the final development footprint and the siting or positioning of the infrastructure will be determined during the EIA Phase with the availability of a facility layout plan.

A detailed description of the components listed above and the potential impacts identified is provided in Chapter 2.

To facilitate the evacuation of the generated electricity into the national grid, two power lines corridors will be investigated through a separate Basic Assessment Process to connect from the on-site substation to the New Freemantle Substation currently under construction near Lady Frere and to a connection point between Molteno and Sterkstroom. The existing grid connection is indicated in Figure 1.2.

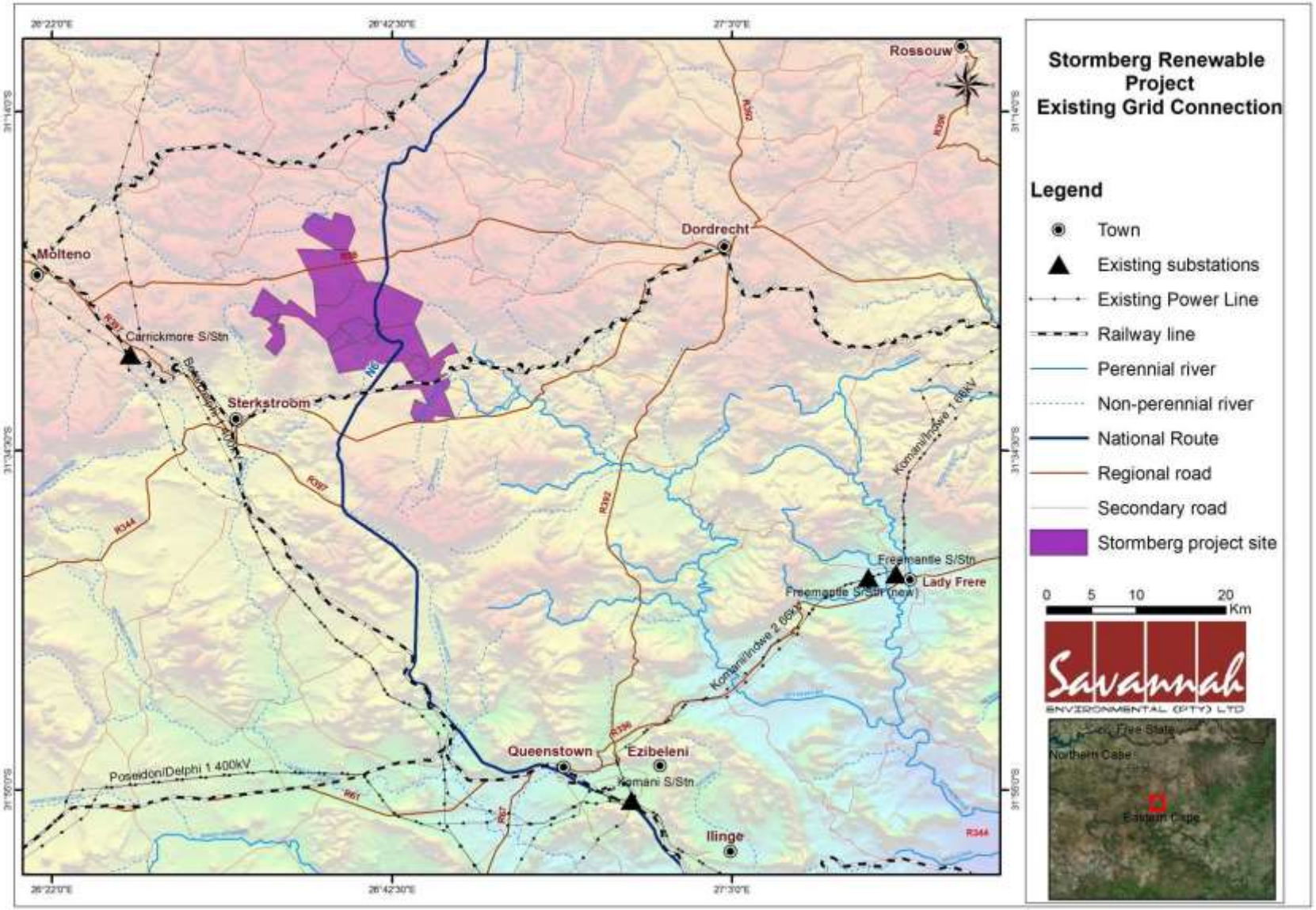

Figure 1.2: Map showing the study area in relation to the the existing alternative grid connection options: Komani substation (near Queenstown), Freemantle substation (near Lady Frere) and the Beta-Delphi 400kV power line (between Molteno and Sterkstroom)

1.5. The Need and Desirability for the Proposed Project

Global perspective: Globally there is increasing pressure on countries to increase their share of renewable energy generation due to concerns such as climate change and the need to reduce the dependence upon fossil fuels, such as oil and coal, for energy and therefore reduce the volume of greenhouse gasses emitted into the atmosphere. Grid connected renewable energy is currently the fastest growing sector in the global energy market.

National perspective: Targets for the promotion of renewable energy now exist in more than 58 countries, of which 13 are developing countries. The South African Government has recognised the country's high level of renewable energy potential and presently has in place targets of 10 000 GWh of renewable energy by 2013.

The need to expand electricity generation capacity in South Africa is based on national policy and is informed by on-going strategic planning undertaken by the Department of Energy (DoE). In response to the National Energy Policy's objective relating to affordable energy services, the DoE commissioned a National Integrated Resource Plan (IRP) in order to provide a long-term, cost-effective resource plan for meeting electricity demand, which is consistent with reliable electricity supply and environmental, social, and economic policies. The planning horizon for the study was from 2010 to 2030. The objective of the IRP is to determine the least-cost supply option for the country, provide information on the opportunities for investment into new power generating projects, and evaluate the security of supply. The long-term electricity planning goal is to ensure sustainable development considering technical constraints, economic constraints, social constraints, and externalities.

In order to meet the long-term goal of a sustainable renewable energy industry and to diversify the energy-generation mix in South Africa, a goal of 17,8GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010. This energy will be produced mainly from wind, solar, biomass, and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This amounts to ~42% of all new build power generation being derived from renewable energy forms by 2030.

The proposed wind energy facility is a potential Strategic Infrastructure Project (SIP) developed under the National Infrastructure Plan:

- SIP 8: Green energy of support of South African economy - Support sustainable green energy initiatives on a National scale through a diverse range of clean energy options envisaged in the Integrated Resource Plan(IRP 2010)

Provincial and municipal perspective: Focus Area 1 of the Eastern Cape Sustainable Energy Strategy is to support sustainable economic development through the promotion

of renewable energy generation (both through National Renewable Energy Independent Power Producer Programme (REIPPP) and at the municipal level) and the establishment of a sustainable energy manufacturing and service industry. In its five year Integrated Development Plan (IDP) the Joe Gqabi District Municipality identifies the production of clean energy through solar and wind projects as development opportunities for the District. The most relevant mitigation measures and areas that the municipality should focus on in terms of air quality and pollution prevention is specified in the IDP as the use of biofuels, renewable energy, improved waste management and agricultural resource management. With regard to local level policy documents, the Inkwanka Local Municipality IDP indicates that the area has potential for the establishment of wind energy facilities.

1.6. Requirement for an Environmental Impact Assessment Process

The construction and operation of the proposed Stormberg Renewable Energy Facility project is subject to the requirements of the Environmental Impact Assessment Regulations (EIA Regulations) published in terms of Section 24(5) of the National Environmental Management Act (NEMA, No 107 of 1998). This section provides a brief overview of EIA Regulations and their application to this project.

NEMA and Competent Authority: NEMA is national legislation that provides for the authorisation of certain controlled activities known as "listed activities". In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the competent authority (the decision-maker) mandated by NEMA with the granting of the relevant environmental authorisation. The National Department of Environmental Affairs (DEA) is the competent authority for this project.

Throughout the decision-making process, the DEA will be supported by the Eastern Cape Department of Economic Development and Environmental Affairs (Eastern Cape DEDEA).

The need to comply with the requirements of the EIA Regulations ensures that decision-makers are provided the opportunity to consider the potential environmental impacts of a project early in the project development process, and assess if environmental impacts can be avoided, minimised or mitigated to acceptable levels. Comprehensive, independent environmental studies are required to be undertaken in accordance with the EIA Regulations to provide the competent authority with sufficient information in order for an informed decision to be taken regarding the project. Networx Eolos Renewables (Pty) Ltd appointed Savannah Environmental (Pty) Ltd to conduct the independent Environmental Impact Assessment (EIA) process for the proposed project.

An EIA is also an effective planning and decision-making tool for the project proponent. It allows the environmental consequences resulting from a technical facility during its establishment and its operation to be identified and appropriately managed. It provides

the opportunity for the developer to be forewarned of potential environmental issues, and allows for resolution of the issue(s) reported on in the Scoping and EIA reports while facilitating dialogue between affected parties.

In terms of sections 24 and 24D of NEMA, as read with the EIA Regulations of GN R543 (Regulations 26-35), R544, R545 and R546, a Scoping Study and EIA are required to be undertaken for this proposed project as it includes the following activities listed in terms of GN R545, R544 and R 546 (as amended in December 2010):

Table 1.1: Listed Activities applicable to the Stormberg Wind Energy Facility

Relevant Notice	Activity No	Description of listed activity	Applicability to the project	Reference
GN544	*10(a)*	*The construction of facilities or infrastructure for the transmission and distribution of electricity –* (a) *Outside urban areas or industrial complexes with a capacity of more than 33kv but less than 275kv*	The project will include the construction of a substation as associated infrastructure on the site (outside of an urban area).	Refer to Chapter 2.2.7 for a description of the grid connection infrastructure.
GN544	*11*	*The construction of:* *(x) buildings exceeding 50 square metres in size; or* *(xi) infrastructure or structures covering 50 square metres or more* *Where such construction occurs within a watercourse or within 32 metres of a watercourse, measures from the edge of a watercourse, excluding where such construction will occur behind the development setback line.*	The wind energy facility may include the construction of infrastructure within 32m of a watercourse	Refer to Chapter 4 indicating the location of watercourses on the site which may be affected by infrastructure to be located within 32m from the edge of a watercourse
GN544	*18(i)*	*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 wind energy facility may include the construction of infrastructure (roads) within a watercourse which may require the excavation of soil or rock from the watercourse.	Refer to Chapter 4 indicating the location of watercourses on the site which may be affected by infrastructure requiring the excavation of soil from a watercourse
GN544	*22(i)(ii)*	*The construction of a road, outside urban areas,* *(i) with a reserve wider than 13.5 metres or,* *(ii) where no road reserve exists where the road is wider than 8 metres*	The wind energy facility will require access roads to be constructed between the wind turbines which may be wider than 8m in width.	Refer to Section 2.2.7
GN544	*26*	*Any process or activity identified in terms of section 53(1) of the*	The site may / may not have sensitive /	Refer to Section 4 for a

Relevant Notice	Activity No	Description of listed activity	Applicability to the project	Reference
		National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	conservation worthy vegetation, protected under the NEM:BA.	description of the potential conservation worthy species which may occur on the site.
GN544	*47(i)(ii)*	*The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre –* *(i) where the existing road reserve is wider than 13.5 metres; or* *(ii) where no reserve exists, where the existing road is wider than 8 metres excluding widening or lengthening occurring inside urban areas.*	Existing farm (gravel) access roads may be widened by more than 6m or lengthened by more than 1km in order to provide access between the infrastructure.	Refer to Section 2.2.7 describing the internal roads to be constructed
GN545	*1*	*The construction of facilities or infrastructure, for the generation of electricity where the output is 20 megawatts or more.*	The wind energy facility will consist of wind turbines for electricity generation of up to 420MW. Power lines and substations are ancillary infrastructure for this generation process.	Refer to Section 2.2 which provides a description of the wind energy facility
GN545	*8*	*The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.*	The project will include the construction of a substation as associated infrastructure on the site (outside of an urban area) which may be more than 275 kV.	Refer to Chapter 2.2.7 for a description of the grid connection infrastructure.
GN545	*15*	*Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; Except where such physical alteration takes place for:* *(i) Linear development*	The development footprint for the proposed wind energy facility will cover an area greater than 20 hectares.	The footprint of the wind energy facility is described in Section 2.2.5.

Relevant Notice	Activity No	Description of listed activity	Applicability to the project	Reference
		activities. *(ii) Agriculture or afforestation where activity 16 in this schedule will apply*		
GN546	*4(iii)(ee)*	*The construction of a road wider than 4 metres with a reserve less than 13,5 metres* *(iii) outside urban areas, in:* *(ee) Critical Biodiversity Areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*	The construction of roads wider than 4m would occur within Critical Biodiversity Areas (Tier 2) occurring on the site	Refer to Section 4.4.1 indicating the CBA status and Section 2.2.7 describing the internal roads to be constructed.
GN546	*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.* *(ii)outside urban areas, in:* *(ee) Critical Biodiversity Areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans*	A 20,000 diesel storage tank for plant and machinery refuelling purposes will be stationed at the construction camp which may be situated in a CBA on the site. Other hazardous substances to be stored on site will not exceed 10 cubic metres.	Refer to Section 4.4.1 indicating the CBA status and Section 2.2.7 concerning volumes of hazardous substances to be stored and handled on site.
GN546	*12*	*The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.* *(b) Within critical biodiversity areas identified in bioregional plans;*	The site falls within a CBA and Centre of Endemism in the Eastern Cape, and will result in the clearance of indigenous vegetation within the footprint of the wind turbines and associated infrastructure	Refer to Section 4.4.1
GN546	*13 (a)*	*The clearance of vegetation of an area of 1 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation:* *In critical biodiversity areas and ecological support areas as identified in systematic biodiversity plans adopted by the competent authority*	The site falls within a CBA and Centre of Endemism in the Eastern Cape, and will result in the clearance of more than 1 ha of indigenous vegetation within the footprint of the wind turbines and	Refer to Section 4.4.1 indicating the CBA status The footprint of the wind energy facility is described in Section 2.2.5.

Relevant Notice	Activity No	Description of listed activity	Applicability to the project	Reference
			associated infrastructure	
GN546	*14*	*The clearance of vegetation of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation.*	The development of the wind energy facility will result in the clearance of more than 1 ha of indigenous vegetation within the footprint of the wind turbines and associated infrastructure	The footprint of the wind energy facility is described in Section 2.2.5.

This report documents the scoping evaluation of the potential environmental impacts associated with the construction and operation of the proposed Stormberg Wind Energy Facility. This scoping study forms part of the EIA process and was conducted in accordance with the requirements of the EIA Regulations in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998).

1.7. Objectives of the Scoping Phase

The Scoping Phase of the EIA process refers to the process of identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA Phase. This is achieved through:

» An evaluation of the proposed project within the broader study area,
» Involving the project proponent/applicant and communication of environmental risk,
» Involving specialists with experience in the study area and in EIAs for similar projects, and
» Conducting a public consultation process with key stakeholders, government authorities and interested and affected parties (I&APs).

In accordance with the EIA Regulations, the main purpose of the Scoping Phase is to focus the environmental assessment in order to ensure that only potentially significant issues and reasonable and feasible alternatives are assessed in detail in the EIA Phase. Review of the Draft Scoping Report provides the public with an opportunity to verify that all potential issues associated with the proposed project have been identified through this scoping study, and provides an opportunity for additional key issues requiring consideration to be raised. The Final Scoping Report incorporates all issues and responses raised during the public review of the Draft Scoping Report prior to submission to DEA.

The nature and extent of this facility, as well as potential environmental impacts associated with the construction and operation of a facility of this nature is explored in

more detail in this Draft Scoping Report. The purpose of this report is to identify and evaluate potential environmental issues associated with the proposed project and to recommend further studies which may be required to determine the significance of the environmental impacts within the EIA phase of the process. This Scoping Report consists of the following chapters:

» **Chapter 1** provided background to the proposed project and the environmental impact assessment.
» **Chapter 2** describes the activities associated with the project (project scope). This chapter also describes wind energy as a power generation option and provides insight of the available technologies.
» **Chapter 3** outlines the process which was followed during the Scoping Phase of the EIA process, including the consultation programme that was undertaken and input received from interested and affected parties.
» **Chapter 4** describes the existing biophysical and socio-economic environment.
» **Chapter 5** provides an identification and evaluation of the potential issues associated with the proposed Wind Energy Facility.
» **Chapter 6** presents the conclusions of the scoping evaluation for the proposed Wind Energy Facility.
» **Chapter 7** describes the Plan of Study for EIA.
» **Chapter 8** provides references used to compile the Scoping Report.

Environmental issues and constraints are considered within site-specific specialist studies and assessments through the EIA process in order to delineate areas of sensitivity within the broader area which should ideally be avoided in planning the proposed facility. A preliminary layout of the components of the renewable energy facility will be developed for assessment during the EIA phase of the project.

1.8. Details of Environmental Assessment Practitioner and Expertise to conduct the Scoping and EIA

Savannah Environmental was contracted by the applicant as an independent consultant to undertake an Environmental Impact Assessment (EIA) for the proposed project, as required in terms of Regulation 17 of the NEMA EIA Regulations. Neither Savannah Environmental, nor any its specialist sub-consultants on this project are subsidiaries of or affiliated with the applicant. Furthermore, Savannah Environmental does not have any interests in secondary developments that may arise out of the authorisation of the proposed project.

Savannah Environmental is a specialist environmental consulting company providing a holistic environmental management service, including environmental assessment and planning to ensure compliance and evaluate the risk of development; and the development and implementation of environmental management tools. Savannah

Environmental benefits from the pooled resources, diverse skills and experience in the environmental field held by its team.

The Savannah Environmental team have considerable experience in environmental impact assessments and environmental management, and have been actively involved in undertaking environmental studies, for a wide variety of projects throughout South Africa, including those associated with electricity generation.

The EAPs from Savannah Environmental who are responsible for this project are:

» *Steven Ingle* - Steven Ingle is a senior environmental consultant with over 7 years of experience in the environmental field and holds a degree in Environmental Management. His competencies lie in environmental impact assessments for large scale infrastructure, property and mining projects, environmental due diligence and risk assessment, environmental compliance monitoring, waste management licensing and strategic environmental assessment.
» *Karen Jodas* - a registered Professional Natural Scientist and holds a Master of Science degree. She has 16 years of experience consulting in the environmental field. Her key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. She is currently responsible for the project management of EIAs for several renewable energy projects across the country.

In order to adequately identify and assess potential environmental impacts associated with the proposed project, Savannah Environmental has appointed several specialist consultants to conduct the specialist scoping studies, as required.

The curricula vitae for the EIA project team are included in Appendix A.

SCOPE OF THE PROPOSED PROJECT CHAPTER 2

This chapter of the scoping report provides background to the proposed wind energy facility and supporting ancillary infrastructure. The proposed Stormberg Wind Energy Facility will have a **generating capacity of up to 420MW** (with the installation of up to 150 turbines) and is to be developed in progressive stages.

The study area in which the proposed facility is to be constructed extends for approximately 27km from the northern-most boundary to the southern-most boundary, and for approximately 16.5km from east to west. It is noted that 420MW is the maximum proposed output and that nominal decreases in the number of wind turbines is expected based on technical requirements and the outcome of the EIA process, without significantly diminishing the overall feasibility of the wind energy facility. The absence of distribution infrastructure (power lines and substations) in the immediate vicinity of the study area requires the construction of new power lines (up to 86km in length) from the study area to the south-south-east and westerly directions to connect to viable points of connection on the Eskom National grid. The proposed power lines will be further described and assessed in a separate Basic Assessment application.

The following information is presented in this Chapter:

» Benefits of renewable energy
» Wind energy as a power generation technology
» Details regarding the scope of the proposed wind energy facility during construction, operation and decommissioning activities.
» Alternatives with regard to the proposed wind energy facility including the "do nothing" option.

2.1. Benefits of Renewable Energy

The generation of electricity from renewable energy resources offers a range of potential socio-economic and environmental benefits for South Africa. These benefits include:

Increased energy security: The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of power supplementation. In addition, given that renewables can often be deployed in a short timeframe and in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality in the short-term, while reducing expensive distribution losses.

Resource saving: It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million

kilolitres per annum. This translates into revenue savings of R26.6 million per annum, as fuel for renewable energy facilities is free while compared to the continual purchase of fuel for conventional power stations. As an already water-stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly due to the detrimental effects of climate change on water availability.

Exploitation of our significant renewable energy resource: At present, valuable national resources including biomass by-products, solar radiation and wind power remain largely unexploited. The use of these energy flows will strengthen energy security through the development of a diverse energy portfolio in South Africa.

Pollution reduction: The releases of by-products through the burning of fossil fuels for electricity generation have a particularly hazardous impact on human health and contribute to ecosystem degradation. The use of solar radiation and wind energy for power generation is a non-consumptive use of a natural resource which produces zero emissions.

Climate friendly development: The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through the reduction of greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for approximately 1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita carbon dioxide emissions.

Support for international agreements: The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.

Employment creation: Although the immediate opportunity for job creation is limited due to a lack of local skilled, the sale, development, installation, maintenance and management of renewable energy facilities have significant potential for job creation in South Africa in the long-term.

Acceptability to society: Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Support to a new industry sector: The development of renewable energy offers the opportunity to establish a new industry within the South African economy.

Protecting the natural foundations of life for future generations: Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the

natural foundations of life for generations to come. This is the basis of sustainable development.

2.2. Wind Energy Facility

2.2.1 Converting Wind into Electricity

Wind power is the conversion of wind energy into a useful form, such as electricity, using wind turbines. The use of wind for electricity generation is a non-consumptive use of a natural resource, and produces an insignificant quantity of greenhouse gases in its lifecycle. Wind power consumes no fuel for continuing operation, and has no emissions directly related to electricity production. Operation does not produce any type of air pollution, as would be associated with fossil fuel power sources. Wind energy is one of the fastest growing electricity generation technologies, and features in energy plans worldwide.

As part of the feasibility phase of a proposed wind energy project, a wind resource measurement and analysis programme must be conducted for the site proposed for development, as only measured data from the proposed development site will provide a robust prediction of the facility's expected energy production over its lifetime. The applicant is currently conducting wind measurement monitoring on the proposed development site to measure the wind potential (wind energy) in the area. The aim of this wind measurement monitoring is to obtain reliable information about the speed, strength, direction, and frequency of the wind resource.

Wind speed is the rate at which air flows past a point above the earth's surface. Average annual wind speed is a critical siting criterion, since this determines the cost of generating electricity. Wind turbines can start generating at wind speeds of between ~3 m/s to 4 m/s. Wind speed can be highly variable and is also affected by a number of factors, including surface roughness of the terrain. Turbines are able to operate at varying wind speeds. The amount of energy a turbine can harness depends on both the wind velocity and the length of the rotor blades.

Wind power (strength and frequency) is a measure of the energy available in the wind and the ability to convert the wind energy into electricity using wind turbines.

Although wind turbines are able to yaw to the direction of the wind, the design of a wind energy facility is sensitive to the predominant wind directions and wind speeds for the site, as well as to topographical features or relief affecting the flow of the wind (e.g. causing shading effects and turbulence of air flow), and the effect of adjacent turbines on wind flow and speed (specific spacing is required between turbines in order to reduce the effects of wake turbulence). As the performance of the turbines is determined by disturbances to the wind resource, they must be appropriately spaced within the facility.

The overall aim of the design and layout of the facility is to maximise electricity production through exposure to the wind resource, while minimising infrastructure, operation and maintenance costs, as well as social and environmental impacts. Once a viable footprint for the establishment of the wind energy facility has been determined (through the consideration of both technical and environmental criteria), the micro-siting of the turbines on the site will be determined using industry standard software systems.

2.2.2 Main Components of a Wind Turbine

Generally a wind turbine consists of a **rotor (with three blades)** and a **nacelle** mounted at the top of a tapered **tower** (refer to Figure 2.1). The mechanical power generated by the rotation of the blades is transmitted to the generator within the nacelle via a gearbox and drive train.

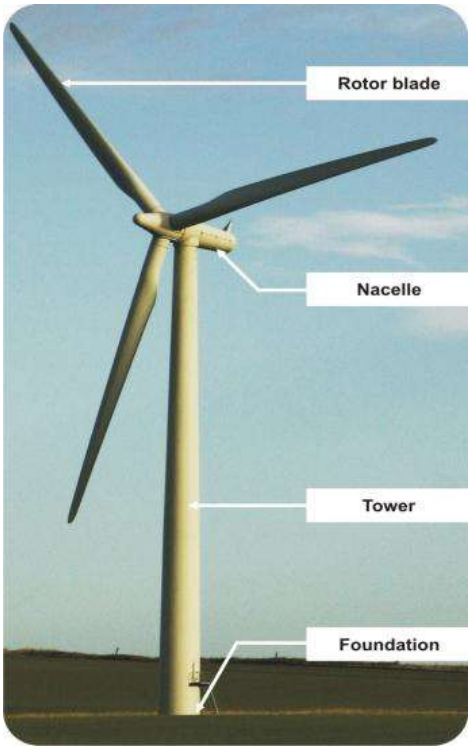

Figure 2.1: Illustration of the main components of a wind turbine

Up to 150 turbines are proposed to be constructed. The turbines will each be up to **3.5 MW** in capacity and will have a maximum **hub height** of up to **120m** and a **rotor diameter of up to 130m**.

Other infrastructure associated with the facility includes:

» Concrete foundations to support the turbines;
» Cabling between the turbines, to be laid underground where practical, will connect to an on-site substation;

» An on-site substation to facilitate the connection between the wind energy facility and the electricity grid, including a building for control and storage;
» Internal access roads to each turbine linking the wind turbines and other infrastructure on the site.

The Rotor: The portion of the wind turbine that collects energy from the wind is called the rotor. The rotor converts the energy in the wind into rotational energy to turn the generator. The rotor generally has three blades that rotate at a constant speed up to 24 revolutions per minute (rpm). The speed of rotation of the blades is controlled by the nacelle, which can turn, so that the blades face into the wind ('yaw control'), and change the angle of the blades ('pitch control') to make the most use of the available wind.

The nacelle: The nacelle refers to the structure that houses all the generator components, i.e. control equipment, gearbox and anemometer for monitoring the wind speed and direction (as shown in Figure 2.2). The rotor is attached to the nacelle.

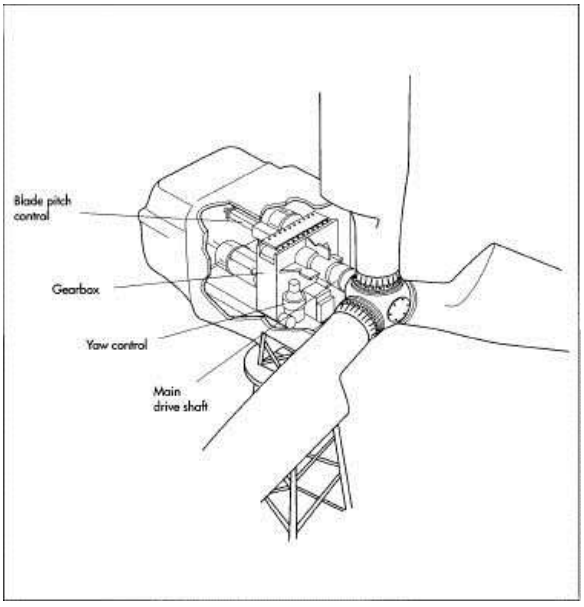

Figure 2.2: Detailed structure of a typical nacelle of a wind turbine

The tower: The tower, which supports the rotor, is constructed from tubular steel or concrete. The tower will be up to 120 m in height, depending on the turbine type selected for the wind energy facility. The nacelle is attached to the top of the tower.

The tower acts as the support structure, and must be strong enough to support the wind turbine and to sustain vibration, wind loading and the overall weather elements for the lifetime of the wind turbine. It also raises the wind turbine to reach the stronger winds at higher elevations.

Foundation: A concrete foundation is laid into the ground at the base of the turbine to provide stability and support to the turbine. The dimensions of these foundations are ~20 m x 20 m wide and up to 3 m deep on average depending on the geotechnical properties at the footprint for the individual turbine.

2.2.3 Operating Characteristics of a Wind Turbine

A turbine is designed to operate continuously, unattended and with low maintenance for 20 - 30 years. The turbines will generate electricity only during times of sufficient wind.

Once operating, a wind energy facility can be monitored and controlled remotely, with a mobile team for maintenance, when required. Downtime for preventive maintenance and/or malfunctions may reduce the operating hours.

The **cut-in speed** is the minimum wind speed at which the wind turbine will generate usable power. This wind speed is typically between ~3 m/s and 4 m/s.

At very high wind speeds, typically over 25 m/s, the wind turbine will cease power generation and shut down. The wind speed at which shut down occurs is called the **cut-out speed**. Having a cut-out speed is a safety feature which protects the wind turbine from damage. Normal wind turbine operation usually resumes when the wind drops back to a safe level.

Wind turbines can be used as stand-alone applications, or they can be connected to a utility power grid. For utility-scale sources of wind energy, a large number of wind turbines are usually built close together to form a wind energy facility (also commonly referred to as a wind farm).

2.2.4 Identification of the Proposed Site as Suitable for Wind Energy Development

In determining a potentially suitable site for the establishment of a wind energy facility, a screening investigation was commissioned by the applicant for three areas in the Eastern and Northern Cape provinces. These three sites were evaluated against specific criteria, which included grid connectivity, land availability, the wind resource and environmental risks. The screening investigation included a broader area around the Stormberg site. The Stormberg study area was identified as being potentially feasible for wind development in terms of these criteria. Wind resource data is currently being collected from existing wind monitoring masts installed on the site, which indicate a suitable wind resource for operation of a wind energy facility on the proposed site.

2.2.5 Site-specific or Layout Design Alternatives

As mentioned above, a Screening Assessment was undertaken to assist in determining overall project feasibility and to assist in the conceptual and broad scale siting of the

wind energy facility. The scope of the assessment included a desktop ecological scan, a noise impact scan and an avifaunal scan. The screening exercise served to assist the applicant in mapping and identifying desktop sensitivities in order to delineate preliminary areas of exclusion within the broader development area.

The site under consideration is approximately 15 000ha in extent. With a footprint of approximately 60ha (calculated at 150 turbines and associated infrastructure), less than 0.5% of the study area will be permanently transformed as a result of the proposed wind energy facility. Exposure to the wind resource is considered favourable across the full extent of the study area, however, wind data from the areas at the top of the escarpment, the whole of the western portion and the majority of the southern portion suggests optimal wind exposure. The placement of the wind turbines and associated infrastructure within the study area can be undertaken taking cognisance of the identified environmental sensitivities and monitoring results. The final layout will consider and aim to achieve a balance between energy production and environmental protection, with the micro-siting of the turbines to be provided for assessment in the EIA Phase.

The applicant has not selected the final turbine model, or models, that will be installed on the site as this will also depend on future findings within the next phase of this EIA. The capacity of the actual turbines to be used for the project is not defined at this point, but the units are expected to be up to 3.5 MW in capacity. The turbines will have a hub height of up to 120 m and a rotor diameter of up to 130m.

2.2.6 The 'do-nothing' Alternative

The 'do-nothing' alternative is the option of the Applicant not constructing the Wind Energy Facility. This would result in no impacts on the environment as a result of a wind energy facility in this area.

In order to meet the long-term goal of a sustainable renewable energy industry and to diversify the energy-generation mix in South Africa, a goal of 17,8GW of renewables by 2030 has been set by the Department of Energy (DoE) within the Integrated Resource Plan (IRP) 2010. This energy will be produced mainly from wind, solar, biomass, and small-scale hydro (with wind and solar comprising the bulk of the power generation capacity). This amounts to ~42% of all new build power generation being derived from renewable energy forms by 2030.

DoE's macroeconomic study of renewable energy, developed under the now completed Capacity Building in Energy Efficiency and Renewable Energy (CaBEERE) project, has established that the achievement of this target would provide a number of economic benefits, including increased government revenue amounting to R299 million, increased GDP of up to R1 billion per year and the creation of an estimated 20 500 new jobs. In

addition, the development of renewable energy beyond the 10 000 GWh target holds further employment benefits and would maximise the number of jobs created per TWh.

The electricity demand in South Africa is placing increasing pressure on the country's existing power generation capacity. There is, therefore, a need for additional electricity generation options to be developed throughout the country. The 'do nothing' option in terms of implementing renewable energy projects therefore results in a scenario where the facility is developed in another location. The development of a renewable energy source, as promoted by the South African Government would therefore not be realised, and reliance on fossil fuel energy sources would not be reduced.

In response to the above, the purpose of the proposed wind energy facility is to add new capacity for generation of renewable energy to the national electricity mix and to aid in achieving the goal of a 43% share of all new power generation being derived from independent power producers (IPPs), as targeted by the Department of Energy (DoE). The 'do-nothing' alternative would result in this additional power from renewable energy not being added to the electricity grid. Although only a small contribution to the overall power requirements and renewable energy goals, the implementation of the proposed project (or any similar projects) is considered to provide possible environmental and socio-economic benefit at a local, regional and national level, and is in line with Government policy. Therefore, the do-nothing alternative is not considered a preferred alternative as economic and environmental benefits associated with development of a renewable energy source outweigh the short-term and long-term impacts of project construction and operation.

This option will be further assessed within the EIA phase of the process.

2.2.7 Description of the Project Construction Phase

The construction phase of the wind energy facility is dependent on the number of turbines to be erected. A facility of this size would take up to five years to construct in progressive stages. The construction of the proposed facility will mainly require the expertise of skilled staff, with limited opportunities for unskilled labour. In order to construct the proposed wind energy facility and associated infrastructure, a series of activities will need to be undertaken. The following construction activities have been considered to form part of the project scope.

Conduct Surveys: Prior to initiating construction, a number of surveys will be required including, but not limited to, geotechnical survey, site survey and confirmation of the turbine micro-siting footprint and associated infrastructure. Much of this survey work occurs during the environmental feasibility process undertaken within the Environmental Impact Assessment (EIA) process. This is required in order to inform the preliminary layout of the facility which is assessed in the EIA.

Establishment of Access Roads to and within the Site: Access/haul roads to the site as well as internal access roads within the site are required to be established. It is currently unknown whether access directly off the N6 will be required or allowed by SANRAL. Access to the site north of the escarpment can be via the R56, via an access road onto the farm Nooitgedacht. Access to the site south of the escarpment can be via a graded gravel road extending west off the N6 over the farm Valsch Fontein which in turn branches off in various directions over the farm Pen Hoek. Access to the site south-east of the N6 is currently provided via a graded gravel road (road to Halseton train station) extending over the farm Gelegen Fontein or from the R344 via the farm Schoemans Kraal.

Figure 2.3: View of eastern section of site from N6

Figure 2.4: View of the R56 in the direction of Molteno

Figure 2.5: Gravel access road to study area (farm Nooitgedacht 5/152) south of the R56

Figure 2.6: Gravel access road to study area (farm Nooitgedacht 1/152) north of the R56

Figure 2.7: Gravel road to south eastern section of study area

Figure 2.8: Gravel road to central section of study area below the escarpment

As far as possible, existing access roads would be utilised, and upgraded where required. Within the site itself, access will be required between the turbines for construction purposes (and later limited access for maintenance). Access roads are estimated to be between 5m to 8m in width. Special haul roads will be need to be constructed within the site to accommodate abnormally loaded vehicle access and circulation on the site, and these roads may exceed 8m in width in places (e.g. where turning circles are required). The internal service road alignment will be informed by the final micro-siting/positioning of the wind turbines.

These access roads will have to be constructed in advance of any components being delivered to site, and will remain in place after completion for future access and possibly access for replacement of parts if necessary.

Undertake Site Preparation: Site preparation activities will include clearance of vegetation at the footprint of each turbine, levelling and clearance of laydown areas at each turbine position, the establishment of internal access roads and excavations for foundations. These activities will require the stripping of topsoil, which will need to be stockpiled, backfilled and/or spread on site.

Construct Foundation: Concrete foundations will be constructed at each turbine location. The dimensions of the turbine foundations will be approximately 350m². The total operational footprint occupied exclusively by the turbines assuming that all 150 turbines are installed will therefore be 5,25ha. Foundation holes will be mechanically excavated to a depth of approximately 3m and subject to turbine-specific geotechnical results. A batching plant will be required to be erected close to the site for the construction of foundations. The foundation will be poured and will support a mounting ring. The foundation will then be allowed to cure.

Transport of Components and Equipment to Site: The wind turbine, including the tower, will be brought on site by the turbine supplier or a designated hauler in sections on flatbed trucks. Turbine units which must be transported to site consist of the tower

(in segments), nacelle and three rotor blades. The individual components are defined as abnormal loads in terms of Road Traffic Act (Act No 29 of 1989)[8] by virtue of the dimensional limitations (abnormal length of the blades) and load limitations (i.e. the nacelle). In addition, components of various specialised construction and lifting equipment are required on site to erect the wind turbines and need to be transported to site. In addition to the specialised lifting equipment/cranes, the normal civil engineering construction equipment would need to be brought to the site for the civil works (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.).

The components required for the establishment of the substation/s (including transformers) as well as the power lines (including towers and cabling) will also be transported to site as required.

The dimensional requirements of the load during the construction phase (length/height) may require alterations to the existing road infrastructure (e.g. widening on corners), accommodation of street furniture (e.g. street lighting, traffic signals, telephone lines etc.) and protection of road-related structures (i.e. bridges, culverts, portal culverts, retaining walls etc.) as a result of abnormal loading.

The equipment will be transported to the site using appropriate National and Provincial roads, and the access/haul roads to the site.

Establishment of Laydown Areas on Site: Laydown areas will need to be established at each turbine position for the storage of wind turbine components. The laydown area will need to accommodate the cranes required in tower/turbine assembly. Laydown and storage areas will be established for the normal civil engineering construction equipment which will be required on site.

A laydown area, incorporated into the turbine component laydown area, will be required at each position where the main lifting crane will be required to erect the turbine. This area would be required to be compacted and levelled to accommodate the above-mentioned necessary equipment.

Construct Turbine: A lifting crane will be brought on site. It will lift the tower sections into place. The nacelle, which contains the gearbox, generator and yawing mechanism, will then be placed onto the top of the assembled tower. The next step will be to assemble or partially assemble the rotor (i.e. the blades of the turbine) on the ground. It will then be lifted to the nacelle and bolted in place. A small crane will likely be needed for the assembly of the rotor while a large crane will be needed to put it in place. It will take approximately 2 days to erect a single turbine.

Construct Substation: An on-site substation will need to be constructed within the site development footprint. The turbines will be connected to the substation via

[8] A permit will be required for the transportation of these loads on public roads.

trenched cabling. The local switchgear and transformers for each turbine may be installed in the base of the tower, or on a small concrete plinth (approx. 5m x 5m) adjacent to the tower.

Once micro-siting/positioning of the turbines has been finalised, the position of the on-site substation will be chosen to optimise cable lengths and associated losses. The construction of the substation would require a survey of the site (approximately 200m x 200m); site clearing and levelling and construction of an access road to substation site (where required); construction of substation terrace and foundations; substation building, assembly, erection and installation of equipment (including transformers); connection of conductors to equipment; and rehabilitation of any disturbed areas and protection of erosion sensitive areas.

Establishment of Ancillary Infrastructure: A workshop and administrative centre as well as a contractor's equipment camp may also be required to be constructed. The establishment of these facilities/buildings will require the clearing of vegetation and levelling of the development site and the excavation of foundations prior to construction. A laydown area for building materials and equipment associated with these buildings will also be required. A 20 000 liter (20 m^3) steel diesel storage tank will be stationed in a bunded area at the contractors camp for refueling of vehicles and other machinery. Other hazardous substances which may temporarily be stored on site may be other lubricants and waste oil however the volumes are anticipated to be less than 10m3.

Connection of Wind Turbines to the Substation: Each wind turbine will be connected to an optimally positioned substation, which is likely to be sited in the southern section of the site in order to minimise the need for overhead distribution power lines to the off-site substations (refer to Section 2.4). The installation of underground electrical cables (33kV or 22kV) between the turbines to the substation will require the excavation of trenches, approximately 1 m in depth within which these cables can then be laid. The underground cables will be planned to follow the internal access roads where possible (as will any above-ground cabling, where required).

Connect Substation to Power Grid: Overhead power lines are proposed as essential infrastructure to connect the proposed on-site substation to the Eskom grid located off the site. Refer to Section 2.3 for additional information regarding the grid connection options.

2.2.8 Undertake Site Rehabilitation

As construction is completed in an area, and as all construction equipment is removed from the site, the site rehabilitation will begin where practical and reasonable. On full commissioning of the facility, any access points to the site which are not required during the operation phase will be closed and prepared for rehabilitation.

2.2.9 Project Operation Phase

The lifespan of the facility is approximated at 20 to 30 years. It is unknown at this stage how many employees would be required for the monitoring and maintenance of the facility.

The operations staff would be responsible for routine maintenance, long-term maintenance, and emergency work on the turbines. Routine maintenance activities for the turbines will include testing of lubricants for contaminants, changing of lubricants, calibrating and testing electronic systems, and tightening of bolts and components. Routine maintenance is generally completed on a scheduled basis by climbing the tower using the internal ladder and doing the work with normal hand tools and electrical testing equipment.

Long-term maintenance may include replacement/rebuilding and cleaning of larger components such as generators and gearboxes, testing of electrical components, and refurbishing blades.

Emergency work also may be required as the result of a system or component failure. Certain unplanned work such as blade repairs or repairs to other large components may require the use of a crane to complete the work.

2.2.10 Project Decommissioning Phase

The turbine infrastructure which will be utilised for the proposed Stormberg Wind Energy Facility is expected to have a lifespan of approximately 20 - 30 years (with maintenance). Equipment associated with this facility would only be decommissioned once it has reached the end of its economic life. It is most likely that decommissioning activities of the infrastructure of the facility discussed in this EIA would comprise the disassembly and replacement of the turbines with more appropriate technology/infrastructure available at that time.

The following decommissioning activities have been considered to form part of the project scope.

Site Preparation: Site preparation activities will include confirming the integrity of the access to the site to accommodate required equipment and lifting cranes, preparation of the site (e.g. laydown areas, construction platform) and the mobilisation of construction equipment.

Disassemble and Replace Existing Turbine: A large crane will be brought on site. It will be used to disassemble the turbine and tower sections. These components will be

reused, recycled or disposed of in accordance with regulatory requirements. All parts of the turbine would be considered reusable or recyclable except for the blades.

It is most likely that decommissioning would involve the disassembly and replacement of the turbines with more appropriate technology/infrastructure available at that time.

2.3. Grid connection

2.3.1 On-site substations

Once wind energy has been converted into electricity, an on-site substation (constituting supporting infrastructure) will be required to step-up the generated power for distribution via the proposed overhead power lines. A suitable area for the development of the substation will be identified during the EIA phase.

Substations are constructed in the following simplified sequence:

Step 1: Survey the area
Step 2: Final design of the substation and placement of the infrastructure
Step 3: Issuing of tenders and award of contract to construction companies
Step 4: Vegetation clearance and construction of access roads (where required)
Step 5: Construction of foundations
Step 6: Assembly and erection of infrastructure on site
Step 7: Connect conductors
Step 8: Rehabilitation of disturbed area and protection of erosion sensitive areas
Step 9: Testing and commissioning
Step 10: Continued maintenance

The duration of the operational phase of the substation will be dependent on the economic lifespan of the wind energy facility, or on whether other distribution infrastructure will tie into the substation at a later stage.

2.3.2 Power lines between the study area and the nearest grid connection points

Please note that this section has been included to provide the reader with an understanding of the proposed grid availability and connection options, however the proposed power lines required to evacuate the generated electricity into the national grid will be further described, evaluated and assessed as part a separate Basic Assessment process.

Phasing overview: There are no power lines traversing the study area or are located in the immediate vicinity of the study area for evacuation of the electricity into the Eskom grid. Connection to the Eskom grid is to be implemented in phases as capacity in the grid becomes available. 132kV overhead power lines are proposed to be

constructed to the identified grid connection points within servitudes of approximately 36m wide, while the EIA and associated specialist studies will consider a corridor of 300m in width to accommodate any potential environmental constraints and sensitivities which may be located along the routes. Based on the technical and environmental suitability of the selected option, a final route (corridor) will be selected to connect to the identified Eskom Substations.

Substations: The nearest operational substation to the study area is the Carrickmore substation located approximately 13km from the study area. This substation is currently running at full capacity and therefore cannot accommodate the additional electricity proposed to be generated by the project. In order to evacuate electricity generated by the proposed Stormberg project, the Freemantle and Komani Substations were identified as being the nearest potentially viable connection options, however the option to the Komani Substation has been dropped due to constraints as was communicated by Eskom.

New Freemantle Substation connection: To facilitate a connection to the New Freemantle Substation currently under construction near Lady Frere, two alternative corridors are being investigated for the construction of the 132kV power line from the project site to the new Freemantle Substation located near Lady Frere which is currently under construction. Due to the distance over which the proposed power line would extend to the new Freemantle Substation, a specialist grid planning company was involved in the identification and planning of two technically viable alternative power line corridors.

APPROACH TO UNDERTAKING THE SCOPING PHASE CHAPTER 3

An Environmental Impact Assessment (EIA) process refers to that process (dictated by the EIA Regulations) which involves the identification of and assessment of direct, indirect and cumulative environmental impacts associated with a proposed project. The EIA process comprises two phases: i.e. **Scoping Phase** and **EIA Phase**. The EIA process culminates in the submission of an EIA Report (including an Environmental Management Programme (EMPr)) to the competent authority for decision-making. The EIA process is illustrated below:

The Scoping Phase for the proposed Stormberg Wind Energy Facility has been undertaken in accordance with the EIA Regulations published in Government Notice 33306 of 18 June 2010, as amended in December 2010, in terms of Section 24(5) of the National Environmental Management Act (NEMA; Act No 107 of 1998). This scoping process is aimed at identifying potential issues associated with the proposed project, and defining the extent of studies required within the EIA. This was achieved through an evaluation of the proposed project involving specialists with expertise relevant to the nature of the project and the study area, the project proponent, as well as a consultation process with key stakeholders (including relevant government authorities) and interested and affected parties (I&APs). This chapter serves to outline the process which was followed during the Scoping Phase of the EIA process.

3.1 Objectives of the Scoping Phase

This Scoping Phase aims to:

» Identify and evaluate potential environmental (biophysical and social) impacts and benefits of all phases of the proposed development (including design, construction, operation and decommissioning) within the broader study area through a desk-top review of existing baseline data and specialist studies.
» Define the scope of studies to be undertaken within the EIA process.
» Identify potentially interested and affected parties and stakeholders and involve them within the EIA process.
» Provide the authorities with sufficient information in order to make a decision regarding the scope of issues to be addressed in the EIA process, as well as regarding

the scope and extent of specialist studies that will be required to be undertaken as part of the EIA Phase of the process.

Within this context, the objectives of this Scoping Phase are to:

» Clarify the scope and nature of the proposed activities.
» Clarify the reasonable and feasible project-specific alternatives to be considered through the EIA process, including the "do nothing" option.
» Identify and evaluate key environmental issues/impacts associated with the proposed project, and through desk-top specialist studies identify those issues to be addressed in more detail in the Impact Assessment Phase of the EIA process.
» Conduct an open, participatory and transparent public involvement process and facilitate the inclusion of stakeholders' concerns regarding the proposed project into the decision-making process.

3.2. Overview of the Scoping Phase

The Scoping Phase has been undertaken in accordance with the EIA Regulations published in Government Notice 33306 of 18 June 2010, in terms of NEMA. Key tasks undertaken within the scoping phase included:

» Consultation with relevant decision-making and regulating authorities (at National, Provincial and Local levels).
» Submission of a completed application form for authorisation in terms of Regulation 12 and 26 of Government Notice No R543 of 2010 to the competent authority (DEA).
» Undertaking a public involvement process throughout the Scoping process in accordance with Chapter 6 of Government Notice No R543 of 2010 in order to identify issues and concerns associated with the proposed project.
» Preparation of an Comments and Response Report detailing key issues raised by I&APs as part of the EIA Process (in accordance with Regulation 57 of Government Notice No R543 of 2010).
» Undertaking of independent specialist studies in accordance with Regulation 32 of Government Notice No R543 of 2010.

These tasks are discussed in detail below.

3.2.1. Authority Consultation and Application for Authorisation in terms of GN No R543 of 2010

As this is an electricity generation project the National Department of Environmental Affairs (DEA) is the competent authority for this application. As the project falls within the Eastern Cape Province, the Eastern Cape Department of Economic Development and Environmental Affairs and Tourism(Eastern Cape DEDEAT) act as a commenting authority for the project. Consultation with the Regulating authorities has been undertaken throughout the Scoping process. This consultation has included the following:

» Consultation with DEA regarding the proposed project and the EIA process to be undertaken.
» Submission of an application for authorisation to DEA. The DEA has allocated the following reference numbers for each of the respective components:
  » Wind Energy Facility (the subject of this Scoping report) - 14/12/16/3/3/2/394
  » Solar Energy Facility (separate scoping report) - 14/12/16/3/3/2/398
  » Power Lines (separate Basic Assessment Report) – 14/12/16/3/3/1/912

3.2.2. I&AP Identification, Registration and the Creation of a Project Database

The first step in the public involvement process was to identify relevant stakeholders and interested and affected parties (I&APs). This process was undertaken through existing contacts and databases, recording responses to site notices and newspaper advertisements, as well as through the process of networking. Stakeholder groups identified include:

» National, provincial and local government departments (including DEA, Eastern Cape DEDEAT, South African Heritage Resources Agency (SAHRA), Department of Water Affairs (DWA), Civil Aviation Authority (CAA), Department of Agriculture, etc.);
» Government Structures (including the Provincial Roads Authority, municipal planning departments, etc.);
» Local Municipalities including the Inkwanca Local Municipality and the Maletswai Local Municipality;
» District Municipalities including the Chris Hani District Municipality and the Joe Gqabi District Municipality;
» Potentially affected and neighbouring landowners and tenants;
» Conservation authorities;
» Industry and business; and

All relevant stakeholder and I&AP information has been recorded within a database of affected parties (refer to Appendix C for a listing of recorded parties). While I&APs have been encouraged to register their interest in the project from the start of the process, the

identification and registration of I&APs will be on-going for the duration of the EIA process. The project database will be updated on an on-going basis throughout the project process, and will act as a record of the parties involved in the public involvement process.

3.2.3. Notification of the EIA Process

In order to notify and inform the public of the proposed project and invite members of the public to register as interested and affected parties (I&APs), the project and EIA process was advertised in the Barkley East Reporter and Die Burger newspapers.

In addition, site advertisements were placed on site and at various other visible locations in Molteno and Sterkstroom (including public libraries and municipal offices) in accordance with the requirements of the EIA Regulations.

In addition to the above advertisements and notices, key stakeholders and identified I&APs were notified in writing of the commencement of the EIA process. These parties included, inter alia:

- Relevant parties from Municipalities potentially affected by the proposed project including:
  - Chris Hani District Municipality and the Joe Gqabi District Municipality
  - Inkwanca Local Municipality and Maletswai Local Municipality
- The affected landowners and neighbouring landowners
- Organs of State having jurisdiction in respect of any aspect of the activity, including:
  - Department of Water Affairs (DWA)
  - Department of Mineral Resources (DMR)
  - Department of Agriculture – Land Care
  - Department of Transport and Public Works and various District Roads Departments
  - South African National Roads Agency
  - Department of Rural Development and Land Reform
  - Civil Aviation Authority
  - South African Heritage Resources Agency (SAHRA)

Copies of all the advertisements placed and notices distributed are contained in Appendix D of this report. Copies of these letters distributed to the above mentioned organs of state/ key stakeholders are included in Appendix E of this report.

3.2.4. Framework for Public Involvement and Consultation

The aim of the public participation process throughout the EIA process is primarily to ensure that:

» All potential stakeholders and I&APs are identified and consulted with.
» Information containing all relevant facts in respect of the application is made available to potential stakeholders and I&APs.
» Participation by potential I&APs is facilitated in such a manner that all potential stakeholders and I&APs are provided with a reasonable opportunity to comment on the application.
» Comment received from stakeholders and I&APs is recorded.

In order to provide information regarding the proposed project and the EIA process, a background information document (BID) for the project was compiled at the outset of the process (refer to Appendix E). The BID has been distributed to identified stakeholders and I&APs, and additional hard copies have been made available at public venues within the broader study area. The BID is also available on the Savannah Environmental website (www.savannahsa.com).

Through consultation with key stakeholders and I&APs, issues for inclusion within the issues-based scoping study are identified and confirmed. In order to accommodate the varying needs of stakeholders and I&APs within the study area, as well as capture their views, issues and concerns regarding the project, various opportunities have been and will continue to be provided for I&APs to have their issues noted, as follows:

» **Notification** of the proposed project in printed media and on site
» **Public meeting** in the study area (open meeting advertised in the local press)
» **Focus group meetings** (pre-arranged and stakeholders invited to attend)
» One-on-one **consultation meetings** (including with directly affected or surrounding landowners)
» **Telephonic consultation** sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants)
» Written, faxed or e-mail **correspondence.**

3.2.5. Public Involvement and Consultation Undertaken during Scoping Phase

Notification and telephonic consultations: Authorities having jurisdiction over the study area were notified of the proposed project and meeting requests submitted. Landowners and adjacent landowners were identified and provided with a Background Information Document and an invitation to attend the public meeting. The details of the public meeting were advertised in a stakeholder letter to state departments, municipalities, landowners and adjacent landowners and widely in the regional newspapers (Barkley East Reporter and Die Burger). Site notices were erected in English and Afrikaans at visible locations along access roads traversing the study area on 17 May 2013.

Authorities meetings: During the Scoping phase meetings were held with a representative of the Chris Hani District Municipality on 16 May 2013 and with representatives of the Maletswai Local Municipality on 22 May 2013. The minutes of the meetings are attached in Appendix E. Meetings with the Joe Gqabi District Municipality and the Inkwanca Local Municipality could not be secured, however these municipalities were notified of the proposed project.

Public meeting: A public consultation meeting was held on 22 May 2013 at the Molteno Town Hall in Molteno (refer to Appendix E for the minutes of the meeting and attendance register). The meeting was well attended by landowners directly affected by the proposed project. The purpose of the meeting was to identify potential issues at the outset of the EIA process which require further investigation during Scoping and assessment during the EIA phases.

Focus group meetings: during the Scoping Phase meetings were held with a representative of the Molteno Farmers Association and a representative of Cape Vultures in Crisis on 23 May 2013. The minutes of the meetings are attached in Appendix E.

Networking with I&APs will continue throughout the duration of the EIA process. Issues and concerns raised by I&APs will be consolidated into a Comments and Response Report, which will form part of the Final Scoping Report.

3.2.6. Public Review of Draft Scoping Report

This is the **current stage** of the Scoping Phase. The Draft Scoping Report has been made available for public review from **9 April 2014 – 15 May 2014** at the following locations:

» www.savannahSA.com
» Molteno Public Library
» Sterkstroom Public Library

3.2.7. Summary of Public Involvement Process undertaken to date (Scoping Phase)

Activity	Date
Placement of site notices on-site & in public places	17 May 2013
Distribution of a stakeholder letter, background information document to authorities, ward councillors, landowners within the study area, neighbouring landowners and stakeholder groups	From 14 May 2013
Placement of newspaper advert in local newspaper (Barkley East Reporter and Die Burger) informing interested parties of the following: » Project description and locality » The date, time and venue of the public meeting held on	14 May 2013

22 May 2013 in Molteno	
Focus group meeting with Maletswai Local Municipality and Public Meeting held in Molteno	22 May 2013
Focus group meetings with a representative of the Molteno Farmers association and a representative of Cape Vultures in Crisis	23 May 2013
Distribution of Draft Scoping Report for comment	9 April 2014 – 15 May 2014
Advertisement in the local newspapers advertising the release of the draft Scoping Report	Week of 14 April 2014

3.2.8. Evaluation of Issues Identified through the Scoping Process

Issues (both direct and indirect environmental impacts) associated with the proposed project identified within the scoping process have been evaluated through desk-top studies. In evaluating potential impacts, Savannah Environmental has been assisted by the following specialist consultants:

Specialist	Area of Expertise	Refer Appendix
Simon Todd Consulting	Ecology, flora and fauna	Appendix F
Jon Smallie of WildSkies Ecological Services	Avifauna	Appendix G
Dr Ian Whyte	Grassland avifauna	Appendix H
Endangered Wildlife Trust	Bats	Appendix I
Johann Lanz	Agricultural potential & Soils	Appendix J
Lourens du Plessis of MetroGIS	Visual Impact	Appendix K
Jaco van der Walt of Heritage Contracts	Heritage	Appendix L
Dr. B.D Millsteed	Palaeontology	Appendix M
Morne de Jager of MENCO (M2 Environmental Connections cc)	Noise	Appendix N
Tony Barbour (Environmental Consultant and Researcher)	Social Impact	Appendix O

In order to evaluate issues and assign an order of priority, the following methodology was used to identify the characteristics of each potential issue/impact for each of the proposed phases:

» Identify the **nature** of the potential impact, which includes a description of what causes the effect, what will be affected and how it will be affected
» Identify the **extent** of the potential impact, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development) or regional
» Identify **sensitive receptors** that may be impacted on by the proposed facility and the **types of impacts** that are most likely to occur.

» Evaluate the **significance** of potential impacts in terms of the requirements of the EIA Regulations.
» Identify the potential impacts that will be **considered further** in the EIA Phase.

3.2.9. Final Scoping Report

The final stage in the Scoping Phase will entail the capturing of responses from stakeholders and I&APs on the Draft Scoping Report in order to refine this report. It is this final report upon which the decision-making environmental Authorities provide comment, recommendations and acceptance to undertake the EIA Phase of the process.

3.3. Regulatory and Legal Context

The South African energy industry is evolving rapidly, with regular changes to legislation and industry role-players. The regulatory hierarchy for an energy generation project of this nature consists of three tiers of authority who exercise control through both statutory and non-statutory instruments – that is National, Provincial and Local levels. As wind energy development is a multi-sectoral issue (encompassing economic, spatial, biophysical, and cultural dimensions) various statutory bodies are likely to be involved in the approval process for wind energy facility project and the related statutory environmental assessment process.

3.3.1. Regulatory Hierarchy

At **National Level**, the main regulatory agencies are:

» *Department of Energy*: This department is responsible for policy relating to all energy forms, including renewable energy, and are responsible for forming and approving the IRP (Integrated Resource Plan for Electricity). It is the controlling authority in terms of the Electricity Regulation Act (Act No 4 of 2006).
» *National Energy Regulator of South Africa (NERSA):* This body is responsible for regulating all aspects of the electricity sector, and will ultimately issue licenses for wind energy developments to generate electricity.
» *Department of Environmental Affairs (DEA):* This Department is responsible for environmental policy and is the controlling authority in terms of NEMA and the EIA Regulations. The DEA is the competent authority for this project, and charged with granting the relevant environmental authorisation.
» *The South African Heritage Resources Agency (SAHRA):* The National Heritage Resources Act (Act No 25 of 1999) and the associated provincial regulations provides legislative protection for listed or proclaimed sites.
» *Department of Transport – South African Civil Aviation Authority (SACAA):* This department is responsible for aircraft movements and radar, which are aspects that influence wind energy development location and planning.

» *South African National Roads Agency Limited (SANRAL):* This department is responsible for all National road routes.
» *Department of Water Affairs (DWA):* The DWA is mandated to manage South Africa's water resources by ensuring the security and quality thereof.
» *The Department of Agriculture, Forestry and Fisheries (DAFF):* This Department is the custodian of South Africa's agriculture, fisheries and forestry resources and is primarily responsible for the formulation and implementation of policies governing the Agriculture, Forestry and Fisheries Sector. This Department has published a guideline for the development of wind farms on agricultural land.

At **Provincial Level**, the main regulatory agencies are:

» *Provincial Government of the Eastern Cape – Department of Economic Development and Environmental Affairs and Tourism (DEDEAT).* This department is the commenting authority for this project.
» *Department of Transport and Public Works - Eastern Cape.* This department is responsible for roads and the granting of exemption permits for the conveyance of abnormal loads on public roads.
» *Eastern Cape Department of Agriculture and Rural Development* – This is the provincial authority responsible for matters affecting agricultural land.
» *Eastern Cape Provincial Heritage Resources Authority.*
» *DWA* – This Department is responsible for evaluating and issuing licenses pertaining to water use.

At **Local Level** the local and municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Eastern Cape, the Inkwanca and Maletswai Local Municipalities as well as the Chris Hani District Municipality and the Joe Gqabi District Municipality play a role.

» In terms of the Municipal Systems Act (Act No 32 of 2000) it is compulsory for all municipalities to go through an Integrated Development Planning (IDP) process to prepare a five-year strategic development plan for the area under their control.
» Bioregional planning involves the identification of priority areas for conservation and their placement within a planning framework of core, buffer and transition areas. These could include reference to visual and scenic resources and the identification of areas of special significance, together with visual guidelines for the area covered by these plans.
» By-laws and policies have been formulated by local authorities to protect visual and aesthetic resources relating to urban edge lines, scenic drives, special areas, signage, communication masts, etc.

There are also numerous non-statutory bodies such as Wind Energy Associations and environmental lobby groups that play a role in various aspects of planning and the environment that will influence wind energy development.

3.3.2. Legislation and Guidelines that have informed the preparation of this Scoping Report

The following legislation and guidelines have informed the scope and content of this Draft Scoping Report:

- National Environmental Management Act (Act No. 107 of 1998)
- EIA Regulations and subsequent amendments thereto published under Chapter 5 of the NEMA (GNR R543 in Government Gazette 33306 of 18 June 2010)
- Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010)
  - Public Participation in the EIA Process (DEA, 2010)
  - Integrated Environmental Management Information Series (published by DEA)
- Chris Hani District Municipality Integrated Development Plan (IDP) (2009/10);
- Inkwanca Local Municipality Integrated Development Plan (2012-2017);
- Maletswani Local Municipality Integrated Development Plan (2010/2011 Review);
- International guidelines – the Equator Principles and the International Finance Corporation and World Bank Environmental, Health, and Safety Guidelines for Wind Energy (2007).

Several other Acts, standards or guidelines have also informed the project process and the scope of issues evaluated in the scoping report, and to be addressed in the EIA. A listing of relevant legislation identified at this stage of the process is provided in Table 3.1. A more detailed review of legislative requirements applicable to the proposed project will be included in the EIA phase.

Table 3.1: Initial review of relevant policies, legislation, guidelines and standards applicable to the proposed Stormberg Wind Energy Facility Project EIA

Legislation	Applicable Sections
	National Legislation
Constitution of the Republic of South Africa (Act No 108 of 1996)	» Bill of Rights (S2) » Environmental Rights (S24) – i.e. the right to an environment which is not harmful to health and well-being » Rights to freedom of movement and residence (S22) » Property rights (S25) » Access to information (S32) » Right to just administrative action (S33)
National Environmental Management Act (Act No 107 of 1998)	» National environmental principles (S2), providing strategic environmental management goals and objectives of the government applicable throughout the Republic to the actions of all organs of state that may significantly affect the environment

Legislation	Applicable Sections
	» NEMA EIA Regulations (GNR R543 of June 2010 as corrected December 2010) published in terms of Chapter 5 of the NEMA » The requirement for potential impact on the environment of listed activities must be considered, investigated, assessed and reported on to the competent authority (S24 – Environmental Authorisations) » Duty of Care (S28) requiring that reasonable measures are taken to prevent pollution or degradation from occurring, continuing or recurring, or, where this is not possible, to minimise & rectify pollution or degradation of the environment » Procedures to be followed in the event of an emergency incident which may impact on the environment (S30)
Environment Conservation Act (Act No 73 of 1989)	» National Noise Control Regulations (GN R154 dated 10 January 1992)
National Heritage Resources Act (Act No 25 of 1999)	» Stipulates assessment criteria and categories of heritage resources according to their significance (S7) » Provides for the protection of all archaeological and paleontological sites, and meteorites (S35) » Provides for the conservation and care of cemeteries and graves by SAHRA where this is not the responsibility of any other authority (S36) » Lists activities which require developers any person who intends to undertake to notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development (S38) » Requires the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites as part of tourism attraction (S44)
National Environmental Management: Biodiversity Act (Act No 10 of 2004)	» Provides for the MEC/Minister to identify any process or activity in such a listed ecosystem as a threatening process (S53) - none have as yet been published » A list of threatened & protected species has been published in terms of S 56(1) - Government Gazette 29657. » Three government notices have been published, i.e. GN R 150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R 151 (Lists of critically endangered, vulnerable and protected species) and GN R 152 (Threatened or Protected Species Regulations). » Provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems

Legislation	Applicable Sections
	has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (G 34809, GN 1002), 9 December 2011). » This Act also regulates alien and invader species. » Under this Act, a permit would be required for any activity which is of a nature that may negatively impact on the survival of a listed protected species.
Minerals and Petroleum Resources Development Act	» Regulates mining activities » Requirements for Environmental Management Programme for mining applications, including borrow pits
National Environmental Management: Air Quality Act (Act No 39 of 2004)	» The Draft National Dust Control Regulations prescribe measures for the control of dust in all areas including residential and light commercial areas.
Conservation of Agricultural Resources Act (Act No 43 of 1983)	» Prohibition of the spreading of weeds (S5) » Classification of categories of weeds & invader plants (Regulation 15 of GN R1048) & restrictions in terms of where these species may occur » Requirement & methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R1048)
National Water Act (Act No 36 of 1998)	» National Government is the public trustee of the Nation's water resources (S3) » Entitlement to use water (S4) – entitles a person to use water in or from a water resource for purposes such as reasonable domestic use, domestic gardening, animal watering, fire fighting and recreational use, as set out in Schedule 1 » Duty of Care to prevent and remedy the effects of pollution to water resources (S19) » Procedures to be followed in the event of an emergency incident which may impact on a water resource (S20) » Definition of water use (S21) » Requirements for registration of water use (S26 and S34) » Definition of offences in terms of the Act (S151)
Aviation Act (Act No 74 of 1962)	» 13th amendment of the Civil Aviation Regulations (CARs) 1997 » The Minister of Transport has under section 22(1) of the Aviation Act, 1962 made the regulations in the Schedule hereto.

Legislation	Applicable Sections
	» Obstacle limitations and marking outside aerodrome or heliport - CAR Part 139.01.33
National Environmental Management: Waste Act (Act No 59 of 2008)	» The purpose of this Act is to reform the law regulating waste management in order to protect health and the environment by providing for the licensing and control of waste management activities. » The Act provides listed activities requiring a waste license. » S20 defines waste disposal practices.
National Veld and Forest Fire Act (Act No 101 of 1998)	» Formation of fire protection associations (S3) » Registration of fire protection associations (S4) » Duty to prepare and maintain firebreaks (S12) » Requirements for firebreaks (S13) » Readiness for fire fighting (S17) » Penalties (S24) and Offences (S25)
National Forests Act (Act No 84 of 1998)	» Protected trees (S12) » Forests (S19 – 21)
	Guideline Documents
South African National Standard (SANS) 10328, Methods for environmental noise impact assessments in terms of NEMA No. 107 of 1998	» Prediction of impact that noise emanating from a proposed development would have on occupants of surrounding land by determining the rating level. » Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103
Strategic Initiative to Introduce Commercial Land Based Wind Energy Development to the Western Cape - Towards a Regional Methodology for Wind Energy Site Selection	» Regional methodology for the siting of wind energy facilities within the Western Cape (Report 5) » Project level methodology for assessing wind energy facilities within the Western Cape (Report 6)
Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads	» Outlines the rules and conditions which apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits
» Chris Hani District Municipality Integrated Development Plan (IDP) (2009/10) » Inkwanca Local Municipality Integrated Development Plan (2012-2017) » Maletswani Local Municipality Integrated Development Plan (2010/2011 Review)	» Planning and sustainability objectives for Local and District municipalities
Department of Agriculture, Fisheries and Forestry (DAFF)	» Regulations For The Evaluation And Review Of Applications Pertaining To Wind Farming On Agricultural Land

Legislation	Applicable Sections
Birdlife South Africa / Endangered Wildlife Trust Best Practice Guidelines For Avian Monitoring And Impact Mitigation At Proposed Wind Energy Development Sites In Southern Africa	» Stipulates an integrated programme of pre- and post-construction monitoring for wind farm projects in order to: * develop our understanding of the effects of wind energy facilities on southern African birds. * To develop the most effective means to mitigate the impacts on birds.
South African Good Practice Guidelines for Surveying Bats in Wind Farm Developments (2011)	» Stipulates an integrated programme of pre- and post-construction monitoring for wind farm projects in order to: * develop our understanding of the effects of wind energy facilities on bats. » To develop the most effective means to mitigate the impacts on bats.
Policies and White Papers	
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	» Investment in renewable energy initiatives, such as the proposed wind energy facility, is supported by this white Paper.
The White Paper on Renewable Energy (November 2003)	» This Paper sets out Government's vision, policy principles, strategic goals and objectives for promoting and implementing renewable energy in South Africa.

DESCRIPTION OF THE AFFECTED ENVIRONMENT CHAPTER 4

This section of the Scoping Report provides a description of the environment that may be affected by the proposed Stormberg Wind Energy Facility and associated infrastructure. This information is provided in order to assist the reader in understanding the possible effects of the proposed project on the environment. Aspects of the biophysical, social and economic environment that could be directly or indirectly affected by, or could affect, the proposed development have been described. This information has been sourced from both existing information available for the area as well as collected field data, and aims to provide the context within which this EIA is being conducted. A more detailed description of each aspect of the affected environment is included within the specialist scoping reports contained within **Appendices F – O**.

4.1. Regional Setting

The study area has a distinct rural and natural character and spans across the Stormberg escarpment (from south to north). The northern farm portions are located on the Stormberg Plateau, while the southern farm portions are located within the Grootvleispruit and Hex River basin below the escarpment. The Stormberg Mountains form part of the southern Drakensberg Mountains and the Great Escarpment that divides the Central Interior Plains from the Eastern Plateau Slope. Other mountains or tall hills, that delineate the rim of the Grootvleispruit and Hex River Basin, include the Donkerhoeksberg and Salpeterberg (to the west) and the Andriesberg (to the south and south-east).

The study area ranges in elevation from approximately 1 250m above sea level in the south and south-east, to 2 200m above sea level on top of the taller mountains located to the north. Besides the sections of the study area identified as mountains and tall hills, the larger part of the proposed development area is described as undulating plains, with limited slope elevation (refer to Figure 4.1).

The most prominent hydrological feature, located partially within the proposed study area, in the western portion above the escarpment, is a relatively large pan simply called Die Pan (The Pan). This pan has been identified by the NFEPA as a priority wetland complex for conservation. Other smaller pans and farm dams occur throughout the study area. There are no major perennial rivers besides the Grootvleispruit (and the upper reaches of the Hex River), but a number of non-perennial rivers and streams traverse the study area.

Existing power line and substation infrastructure is limited in the immediate vicinity of the facility. The Carrickmore 132kV substation (located approximately 12.5km west of the study area) and the overhead power lines near this substation (including the Beta-Delphi 1 400kV and Carrickmore-Putterskraal 1 132kV lines) are located

closest to the study area. The Dorper Wind Energy Facility near Molteno is currently under construction. The larger part of the region remains mostly undeveloped.

The population density of the region is indicated at less than 10 people per km², predominantly concentrated within the town of Sterkstroom.

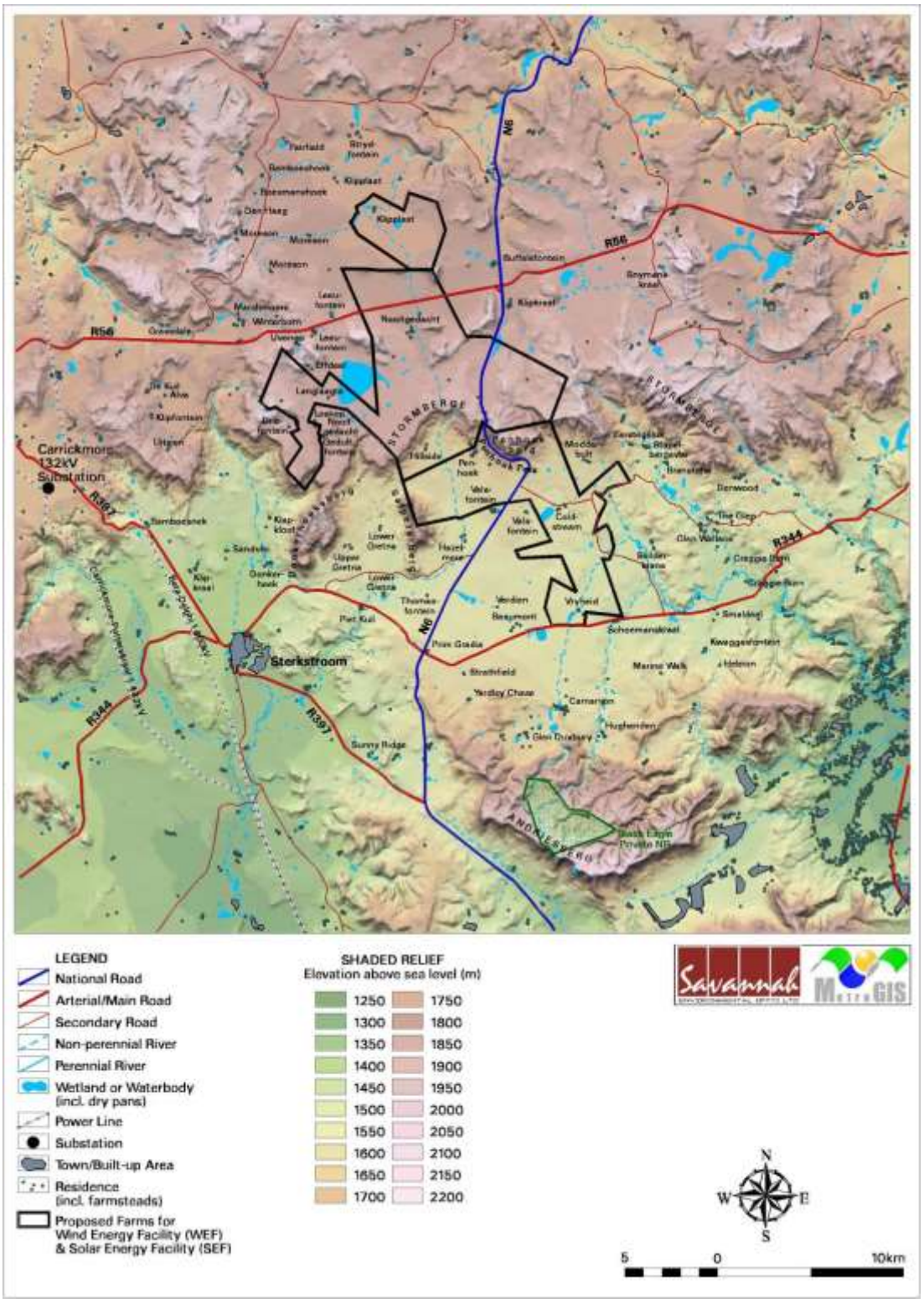

Figure 4.1: Shaded relief map (indicating the location of the study area and the topography and elevation above sea level) of the broader study area.

4.2. Location and Land Use of the Study Area

The project site study area is easily accessible from the north and the south, via the N6 national road, as well as from the east and the west, along the R56 and R344 arterial roads. The N6 traverses the study and the Stormberg Escarpment via the Penhoek Pass. There are also a number of secondary roads and local access roads within the study area.

Land use activities within the broader region are predominantly described as sheep farming with very limited dryland and irrigated agricultural activities occuring. Farm settlements or residences occur at irregular intervals throughout the study area. The population density of the region is indicated at less than 10 people per km², predominantly concentrated within the town of Sterkstroom.

The natural vegetation or land cover types of the region are described as Grassland, with very limited Thicket and Bushland and Wetlands interspersed. Large tracts of the grassland within the study area are indicated as being degraded to some degree. Shrubland can be found along the higher-lying and mountainous terrain east of Sterkstroom and along the slopes of the Andriesberg and Donkerhoekberg. The majority of the remaining natural vegetation within the northern part of the study area is indicated as Stormberg Plateau Grassland, (above the escarpment) and Tsomo Grassland (below the escarpment). The mountainous terrain of the escarpment and further north, are indicated as Southern Drakensberg Highland Grassland and to the south (mainly the Andriesberg) as Tarkastad Montane Shrubland (refer to Figure 4.2).

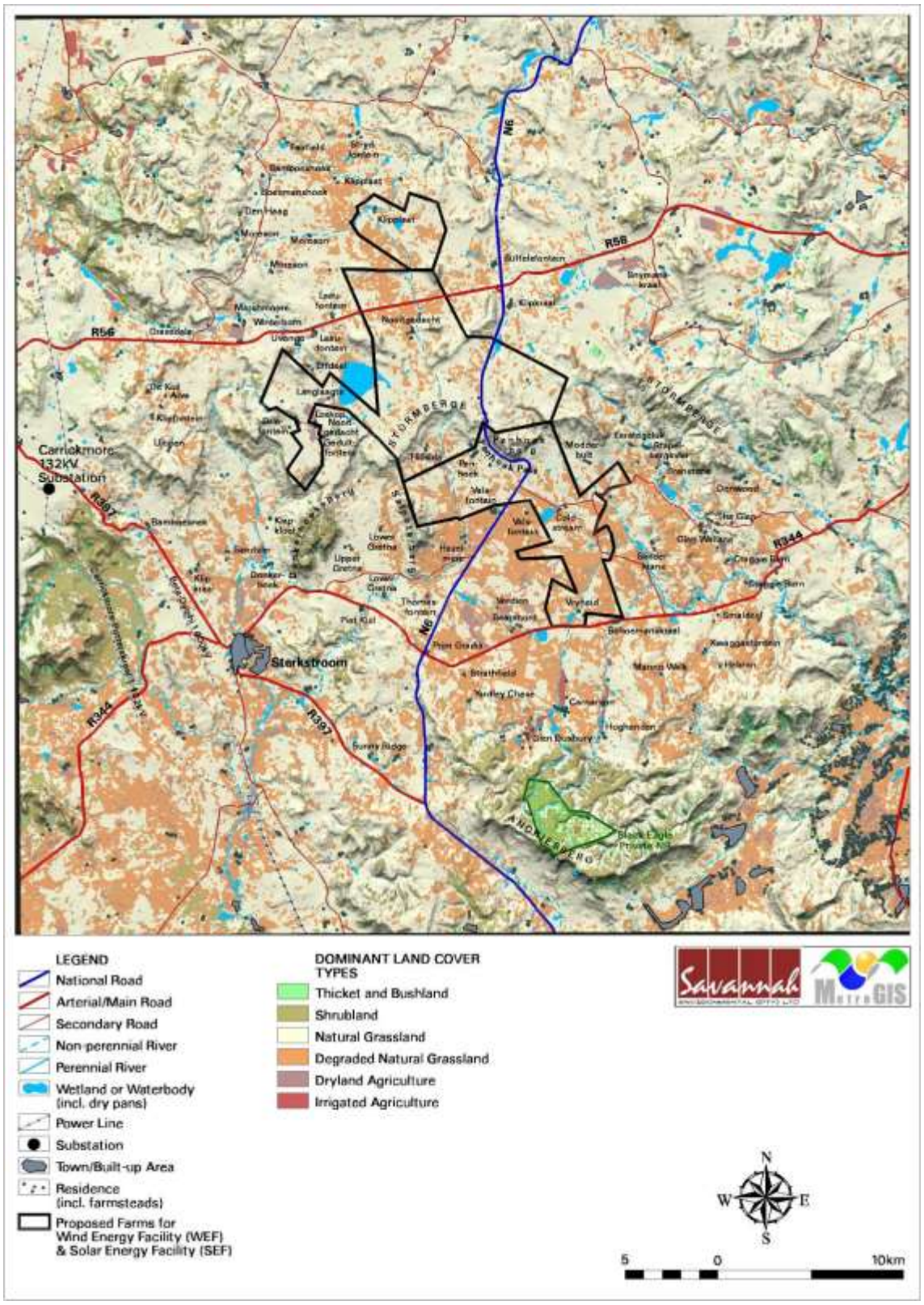

Figure 4.2: Land cover/land use map of the study area

4.3. Geology and Agricultural Potential

Geology: The geology of the renewable energy facility study area is mudstone and sandstone of the Elliot Formation of the Karoo Sequence with some dolerite intrusions. The land is susceptible to erosion by water and changes across the study area due to variations in slope.

Land types and capability: There are five land types across the renewable energy facility study area and surrounding area (refer to Figure 4.3). The Da land types occupy the flatter plateau areas and are dominated by shallow duplex soils, characterised by abrupt transition to a structured clay rich horizon in the subsoil. This land type is representative of marginal potential arable land. The Fb land types occupy the steeper mountainous terrain and are dominated by rock outcrops and shallow soils that have developed directly in partially weathered rock. This land type is representative of non-arable, low potential grazing land.

Land use and grazing capacity: Agricultural land use in the renewable energy facility study area is predominantly grazing with limited cultivation in isolated areas along some of the streams. The natural grazing capacity varies between 5 to 30 hectares per large stock unit across the study area, with the upper plateau area having the higher capacities.

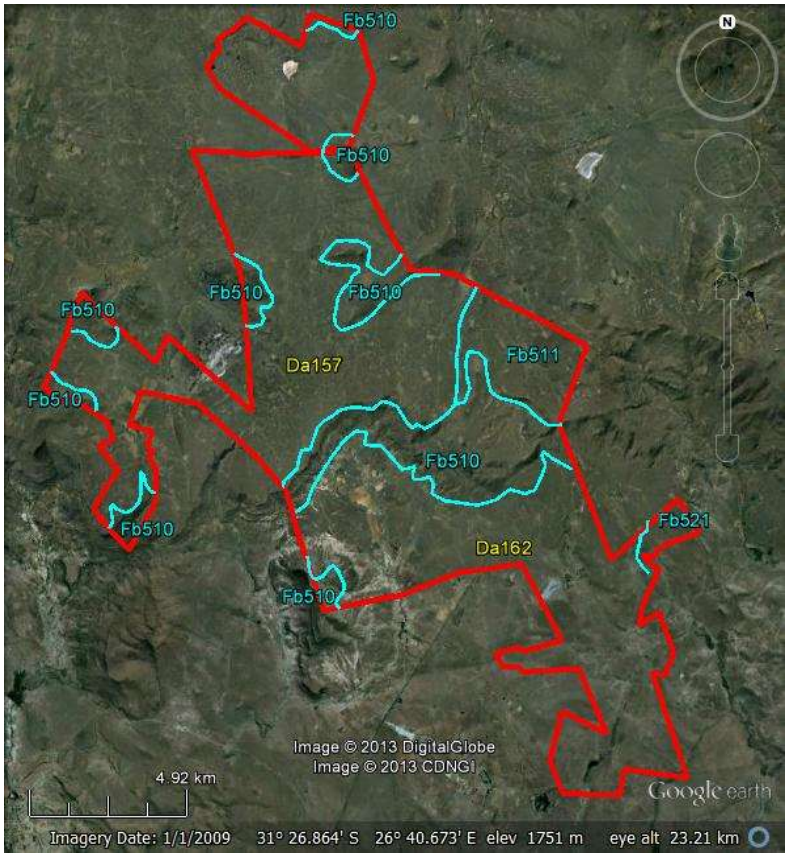

Figure 4.3: Land types of the study area

4.4. Areas of Conservation Importance

4.4.1 Critical Biodiversity Areas and Centres of Endemism

The study area falls within the planning domain of the Eastern Cape Province Biodiversity Conservation Assessment (Skowno, 2008), which maps Critical Biodiversity Areas (CBA) and Ecological Support Areas within the Province (refer to Figure 4.4). The following is relevant to the study area:

- **CBA Tier 2**: The majority of the study area falls within this classification, designed as part of a broad-scale corridor aimed to maintain the connectivity of the landscape and conserve the integrity of long-term ecological processes.
- **CBA Tier 3:** The southern tip of the study area falls within this classification and is defined as vulnerable vegetation types for which there is some conservation concern.

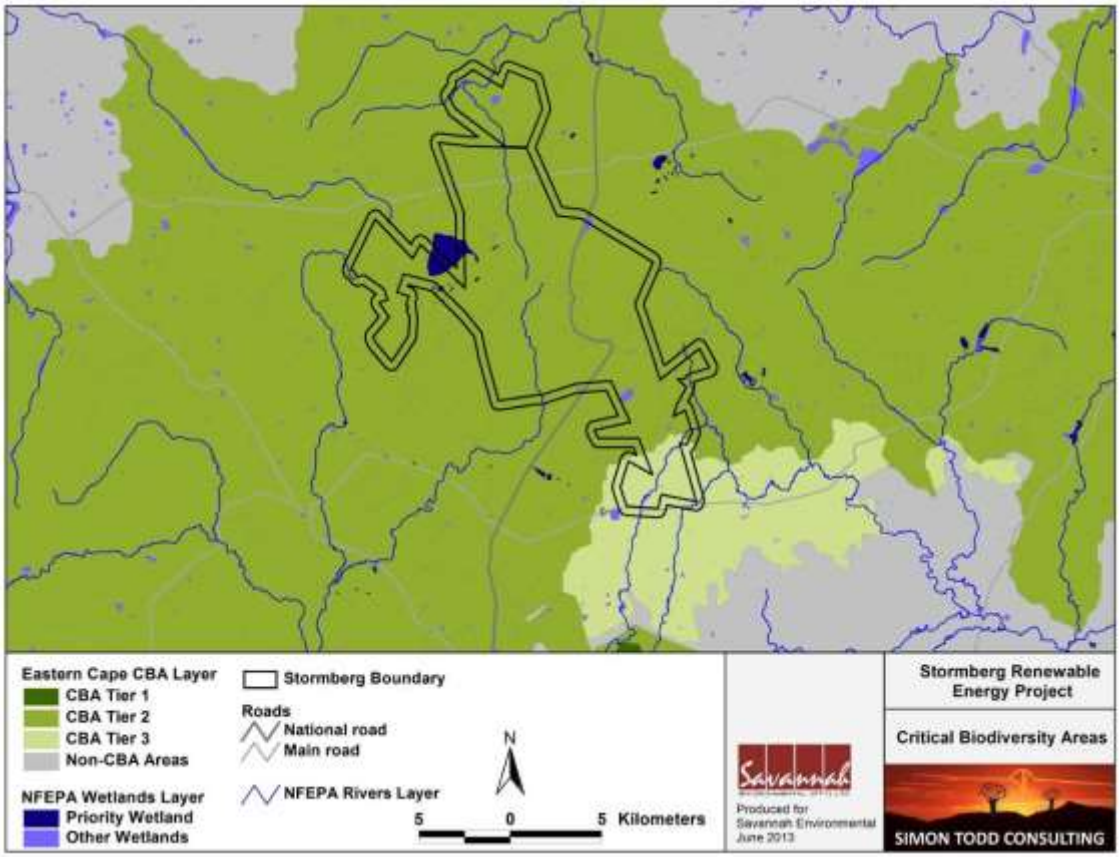

Figure 4.4: Critical biodiversity Areas in the context of the study area

No parts of the study area are recognised as a CBA on account of exceptional or unique biodiversity features that are known to occur in the area (CBA Tier 1). The implications of this for the development are that local-scale impacts on biodiversity may be acceptable, provided that they do not compromise the overall ecological functioning and connectivity of the broader landscape. However, development within

CBAs is not encouraged and any development contemplated in such areas must demonstrate that sufficient cognisance has been paid to avoiding negative biodiversity impacts.

The southern half of the study area falls within the Albany Centre of Endemism although vegetation typical of this Centre does not occur within the study area and the escarpment zone is within the Drakensberg Centre of Endemism.

4.4.2 National Freshwater Ecosystem Priority Areas

A large wetland (identified as "Die Pan") occurs within the western part of the study area, as well as the cluster of smaller wetlands around it. These have been identified under the National Freshwater Ecosystem Priority Areas assessment (NFEPA) as natural wetlands in a good condition and which represent priority wetlands for conservation. No development should occur within the vicinity of these wetlands as they are identified as natural wetlands in good condition (under NFEPA) and are therefore attributed a 500m buffer, which represents a minimum setback distance from such features. These features are important to birds.

4.4.3 Nature Reserves

The Black Eagle Private Nature Reserve (refer to Figure 4.2) is the only formally listed protected area identified within the region. The reserve is located within the Andriesberg Mountains, roughly 10km south of the study area and classified as a CBA 1 (critically endangered vegetation type and irreplaceable biodiversity area).

4.5. Ecological Profile of the Study Area including Flora and Fauna

4.5.1. Vegetation

The vegetation of the study area is divided into three clear sections associated with the different broad environments of the study area according to the national vegetation map (Mucina and Rutherford, 2006). The low-lying areas of the southern part of the study area consist of Tsomo Grassland, while the steep slopes along the escarpment consist of Southern Drakensberg Highland Grassland and the plateau areas of the northern section of the study area consist of Stormberg Plateau Grassland. All of these vegetation units are still relatively intact in the study area.

Tsomo Grassland: having been the most severely impacted by agriculture and urbanisation, is currently listed as Least Threatened as it has not reached the transformation threshold to be considered Vulnerable or Endangered. Tsomo Grassland, however, has no endemic taxa listed according to Mucina and Rutherford (2006) and characterises the southern section of the study area below the escarpment (approximately 5 392 ha).

Southern Drakensberg Highland Grassland: is likely to have the highest species richness as well the greatest number of species of conservation concern. Mucina and Rutherford (2006) list 17 endemic taxa for this vegetation type. Southern Drakensberg Highland Grassland characterises the central section of the study area being the escarpment and sections to the west (approximately 1 992 ha).

Stormberg Plateau Grassland: forms a transitional area with the Southern Drakensberg Highland Grassland and is likely to share a lot of species due to vegetation shifts between the two vegetation types across short distances depending on the local underlying geology and aspect. Mucina and Rutherford (2006) list 1 endemic taxa for this vegetation type. Stormberg Plateau Grassland characterises the northern section of the study area above the escarpment (approximately 6 968 ha).

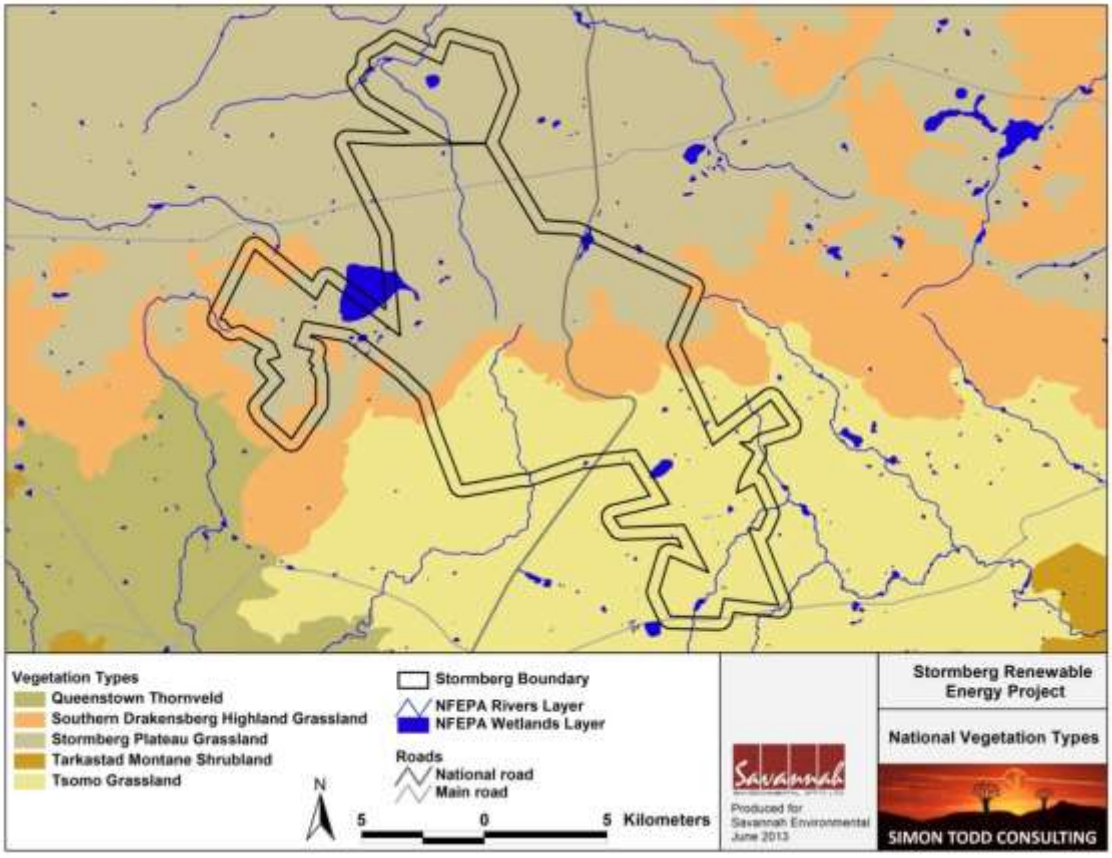

Figure 4.5: Broad-scale overview of the vegetation in and around the study area. The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes rivers and wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011).

Protected plant species: 796 plant species have been recorded within the region, only one of which is of high conservation concern and another 12 of which are of moderate concern. There are, however, no species listed as Critically Endangered or Endangered by the South African Red List of Plants which are known from the area.

Listed species of conservation concern which are potentially widespread within the study area due to the availability of suitable habitat include *Gunnera perpensa*, which is a wetland species, *Boophone disticha*, *Pelargonium sidoides* and *Pelargonium reniforme*.

Figure 4.6: Examples of listed species *Gunnera perpensa, Boophone disticha, Pelargonium sidoides* and *Pelargonium reniforme* which could potentially occur in the study area.

4.5.2 Terrestrial Fauna

Mammals: The study area falls within or near the distribution range of 57 mammals and therefore is likely to have a relatively high mammalian species richness. Although not all of these mammals will occur, the study area has a variety of habitats present, from lowlands and uplands to wetlands and rocky bluffs, which would increase the overall species richness.

Listed species which may occur in the study area include the Black-footed Cat *Felis nigripes* (Vulnerable), *Leopard Panthera pardus* (Near Threatened) and White-tailed Mouse Mystromys albicaudatus (Endangered). All of these species have wide ranges across South Africa and the development would not result in a significant overall decline in the available habitat for these species. At a local level, there is likely to be some impact on the Black-footed Cat and Leopard. However, as these are secretive animals which occur in low densities, it is likely that possibly affected individuals would still be able to utilise the majority of the site.

Reptiles: 45 reptile species are known to occur in the broader region indicating that the reptile diversity at the study area is potentially of moderate to high diversity. As the study area includes a variety of reptile habitats such as rocky outcrops, bluffs, narrow gorges, wetlands and open grassland, the actual diversity of reptiles is also likely to be relatively high, although no listed species are known from the area. This may relate to area having been poorly sampled in the past with rarer species being missed, or due to the lack of specialised habitats in the area.

Amphibians: A total of 13 amphibians are known to occur within the broader region. The only species of conservation concern which is fairly likely to occur within the

study area is the Giant Bullfrog *Pyxicephalus adspersus* which is listed as Near Threatened.

4.5.3 Avifauna - Birds

Habitat availability: The occurrence of the vegetation units described in Section 4.5.1 above partially describes the habitats available to birds within the study area and where bird species are likely to occur. Micro-habitats available to birds within the study area include grasslands, wetlands, dams, arable lands, escarpment, pans, exotic trees, and drainage lines, the availability of which determine the distribution of important species within the study area.

Distribution of birds: Approximately 218 bird species could occur in the study area based on existing data sources. 22 Red Listed bird species (also identified as target species for monitoring purposes in Table 4.1) are considered likely to occur within the study area as determined in both avifaunal scoping studies conducted:

» 2 of which are considered unlikely to occur, of which 1 is classified as Endangered (Bearded Vulture).
» 1 of which is classified as Critically Endangered and confirmed breeding in the most northern section of the study area (Rudd's Lark -based on personal communication with the landowner).
» 11 of which are classified as Vulnerable, of which 3 are confirmed as occurring within the study area (Cape Vulture, Grey Crowned Crane and Ludwig's Bustard) and of which 1 is confirmed breeding (Blue Crane).
» 9 of which are classified as Near Threatened, of which 4 are confirmed as occurring within the study area and of which 1 is confirmed as breeding (Blue Korhaan).

Table 4.1: Listed bird species potentially occurring in the study area (species bolded considered of most importance for the study area), conservation status and likelihood of occurrence

Common Name	*Scientific Name*	Cons status (Barnes)	Cons Status (IUCN)	Preferred micro habitat	Likelihood of occurring on site and source	Relative importance of site for national population
Rudd's Lark	***Heteromirafra ruddi***	**CE**	**VU**	**High altitude pristine grassland**	**Confirmed breeding (Landowner communication with specialist)**	**Very high**
Bearded Vulture	*Gypaetus barbatus*	E	LC	High altitude grassland	Unlikely (SABAP 1)	Low
Cape Vulture	***Gyps coprotheres***	**V**	**VU**	**Open grassland**	**Confirmed (previous**	**Medium**

					siting on site)	
Martial Eagle	*Polemaetus bellicosus*	V	NT	Generalist in this area	Probable (SABAP 1)	Low
African Marsh-Harrier	*Circus ranivorus*	V	LC	Grassland, wetland, pans	Probable (SABAP 1)	Medium
Lesser Kestrel	*Falco naumanni*	V	LC	Grassland, arable land	Probable (SABAP 1)	Medium
Blue Crane	***Anthropoides paradiseus***	**V**	**VU**	**Grassland, arable land, dams, wetlands, pans**	**Confirmed breeding (Dr I. Whyte)**	**Medium**
Grey Crowned Crane	***Balearica regulorum***	**V**	**EN**	**Grassland, arable land, dams, wetlands, pans**	**Confirmed (J. Smallie and Dr I. Whyte)**	**Low**
Striped Flufftail	*Sarothrura affinis*	V	LC	High altitude grassland, pans	Possible (SABAP 1)	Unknown
Denham's Bustard	*Neotis denhami*	V	NT	Grassland, arable land	Possible (SABAP 1)	Low
Ludwig's Bustard	***Neotis ludwigii***	**V**	**EN**	**Karoo veld**	**Confirmed (J.Smallie)**	**Medium**
African Grass Owl	*Tyto capensis*	V	LC	Grassland, wetland, pans	Possible (SABAP 1)	Unknown
Yellow-breasted Pipit	*Anthus chloris*	V	VU	High altitude grassland	Probable (SABAP 1)	Medium
Black Stork	*Ciconia nigra*	NT	LC	Riverine, cliff	Possible	Low
Yellow-billed Stork	*Mycteria ibis*	NT	LC	Riverine, floodplain	Unlikely (SABAP 1)	Low
Greater Flamingo	*Phoenicopterus ruber*	NT	LC	Open water	Confirmed (J.Smallie and Dr I. Whyte)	Medium
Secretarybird	*Sagittarius serpentarius*	NT	VU	Grassland, arable land	Confirmed (J.Smallie)	Medium
Black Harrier	***Circus maurus***	**NT**	**VU**	**Grassland, wetland, pans**	**Confirmed (J. Smallie)**	**High**
Peregrine Falcon	*Falco peregrinus*	NT	LC	Grassland, cliffs	Possible (SABAP 1)	Low
Lanner Falcon	*Falco biarmicus*	NT	LC	Grassland, arable land	Confirmed (J.Smallie)	Medium
Blue Korhaan	***Eupodotis caerulescens***	**NT**	**NT**	**Short grassland**	**Confirmed breeding (Dr I Whyte)**	**High**
Melodious Lark	*Mirafra cheniana*	NT	NT	Grassland	Possible	Medium
White Stork	*Ciconia ciconia*	BONN		Arable land, wetland,	Possible, summer	Low

				grassland, pans		
Jackal Buzzard	*Buteo rufofuscus*	-	-	Generalist	Confirmed **(J. Smallie - previous observation on site)**	Medium
Verreaux's Eagle	***Aquila verreauxii***	**-**	**-**	**Mountainous areas, cliffs**	**Confirmed (J. Smallie - previous observation on site)**	**Medium**
African Fish-Eagle	*Haliaeetus vocifer*	-	-	Open water	Possible (SABAP 1)	Low
Booted Eagle	*Aquila pennatus*	-	-	Generalist	Possible (SABAP 1)	Low
Amur Falcon	*Falco amurensis*	-	-	Open grassland	Confirmed (SABAP 1)	Medium
Steppe Buzzard	*Buteo vulpinus*	-	-	Generalist	Confirmed (SABAP 1)	Low
Drakensberg Rock-jumper	*Chaetops aurantius*	-	-	High altitude grassland, rocky outcrops	Likely (SABAP 1)	Medium
Grey-winged Francolin	***Scleroptila africanus***	**-**	**-**	**High altitude grassland**	**Confirmed (J.Smallie)**	**High**
Marsh Owl	*Asio capensis*	-	-	Grassland, wetland	Possible (SABAP 1)	Low
African Harrier-Hawk	*Polyboroides typus*	-	-	Generalist	Probable (SABAP 1)	Low
Buff-streaked Chat	*Oenanthe bifasciata*	-	-	High altitude grassland, rocky outcrops	Probable (SABAP 1)	Medium
Black-shouldered Kite	*Elanus caeruleus*	-	-	Generalist	Confirmed (J.Smallie)	Low
Spotted Eagle- Owl	*Bubo africanus*	-	-	Generalist	Confirmed (J.Smallie)	Medium
Black Sparrowhawk	*Accipiter melanoleucus*	-	-	Forest or alien trees	Probable (SABAP 1)	Medium
Rufous-chested Sparrowhawk	*Accipiter rufiventris*	-	-	Forest or alien trees	Probable (SABAP 1)	Medium
Rock Kestrel	*Falco rupicolus*	-	-	Generalist	Confirmed (J. Smallie)	Medium
Southern Pale Chanting Goshawk	*Melierax canorus*	-	-	Generalist	Confirmed (J. Smallie)	Medium
White-breasted Cormorant	*Phalacrocorax lucidus*	-	-	Water sources	Confirmed (J. Smallie)	Medium
Black-headed	*Ardea*	-	-	Close to water,	Confirmed (J.	Medium

Heron	*melanocephala*			wetlands	Smallie)	
Hamerkop	*Scopus umbretta*	-	-	Water sources	Confirmed (J. Smallie)	Medium
African Spoonbill	*Platalea alba*	-	-	Water sources	Confirmed (J. Smallie)	Medium
White-faced Duck	*Dendrocygna viduata*	-	-	Water sources	Confirmed (J. Smallie)	Medium
Egyptian Goose	*Alopochen aegyptiaca*	-	-	Water sources, arable lands	Confirmed (J. Smallie)	Medium
South African Shelduck	*Tadorna cana*	-	-	Water sources	Confirmed (J. Smallie)	Medium
Yellow-billed Duck	*Anas undulata*	-	-	Water sources	Confirmed (J. Smallie)	Medium
Red-billed Teal	*Anas erythrorhyncha*	-	-	Water sources	Confirmed (J. Smallie)	Medium
Spur-winged Goose	*Plectropterus gambensis*	-	-	Water sources, arable lands	Confirmed (J. Smallie)	Medium
Red-knobbed Coot	*Fulica cristata*	-	-	Water sources	Confirmed (J. Smallie)	Medium
White-necked Raven	*Corvus albicollis*	-	-	Generalist	Confirmed (J. Smallie)	Medium

CE = Critically Endangered; E = Endangered; V/VU = Vulnerable; NT = Near-threatened; LC = Least concern; Bonn = Protected under the Bonn Convention on migratory species. C = Collision; E = Electrocution; D = Disturbance (and barrier effects); HD = Habitat Destruction/Alteration.
Confirmed = confirmed as occurring on site; Probable = high likelihood of occurring on site but requires confirmation; Possible = could occur but not probable; Improbable = unlikely to occur on site.

4.5.4 Bats

Habitat availability: The occurrence of the vegetation units described in Chapter 4.5.1 above partially describes the habitats available to bats within the study area and where bat species are likely to occur. Specific features within the landscape will further affect which species occur in the study area. Micro-habitats will be critically important in siting the proposed turbines in order to mitigate the impact on bats. The following micro-habitats have been identified on the site (at a desk-top level):

» Cliffs and ridges: A number of bat species use caves, ranging in very small to very large in size, to roost. The Stormberg mountain range, an easterly extension of the Bamboesberge and an outlier of the greater Drakensberg mountain range, runs east to west through the centre of the study site. The caves, crags and crevices likely to be present along the Stormberg range will present many attractive roost sites for bats in the area.
» Wetlands and river courses: Wetlands are characterised by slow flowing water and tall emergent vegetation and river courses, whether perennial or non-perennial are lined with riparian vegetation. Insects such as midges and mosquitoes often breed at wetlands emerging in large numbers, creating a

perfect feeding site for many bat species. A number of wetland-like areas and river courses are present on the site.

» Dams and reservoirs: Due to the standing nature of water in dams and reservoirs many insects use dams as breeding sites (Sirami et al. 2013). The presence of these insects often attracts insect-eating bats. Many active dams and reservoirs occur on the site.
» Thickets: Many of the bat species listed as possibly occurring on the site are clutter and clutter-edge feeders. The presence of thicket or bush on the site may increase the likelihood of such species being present and any alteration to this habitat may have negative effects on the presence of bats in the area, possibly even their survival. Thickets of vegetation occur throughout the study site.
» Man-made structures: Buildings are favoured by many bat species as safe, dry roost sites. They will often roost in the roofs of these structures. The farm houses, staff houses and abandoned structures on the site all present suitable roosting habitat for many bat species. There are at least four farm homesteads on the study and one rural settlement.
» Cultivated land: Seasonal abundance of pest insects is thought to attract bats to cultivated land seasonally (Taylor et al. 2013). Fruit and vegetable crops are more likely to be important in this regard but other crops may also attract bats to forage. Some cultivation is present on the study site.
» Livestock: Livestock, and their associated waste attract insects and, in-turn bats, to their vicinity. The significance of livestock in the study site must be investigated and verified during the field work component of this impact study.

Occurrence of bats: 14 bat species could potentially occur within the study area based on historically recorded and modelled distributions by Friedmann and Daly 2004 and Monadjem *et al.* 2010 (refer to Table 4.2) of which:

» 1 is classified as Vulnerable and has a moderate likelihood of occurring within the study area (Percival's Short Eared Trident Bat)
» 4 are classified as Near Threatened, of which 2 have a high likelihood of occurrence within the study area (African Straw-coloured Fruit Bat and Natal Long-Fingered Bat) and of which 1 has a moderate likelihood of occurrence (Swinny's Horseshoe Bat).
» 9 are of Least Concern.

The monitoring programme currently in process will determine the whether the above species are present in the study area.

Table 4.2: Likelihood and Conservation Status of Bat species potentially occurring in the study area

Species	Common Name	Habitat	Conservation Status	Likelihood of Occurrence
Cleotis percivali	Percival's Short-eared Trident Bat	Woodland	Vulnerable	Moderate

Eidolon helvum	African Straw-coloured Fruit Bat	Fruit-producing woodlands	Near Threatened	High
Miniopterus natalensis	Natal Long-fingered Bat	Savanna/ grassland	Near Threatened	High
Rhinolophus capensis	Cape Horseshoe bat	Fynbos/ succulent Karoo	Near Threatened	Low
Rhinolophus swinnyi	Swinny's Horseshoe Bat	Forest/ savanna woodland	Near Threatened	Moderate
Eptesicus hottentotus	Long-tailed Serotine	Rocky outcrops/ caves	Least Concern	High
Rousettus aegyptiacus	Egyptian Rousette	Caves	Least Concern	Low
Miniopterus fraterculus	Lesser Long-fingered bat	Montane grassland	Least Concern	Low
Myotis tricolor	Temminck's Myotis	Savanna woodland/ mountains	Least Concern	High
Neoromicia capensis	Cape Serotine	Wide tolerance	Least Concern	High
Nycteris thebaica	Egyptian Slit-faced Bat	Savanna/ karoo	Least Concern	Moderate
Rhinolophus clivosus	Geoffroy's Horseshoe	Savanna/ woodland	Least Concern	High
Rhinolophus darlingi	Darling's Horseshoe Bat	Savanna/ woodland	Least Concern	Low
Tadarida aegyptiaca	Egyptian Free-tailed Bat	Wide tolerance	Least Concern	High

4.6. Archaeological Profile and Paleontological Potential

4.6.1 Archaeological profile

History of the study area

The Bushmen were the earliest inhabitants of the Stormberg Mountains and surrounds and left several signs of their presence. The Thembu tribe migrated across the Kei River to settle in what is now the Queenstown district in 1925. At the same time the first Trek Farmers, in search of water and pasturage, had crossed the Stormberg Spruit to settle on the land north of the Stormberg range. It was at this time that these two groups of people came into contact. The settlement of the Stormberg area took place relatively late, as the Stormberg Mountain, a westward elongation of the Drakensberg range, for many years barred the way to the interior. These were deemed impenetrable by the early travellers. The Thembu tribe, who were forced by political reasons to settle the Stormberg area and the Trek Farmers, who moved into the area for geographical reasons, had a peaceful relationship for a relatively long period. This relationship also caused the Cape Government to protect the Thembu against hostile tribes in 1850. The history of the Stormberg region is

further characterised by the Battle of Stormberg which occurred in December 1899 in the Stormberg Valley during the Anglo-Boer War.

Archaeological context

The archaeological background of the study area is characterised by remains dating back to the Stone Age including Rock Art as well as historical structures older than 60 years and graves/cemeteries. Several ruins, kraals and grave sites were identified in the study area by way of the desktop scoping investigation, many of which are potentially older than 60 years and protected by heritage legislation.

Archaeological remains dating to the following periods can be expected to occur within the study area:

Early Stone Age (ESA): Substantial ESA sites are relatively scarce in the Eastern Cape and ESA sites are mostly represented by surface scatters of ESA artefacts. The probability of encountering ESA on the site is considered to be of low to medium probability.

Middle Stone Age (MSA): The study is located near to sites where scatters of Middle Stone Age artefacts have been recorded. The area is renowned for Rock Art sites and shelters or overhangs can contain rock art that will also be of significance. It is therefore expected that there is a high probability of encountering MSA scatters across the study area.

Late Stone Age (LSA): The Later Stone Age archaeology of the area is considered rich and varied. Various studies recorded LSA material in shelters and rock art around and within the study area. There is a medium to high probability of encountering LSA finds in the study area.

Iron Age: There is a low to medium probability of encountering Early, Middle and Low Iron Age finds in the study area.

Historical finds: Historical finds include middens, structural remains and cultural landscape. The desktop study highlighted that the area was occupied from the early 1900's and several Anglo Boer war events took place in the vicinity. Several farm complexes occur within the study area the age of which is currently undetermined however it is assumed that many of these will be older than 60 years and therefore protected by legislation.

Burial/Cemeteries: Several graves were identified based on the desktop investigation undertaken, although more are likely to occur within the study area. The occurrence of Burials overs 100 years is assigned a medium probability while Burials less than 60 years of age are assigned a high probability of occurrence.

Potential Heritage sites

27 preliminary heritage sites, features and objects have been mapped within the study area based on a desk-top heritage investigation (refer to Appendix K). These include kraals, ruins graves, and rock art on the farms Nooitgedacht 152, Penhoek 181, Valschfontein 80, Gelegenfontein 179, Stones Beacon 187, Leeuwe Fontein, Droogefontein, Klip Plaat 22.

4.6.2 Paleontological potential

The study area is underlain by the Molteno, Elliot and Clarens Formations of the Karoo Supergroup and dolerite igneous intrusive rocks of the Karoo Dolerite Suite, the paleontological potential of which are discussed below (refer to Figure 4.7).

Molteno Formation: contains numerous known plant macrofossil localities containing the extremely diverse Dicroidium Flora (Anderson and Anderson, 1983, 1985). The Dicroidium Flora is known to contain representatives of mosses, sphenophytes, ferns, seed ferns, cycads, ginkos, conifers and gymnosperms. Multiple plant macrofossil sites are known to occur within the immediate region of the project area and it is therefore possible that plant macrofossil localities may occur within the study area. The formation is also known to contain fossil insect faunas.

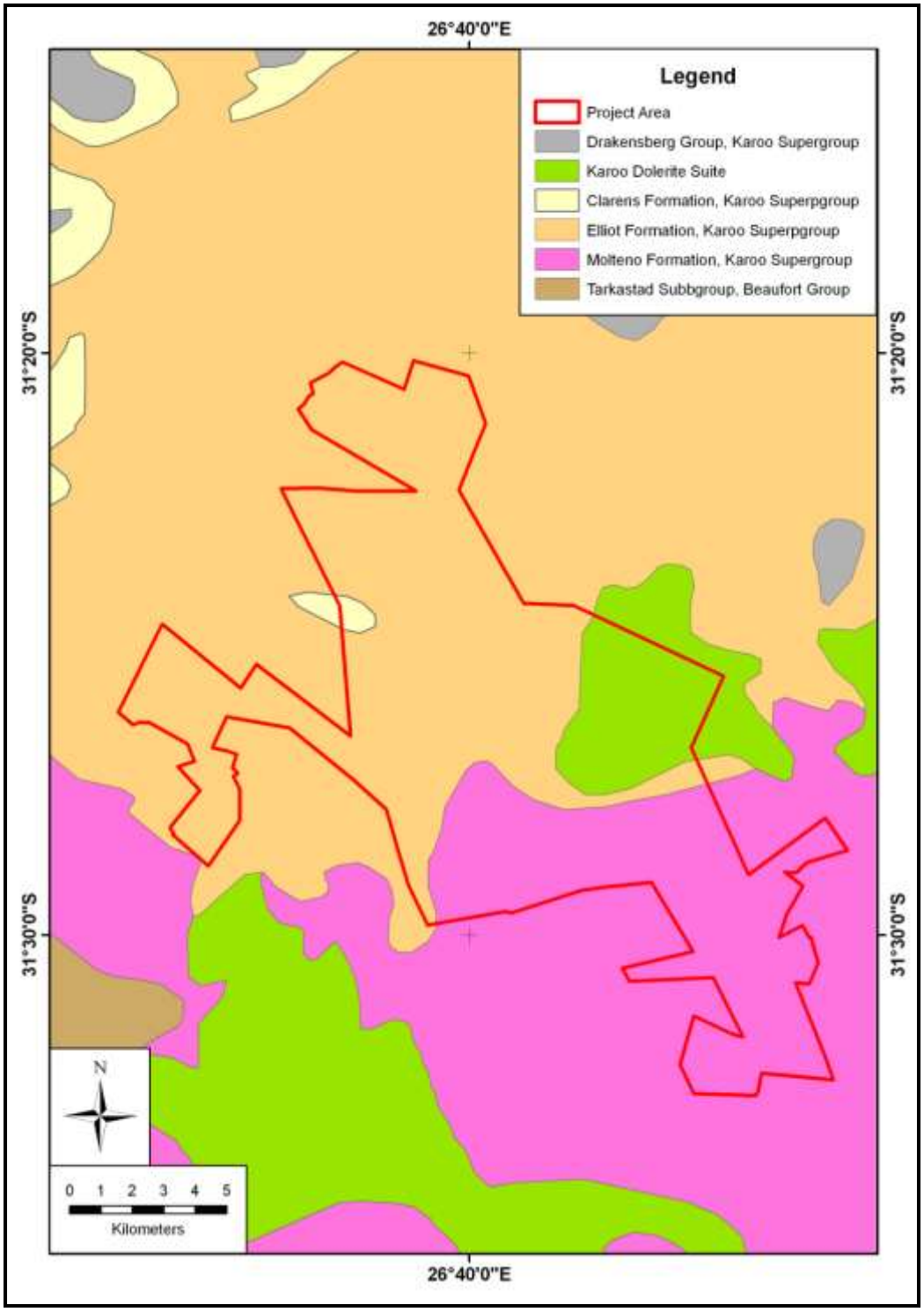

Figure 4.7: Map of bedrock geology underlying the study area

Elliot formation: The strata of the Elliot Formation contain a varied vertebrate fauna containing cynodonts, dinosaurs, thecodonts, amphibians and dinosaur eggs. A diverse assemblage of vertebrate footprints has also been identified within the Elliot formation. The plant macrofossil assemblages present within the Elliot Formation are much rarer, less well understood and considerably less diverse than those of the underlying Molteno Formation.

Clarens formation: assemblages of the Clarens Formation include dinosaurs, sinapsid reptiles, and a mammal. There have also been at least 10 different types of vertebrate footprints identified within the Clarens Formation and its lateral equivalents within South Africa. Plant macrofossil fossils are uncommon with the formation.

Karoo Dolerite suite: The rocks of the Karoo Dolerite Suite are derived from the solidification of molten magma within the subsurface of the Earth. These rocks accordingly, have no palaeontological potential.

Cainozoic Regolith: Cainozoic age palaeontological sites are occasionally identified in alluvial terraces and dongas throughout South Africa. It may be expected that large mammal bones, dentition, horn cores, micromammal bones and fresh water molluscs may be identified within strata of this age.

All of the geological units that underlie the study area (except for the rocks of the Karoo Dolerite Suite) are potentially fossiliferous. The rocks of the Molteno Formation are known to contain significant plant macrofossil assemblages and insect faunas. The sediments of the Elliot and Clarens Formations and the Caenozoic regolith contain scientifically significant vertebrate and vertebrate foot print fossils throughout their outcrop extents within the Main Karoo Basin.

4.7 Social profile

In terms of its administrative setting the study area is located in the Inkwanca and Maletswai Local Municipality (MLM) in the Eastern Cape Province. The Inkwanca Local Municipality (ILM) is located within the Chris Hani District Municipality (CHDM), while the MLM falls within the Joe Gqabi District Municipality (JGDM).

Population growth: Based on the 2011 Census data the population of the ILM increased by 1 727 over the 10 year period 2001-2011, which represents an increase of ~ 8 %. The population of the MLM increased by 6 493 (~ 15%) over the same period. In the case of the ILM and MLM this represents an annual growth rate of 0.82 and 1.60% respectively. The annual growth rate for the ILM is the same as for the period 1996-2001, while the rate for the MLM has decreased from 2.92 to 1.60% per annum. The increases in the population in both the ILM and the MLM were linked largely to an increase in the 15-64 age group.

Dependency: The dependency ratio in both regions has also decreased from 68.6 to 59.9 in the ILM, and 64.2 to 61.1 in the MLM. This implies that there were less people who are dependent the economically active 15-64 age group. This represents positive socio-economic improvement in both areas.

Economic positioning: The percentage of formal dwellings in both municipalities has increased and is high, ~97.3 % in the ILM and 85.6 % in the MLM. In terms of employment, the official unemployment rate in both the ILM and MLM decreased for the ten year period between 2001 and 2011. In the ILM there was a significant decrease from 57.7 % to 39.3 % a decrease of 18.7 %. The decrease in the MLM was from 37.4 % to 26.7 %, a decrease of 10.7 %. Youth unemployment in both regions also dropped over the same period. Despite these improvements unemployment levels in both areas are high.

Education: Over the period education levels improved, with the percentage of the population over 20 years of age with no schooling dropping from 10.8 % to 13.4 % and 12.9 % to 11.0 % for the ILM and MLM respectively. The percentage of the population over the age of 20 with matric also increased in both the ILM and MLM by 5.7 % and 6.3 % respectively.

Municipal services: In terms of municipal services, with the exception of a decrease of 9.6 % in the number of households in the ILM with weekly municipal refuse, access to municipal services as measured in terms of flush toilets', refuse removal, piped water and electricity, increased in both the ILM and MLM. The most significant improvements have been in the percentage of households which use electricity for lighting and access to flush toilets. Despite the increase in the number of households with piped water inside the dwelling the overall percentages for both the ILM and MLM are below 50.

Tourism potential: The region is not considered to be a major tourist destination, but it does offer a number of nature-oriented activities and cultural historical attractions. Some of these include hunting, bass fishing, birding, hiking and game driving.

The findings of a review of the relevant policy documents pertaining to the energy sector indicate that renewable energy and the establishment of renewable energy facilities are supported at national and provincial levels. At a local level the ILM IDP identifies renewable energy as a potential development opportunity.

SCOPING OF ISSUES ASSOCIATED WITH THE PROPOSED STORMBERG WIND ENERGY FACILITY CHAPTER 5

This chapter serves to describe the identified potential environmental impacts associated with the proposed wind energy facility and to make recommendations for further studies required to be undertaken in the EIA phase, and/or recommendations for the management of these impacts for inclusion in the Environmental Management Programme (EMPr) to be prepared as part of the EIA Phase. Similarly, conclusions concerning each of the project components will be made in individual chapters.

From a technical perspective, certain parts of the study area are more suitable for the siting of wind turbines than others (in order to exploit the wind resource), while other parts of the study area are more suitable for the siting of a solar energy facility than others (in order to exploit the solar resource). Important to note is that the wind and solar projects are separate applications (separate DEA reference numbers) and as no distinction has been made between specific areas for the siting of the wind and solar energy facilities at this stage, the issues have been scoped across the entire extent of the study area in order to assist the applicant during the design of the project. The significance of impacts identified during scoping for the wind and solar energy facilities will be addressed in separate EIA Reports during the EIA reporting phases.

Specialist scoping reports are included within **Appendix F to O** wherein the potential issues relating to the proposed wind energy facility are identified. A discussion of the potential cumulative impacts associated with the proposed project at this stage of the process is presented in Section 5.5.

5.1 Construction phase

An understanding of the activities to be undertaken during the construction process is necessary to predict the potential impacts of the facilities on the environment. These have been explained in detail in Chapter 2 of this report and include:

» selective land clearing for site preparation and access routes
» transportation of supply materials and fuels
» construction of foundations involving excavations and placement of concrete
» construction of substation(s), underground and above ground power lines
» operating cranes for unloading and installation of wind turbines (where required)
» commissioning of new installations
» waste removal and rehabilitation of disturbed sites.

Environmental issues: associated with construction activities may include, amongst others, alteration of land use, soil erosion, visual impacts, noise impacts,

threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna and social impacts (as indicated in chapter 5.3).

5.2 Operational phase

Operational activities include regular maintenance of the wind turbines and associated infrastructure.

Environmental issues: specific to the operation of a Wind Energy Facility could include visual impacts, noise impacts produced by the spinning of rotor blades, social impacts, bird or bat injury or mortality resulting from collisions with blades, disturbance, injury or mortality to other faunal species, lighting and illumination issues and change in land use.

The significance of impacts associated with a particular Wind Energy Facility is dependant on site-specific factors, and therefore impacts can be expected to vary significantly from site to site. The extent of the Stormberg study area allows for significant variations in impacts within the study area boundaries.

5.3 Scoping of Issues

The text and tables below provide an indication of the potential direct and indirect environmental issues and impacts which have been identified during the Scoping phase of the EIA and which may be relevant during the construction and operational phases of the proposed Wind Energy Facility. Impacts associated with decommissioning of the project are expected to be similar to those associated with the construction phase.

5.3.1 Potential Impacts on Land Use, Soil and Agricultural Potential

Agricultural land use is predominantly grazing with limited cultivation in isolated areas along some of the watercourses located within the study area. The significance of agricultural impacts is influenced by the limited agricultural capability of the study area. While wind turbines are spread over a large area, their physical operational footprint will be approximately 60ha (less than 0.5%). It is therefore envisaged that the existing land uses will remain across the majority of the project site study area.

Table 5.1: Potential Impacts on Soil, Land Use and Agriculture

Issue	Nature of Impact	Component and Extent of Impact	'No go' areas
Construction Phase			
Physical soil disturbance	» Soil erosion due to alteration of the land surface run-off characteristics. Alteration of	Local	To be confirmed

due to construction activities	run-off characteristics may be caused by construction related land surface disturbance, vegetation removal, the establishment of hard standing areas and roads. Erosion will cause loss and deterioration of soil resources and may occur during all phases of the project. » Loss of topsoil due to poor topsoil management (burial, erosion, etc) during construction-related soil profile disturbance (levelling, excavations, road surfacing etc.) and resultant decrease in that soil's agricultural suitability.		during the detailed soil survey
Impacts on current land use and agricultural potential due to construction activities	» Loss of agricultural land use due to direct occupation by turbines and associated infrastructure, including roads, for the duration of the project. » Placement of spoil material generated from construction related excavations which can cover agricultural land and thereby render it unsuitable for future agriculture. » Temporary disturbance to livestock management due to disruptions to fences and stock watering infrastructure during the construction phase.	Local	To be confirmed during the detailed soil survey.
Operational Phase			
Potential social impacts	» Loss of agricultural land use due to direct occupation by turbines, and other infrastructure, including roads, for the duration of the project. This will take affected portions of land out of agricultural production. » Generation of additional land use income makes a positive contribution to farming cash flow, and thereby improves the financial sustainability of agricultural activity.	Local and Regional	N/A
Cumulative impacts	» Cumulative impacts due to the regional loss of agricultural resources and production as a result of other developments on agricultural land in the region.	Regional	N/A

Gaps in knowledge and recommendations for further study:

Currently there is no evidence to suggest that the Wind Energy Facility cannot be supported from an agricultural perspective, however, the extent and significance of the risk posed to agricultural resources and from soil erosion at a low level is not

fully understood. Field work will be conducted as part of the EIA level investigation which will consider the following parameters:

» More detailed assessment of soil conditions
» Assessment of erosion and erosion potential on study area
» Assessment of specific on-site agricultural activities
» Assessment of the impacts of specific construction activities and layout on soil conditions.

Detail regarding the above is provided in further detail in Chapter 9.

5.3.2 Potential Ecological Impacts

The study area lies within a Critical Biodiversity Area (CBA – Tier 2 and Tier 3) and the development of a Wind Energy Facility, from an ecological perspective is not entirely compatible with the desired land use options for CBAs, as the CBAs distinction is primarily suited towards achieving conservation targets in the Province. The majority of the site is made up of natural grassland of moderate sensitivity, riparian areas, wetlands or steep rocky areas of high sensitivity and previously cultivated areas of low sensitivity. As the previously cultivated areas are of relatively limited extent, they do not present a significant development opportunity and it can be assumed that the Wind Energy Facility will be restricted largely to areas of natural vegetation.

The preliminary ecological sensitivity assessment identifies at a high (regional) level those parts of the study area that have high conservation value or that may be sensitive to disturbance. Areas containing untransformed natural vegetation, high diversity or habitat complexity, or Red List organisms or systems vital to sustaining ecological functions are considered sensitive. There are a number of features that need to be taken into account in order to evaluate sensitivity in the study area. Broad scale mapping contextualised using the Eastern Cape Province Biodiversity Conservation Assessment, the National Freshwater Ecosystem Priority Areas Assessment and other data sources was used to provide information on the location of sensitive features in the study area. Sensitive features have been mapped in Figure 5.1 and include the following:

» The steep and rocky escarpment which runs from east to west across the central part of the site,
» Mountainous areas,
» The NFEPA "Priority Wetland" in the west of the site, known as "Die Pan" and numerous other wetlands,
» Drainage features on the site.

The areas classified as Very High sensitivity should be avoided and no development or infrastructure should be placed within these areas. It may however be necessary for access roads to cross drainage features or watercourses also deemed to be of Very High sensitivity on the site to some extent, and subject to the implementation

of strict mitigation measures and in consultation with the specialist. The areas of High sensitivity are largely associated with steep hills and mountain sides or with buffers around drainage features. Although impacts to these areas should be avoided as much as possible as the likelihood of secondary impacts such as soil erosion is high, some mitigation may be possible and some turbines on the mountain slopes would be ecologically acceptable.

Direct loss of vegetation associated with the construction phase of the proposed development is likely to have a Low – Medium impact on a regional scale, depending on the final extent and position of the actual infrastructure footprints and the management of the land. Indirect (mainly operational phase) impacts (disruption of ecological processes, etc.) are likely to be fairly insignificant due to the nature of the facility.

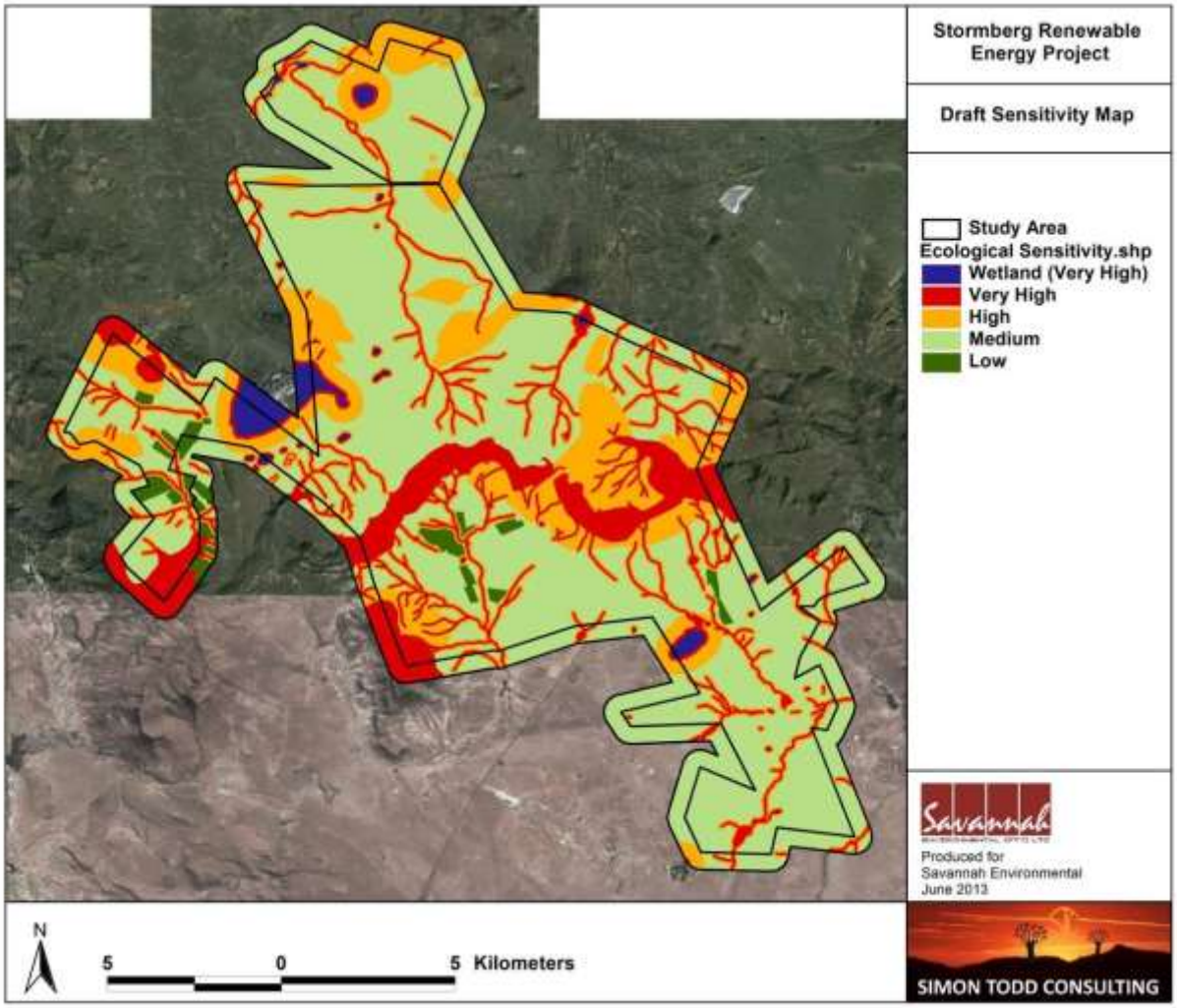

Figure 5.1 Preliminary Ecological Sensitivity Map of the study area proposed for the construction of the Renewable Energy Facility

Table 5.2: Potential impacts on ecology

Issue	Nature of Impact	Extent of Impact	'No go' areas
Impacts on Critical Biodiversity Areas and Loss of Landscape Connectivity	» Impact on listed plant species occurring within the study area by the development. » Loss of sections of Tsomo Grassland (Vulnerable) south of the escarpment and Stormberg Plateau Grasslands (Least Threatened) north of the escarpment.	Highly localised due to low footprint	The areas classified as Very High sensitivity
Degradation of ecosystems	» The large amount of disturbance created during construction will leave the site vulnerable to alien plant invasion and soil erosion. » Ecological functioning of the area could be impacted and an associated decline in biodiversity expected. » Changes in hydrology, water retention, landscape connectivity etc resulting from a decline in ecosystem integrity. » Construction may lead to some direct or indirect loss of or damage to seasonal marsh wetlands or drainage lines or impacts that affect the catchment of these wetlands.	Local	The areas classified as Very High sensitivity
Direct impacts on fauna	» Increased levels of noise, pollution, disturbance and human presence will be detrimental to fauna. » Slow-moving species would not be able to avoid the construction activities and might be killed. » Some mammals and reptiles such as tortoises would be vulnerable to illegal collection or poaching during the construction phase as a result of the large number of construction personnel that are likely to be present.	Local	The areas classified as Very High sensitivity
Impacts on vegetation and protected plant species	» The study area lies within a Critical Biodiversity Area and proposed project is not considered wholly compatible with the desired land use options. » Construction of infrastructure may lead to direct loss of vegetation. This will lead to localised or more extensive reduction in the overall extent of grassland vegetation. Where this vegetation has already been stressed due to degradation and transformation at a regional level, the loss may lead to increased vulnerability of the	Local and regional	The areas classified as Very High sensitivity

	habitat.		

Gaps in knowledge and recommendations for further study:

Currently there is no evidence to suggest that the Wind Energy Facility cannot be supported from an ecological perspective as the majority of the study area is described as being of moderate ecological sensitivity. However, the extent and significance of the risk posed to flora and fauna at a low level is not fully understood as the study area has not been surveyed in detail before. The following activities will be undertaken during the EIA phase in order to properly assess potential impacts on the ecological receiving environment by the proposed facility:

» Ground-truth and refine the ecological sensitivity map of the site. Particular attention will be paid to the wetlands and other sensitive features on the site.
» Characterise the vegetation and plant communities present on the site and undertake on-site surveys to generate a species list for the site as well as identify and map different plant communities present in the study area.
» Identify and map the presence of any unique and special habitats at the site such as gravel patches or wetlands not mapped under the NFEPA.
» Locate, identify and map the location of significant populations of species of conservation concern, so that the final development footprint can be adjusted so as to avoid and reduce the impact on such species. Some species of concern may be widespread and others localised and the distribution of such species will be established during the site visit.
» Evaluate the likely presence of listed faunal species at the site such as the Giant Bullfrog, and identify associated habitats that should be avoided to prevent impact to such species.
» Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented.
» Assess the impacts identified above in light of the site-specific findings and the final layout to be provided by the developer.
» The alternative facility layouts will be assessed in the EIA Phase and appropriate mitigation measures outlined, with details stipulated in the EMPr.

Detail regarding the above is provided in further detail in Chapter 7.

5.3.3 Potential Impacts on Birds

Avifaunal context: The study area is comprised predominantly of high altitude grassland, pans, wetlands and the escarpment surrounding Penhoek Pass. Most of the study area is comprised of grassland home to a number of Red Listed grassland specialist bird species. The grassland is interspersed with various size pans, ranging from a few square metres to several square kilometres, the largest of which are found in the northern section of the study area, to the north of the escarpment.

These are one of the key micro habitat on this site and within the context of the broader study area. These areas are considered highly sensitive for avifauna due to the fact that when holding water they are extremely attractive to various sensitive bird species (cranes, storks, flamingos, water fowl). Even when water is not present these pans are frequented by birds since they are more open and flat than surrounding areas. The ground is generally softer in these areas (more conducive to feeding) and vegetation is greener due to a shallower water table in these parts. Movement of birds between these pans is also likely to be frequent making them vulnerable to collision with wind turbines.

Specialist investigation: Two avifaunal specialist studies were initiated during the Scoping phase of the project in order to understand the potential impact of the proposed project on birds. Following the results and recommendations of an avifaunal study conducted by Jon Smallie of WildSkies Ecological Services which was complemented by fieldwork during June 2013, the applicant considered it prudent to initiate an additional avifaunal study with the objective of further exploring the potential impact on grassland avifaunal species. The latter study was undertaken by Dr Ian Whyte with fieldwork undertaken between 30 September and 6 October 2013. Both studies highlight the potential risks to endangered avifauna from both the wind turbine due to the occurrence of suitable habitat and foraging opportunities within the study area. Fieldwork for both studies occurred during the dry period and additional data is required to be collected in order to improve the confidence in these assessments through the pre-construction monitoring programme currently in process.

Potential impacts: The Scoping process has identified the potential impacts on birds associated with the construction of the proposed Wind Energy Facility as disturbance, habitat destruction and displacement. Operational phase issues are anticipated to include, most significantly, collision of birds with turbine blades.

Habitat alteration and sensitive grassland species: The construction of the proposed wind energy facility will result in habitat loss and alteration during the construction phase, albeit over a very small portion of the site (approximately 0.5%) and primarily within the grassland areas of the site.

It has already been confirmed that the site is used by Vulnerable grassland bird species which include the Ludwig's Bustard, the Blue Crane and the Grey Crowned Crane as well as Near Threatened species such as the Blue Korhaan. The Critically Endangered Rudd's Lark was historically sighted on a section of the site to the north of the R56 which is identified as an area suitable for the development of the PV facility, but was not recorded during either of the Scoping phase avifaunal site visits. The risk to this species in this section of the site would stem from habitat loss and alteration and it is recommended that this area be excluded from the development

footprint so that no alteration of the habitat results in the potential impact to this species.

Once complete, the "development footprint" of the wind turbines and associated infrastructure is expected to be less than 0.5% of the study area. This will allow many of the grassland species which may be displaced by the development /construction phase, to re-colonize the area once these activities have been concluded however the primary risk to avifauna during operation relates to the potential collision risk with wind turbines. Some species which stay at low altitudinal levels such as some species of Longclaws, Larks and Cisticolas should soon become habituated to the turbines and co-exist with them, but other species of Larks and Cisticolas which undertake high level displays could potentially remain at risk of collision.

Pans: There are many pans within the proposed development zone and also in the surrounding areas and a considerable amount of avifaunal movement between these pans, which include water birds of conservation significance. The pans are used by Blue Cranes for roosting and foraging. Greater Flamingos also move freely between these pans. An understanding of the movements of collision-prone species and the altitudes at which they fly will be essential in planning the location of the wind turbines to mitigate the risk of collision.

Escarpment: The study area is divided into northern and southern sections by the escarpment. Many bird species are known to utilize the winds pushing up the face of the escarpment as energy saving measures in order to seek higher altitudes. Wind turbines situated too close to the escarpment edge could potentially pose a direct threat to soaring species such as vultures, eagles, falcons and Secretary birds. Non-soaring species such as cranes, flamingos, bustards, kestrels and korhaans also fly through or over the escarpment from time to time, though these species may not seek higher altitudes and therefore also be at risk of colliding with the wind turbines.

Target species: Twenty-two "target species" or species to be included in the avifaunal monitoring campaign have been identified by Jon Smallie for monitoring purposes which include Red Data Listed species such as the Rudd's Lark, Bearded Vulture, Cape Vulture, Martial Eagle, African Marsh-Harrier, Lesser Kestrel, Blue Crane, Grey Crowned Crane, Striped Flufftail, Denham's Bustard, Ludwig's Bustard, African Grass Owl, Yellow-breasted Pipit, Secretarybird, Black Harrier, Peregrine Falcon, Lanner Falcon, Blue Korhaan and Melodious Lark as well as several non-listed species.

Buffers: Figure 5.2 below provides a preliminary indication of the potential sensitive areas and their classification. The factors believed to influence avifaunal sensitivity most are the presence of sensitive habitats on and near site including surface water features, pans, dams and wetlands, areas of steeper topographic relief as well as

high altitude grasslands. A one kilometre buffer has been applied to the larger pans and one artificial dam based on their size and hence their ability to attract birds when they hold water. A 500m buffer is currently applied to the smaller dams and pans located on the site. Either side of the escarpment edge is buffered by 500m at this stage as it is believed that raptors may make use of favourable air currents to fly in an energy efficient manner as described earlier. The northern most section of the site is also flagged as a high sensitive area representing the approximate locality of the Rudd's Lark (Critically Endangered).

It is noted that these preliminary buffer zones are subject to further evaluation through the avifaunal monitoring programme and may be subject to increase or decrease based on information to be collected through the bird monitoring campaign which has commenced.

Sensitivity mapping: Based on the sensitivity classes mapped by the specialist in Figure 5.2, and the habitats defined in the project study area, the following is relevant to wind energy development within the study area:

- High sensitivity areas (buffered areas)
  - Development of wind turbines within 500m from the escarpment edge should only be considered in consultation with the avifaunal specialist as informed by the results of the pre-construction monitoring programme.
  - Preliminary 1km buffers around the larger pans and 500m around the smaller pans should be applied for all infrastructure and further refined during the EIA Phase as informed by the results of the pre-construction monitoring programme.
  - Highly cautionary consideration of development in the northern-most section of the study area potentially sustaining the Critically Endangered Rudd's Lark.

- Medium to high sensitivity areas (areas of sensitive habitat above the escarpment)
  - Construction of wind turbines in this area needs to be confirmed based on pre-construction monitoring data.

- Low to medium sensitivity (remainder of the site – no obvious sensitivities currently identified)
  - It is likely that wind turbines may be built within this area subject to confirmation thereof during the EIA phase.

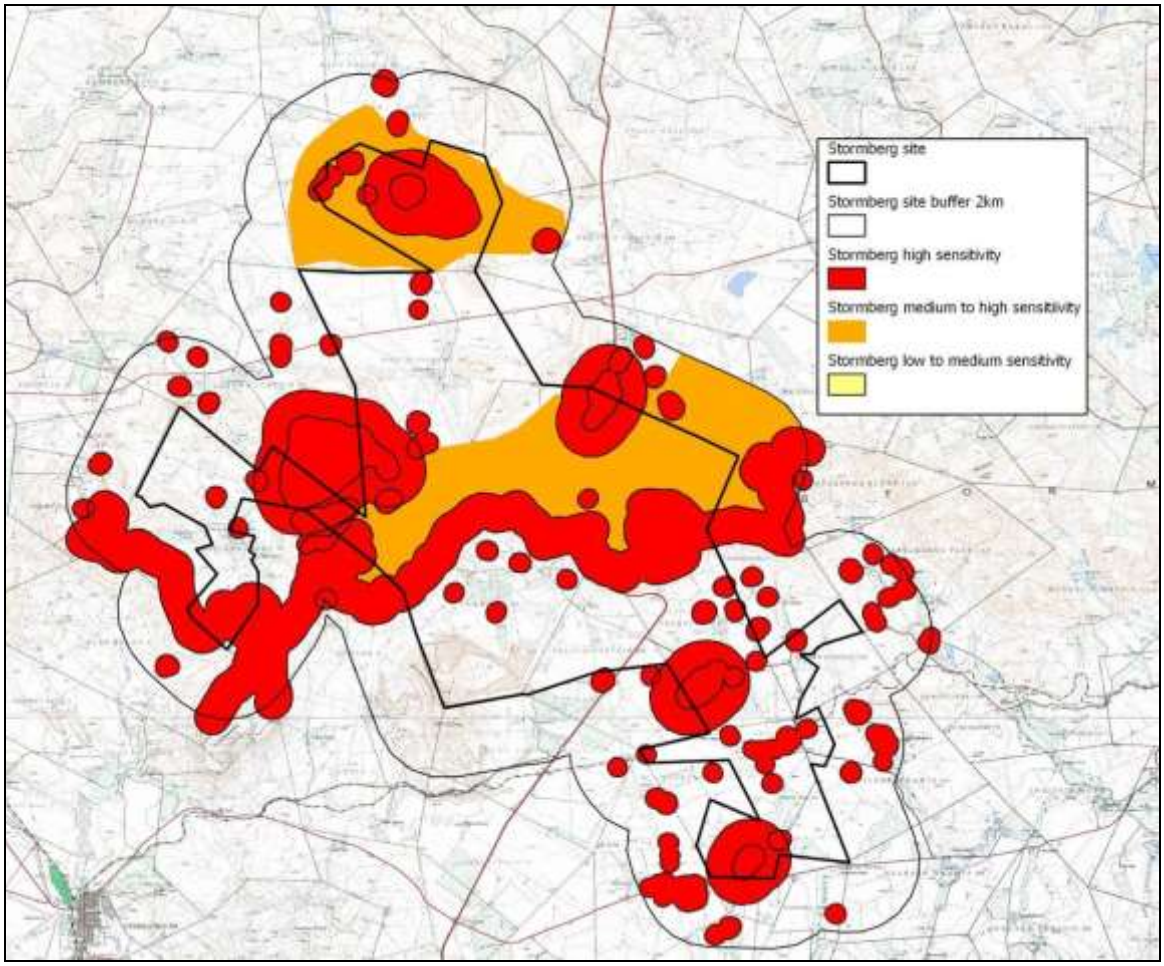

Figure 5.2 Preliminary bird sensitivity map of the study area

Table 5.3: Potential impacts on avifauna

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction phase			
Destruction of bird habitat & disturbance of birds	This is believed to be the impact of most concern for birds, not due necessarily to the space occupied by the turbines, but due to the sum of total land surface affected including the associated infrastructure, especially when viewed against the undisturbed nature of the study area.	This impact will not be uniform across the study area and greater above the escarpment.	Development in areas of high and medium to high sensitivity to be confirmed in the EIA phase as informed by pre-construction monitoring.
Displacement of birds from the site and barrier effects	Similar to the above but also informed by presence of breeding species	Local and regional	
Operational phase			
Collision of birds with turbine blades	This impact is likely to affect species such as vultures, cranes, bustards, korhaans, flamingos, and others if they fly frequently	Local and regional	Development in areas of high and medium to high sensitivity

	enough on and across the site.		to be confirmed in the EIA phase as informed by pre-construction monitoring.

Gaps in knowledge and recommendations for further study:

The most significant limitation to realising the full generating capacity of the proposed project is posed by the availability of good bird habitat and the use of the study area by sensitive bird species. Currently there is no evidence to suggest that the Wind Energy Facility cannot be supported from an avifaunal perspective, however a reduction in the total generating capacity (specifically for placement of the wind turbines) is likely, if the areas mapped as high and medium to high sensitivity in terms of impacts on bird habitat are observed. More baseline information concerning the impact of construction on bird habitat and the significance of the risk of collision of the target species with the wind turbines within the various parts of the study area during operation is required to be collected through the avifaunal monitoring programme before a suitable recommendation can be made in this regard.

EIA Phase

The Bird Specialist Report which will be undertaken as part of the EIA Phase will include the characterisation of the bird populations at the wind facility site and its ecological importance. Based on this characterisation, the expected impacts of the proposed wind energy facility over the bird community will be determined and the impact significance quantified and geographically indicated. This assessment will also inform the measures that need to be implemented during construction and operation in order to avoid or reduce the significance of impacts.

Pre-construction monitoring

The likelihood of collision of birds with turbines is not easy to judge in the absence of baseline data on bird movement on the site or surrounds. Data is currently being collected for the EIA Phase through a pre-construction bird monitoring programme which commenced in December 2013. The proposed methodology assumes as a baseline the requirements of the most recent version of the Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa (Jenkins et al., 2012). The primary aims of this monitoring programme are to assess the potential impacts resulting from the construction and operation of the Stormberg Wind Energy Facility on avifauna utilising the study area and can only be concluded once four seasons worth of monitoring data is available. Therefore the main objectives of this monitoring programme are:

» To characterise the avifauna community and its utilization of the development site;

- » To establish the baseline scenario during a pre-construction phase. This will provide the required information to identify the potential changes in the bird community present within the wind farm site and the eventual exclusion/displacement effect (avoidance of the wind facility area after construction);
- » To provide the baseline scenario on the pre-construction phase of the development to inform the EIA avifauna specialist report;
- » To evaluate potential changes in the way the target-species, and the overall bird community, utilizes the wind farm site;
- » To document patterns of bird activity and movements at the wind farm site and its immediate surroundings and establish a pre-impact baseline scenario of bird utilization of the study area;
- » To estimate predicted collision risk for target-species;
- » To identify sensitive areas and to propose mitigation measures.

In order to meet these objectives the following tasks will be implemented throughout the monitoring programme:

- » Linear walking transects and vantage points to determine the bird communities (with special emphasis to the target species) within the area of the Wind Energy Facility – pre-construction (covering at least four annual seasons before construction);
- » Vantage points to determine and monitor the area usage by raptors and other large terrestrial birds (bird activity patterns and movements) within and in the vicinity of the Wind Energy Facility – pre-construction (covering at least four annual seasons before construction);
- » Priority species nest monitoring to identify and monitor active nesting sites of target-species within the study area and its immediate surroundings – pre-construction (covering at least four annual seasons before construction);
- » Water body monitoring to evaluate the species present and their main movements at the main water bodies – pre-construction (at least for a full one year before construction).

5.3.4 Potential Impacts on Bats

Of the 14 bat species identified as potentially occurring in the study area, one is Vulnerable, 4 Near Threatened and 9 of Least Concern. Seven of the identified species are considered highly likely to occur in the study area, 3 considered moderately likely, and 4 are unlikely but possible to occur.

The Scoping process has identified the potential impacts on bats associated with the construction of the proposed Wind Energy Facility as habitat destruction and disturbance of bats. Operational phase issues are anticipated to include, most significantly, collision of bats with turbine blades and barotrauma which is the

sudden drop in air pressure around turbines causing a bat's lungs to rapidly expand resulting in mortality.

Buffers: A buffer of approximately 200m should be created between natural vegetation patches, riparian vegetation and water-bodies, where bat feeding activity is likely to be higher. The buffer zone may vary depending on the type of vegetation, availability of roost sites and specific bat species present. The South African Bat Assessment Advisory Panel (SABAAP) comprised of bat specialists, scientists and conservationists agree that this minimum of 200m around the above mentioned features should be enforced and that the buffer should be increased to at least 1km around an identified and confirmed bat roost (a nationwide wind energy development buffer of 20km should be maintained around conservation important bat roosts with more than 500 bats). Modification of the habitat to create open areas may increase the chances of clutter-edge feeders coming into contact with turbine blades as the frequency of feeding patches will be increased.

The impact on bats as a result of construction will be restricted to habitat disturbance and destruction during the construction phase. The potential impact on bats will predominantly occur during the operational phase of the Wind Energy Facility.

Figure 5.3 below indicates the relationship of the 200m buffer (200m on either side of the escarpment) to areas within the study area where bat feeding activity is anticipated to be greatest. These areas correspond to a large extent with the bird sensitive buffers.

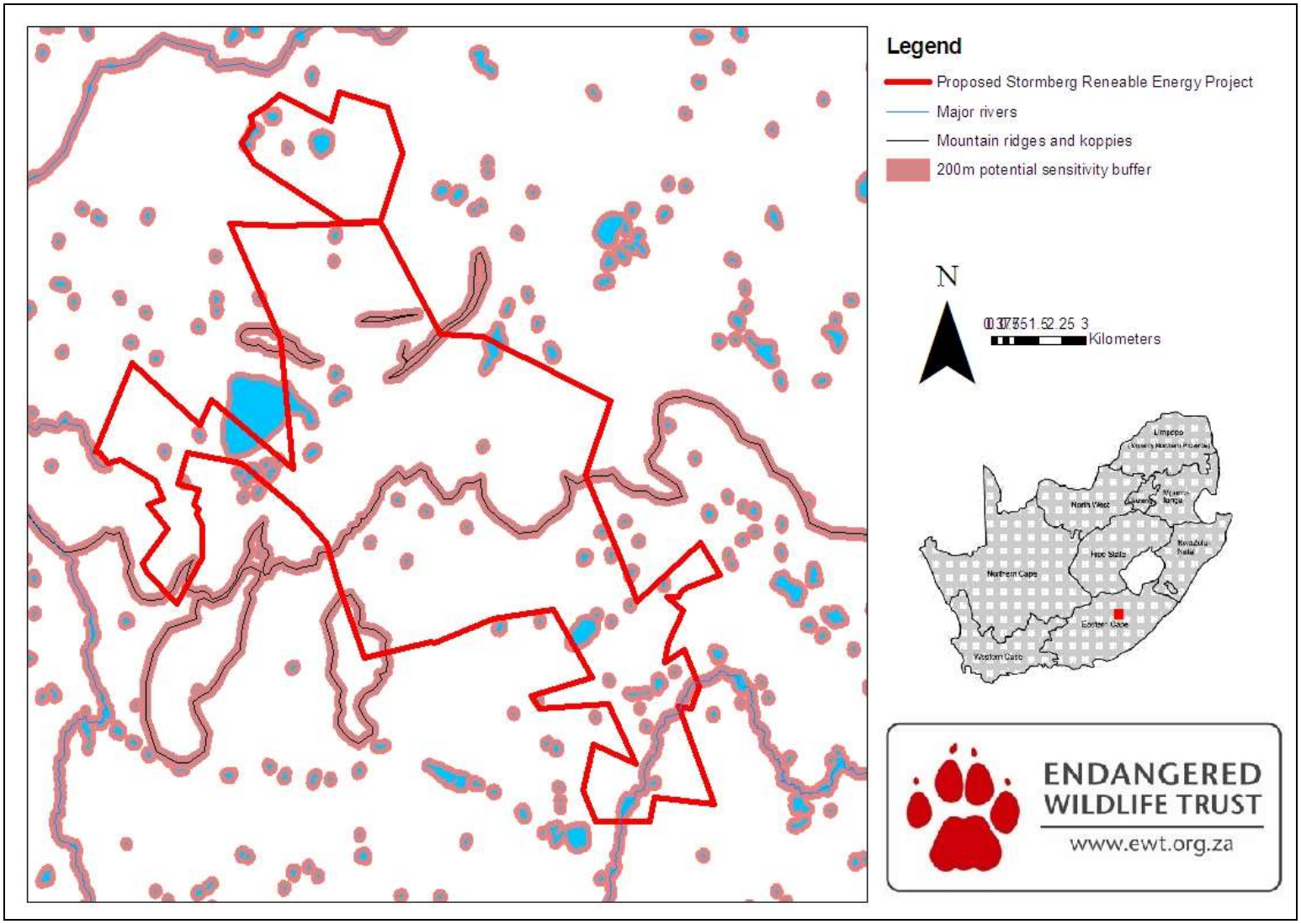

Figure 5.3 Preliminary bat sensitivity map of the study area (buffered by 200m)

Table 5.4: Potential impacts on bats

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Habitat destruction	» Habitat destruction construction of the concrete foundation of the turbines, access roads and associated infrastructure. » Increase in the movement of bats across the area due to removal or destruction of vegetation.	Local	Development in areas of high and medium to high sensitivity to be confirmed in the EIA phase as informed by pre-construction monitoring.
Operational Phase			
Collisions with turbines, associated infrastructure and barotrauma	» Attraction of insects to lights used at the facility, resulting in an increased incidence of bats for feeding purposes.	Local and regional	N/A
	» Movement of bats between food sources into open areas where turbines may be located, is likely to increase the risk of collisions with turbine blades and bat mortality.	Local and regional	Development in areas of high and medium to high sensitivity to be confirmed in the EIA phase as informed by pre-construction monitoring.
	» Exposure of bats to rapid decreases in external air pressure near the blade tips could result in barotrauma and bat mortality.	Local and regional	N/A
Disturbance of bats and interaction with infrastructure	» The construction of wind energy facilities has the potential to disrupt the natural migration routes of migratory bat species in the area by being placed in their flight path. » Wind turbines may disrupt bats that commute nightly from roost sites to feeding areas. » If a wind energy facility results in the death of many individual bats, breeding patterns and population growth and maintenance	Local	Development in areas of high and medium to high sensitivity to be confirmed in the EIA phase as informed by

	could be severely disturbed. » There is a likelihood that bats could roost in the substation/s and workshop areas and/or office or associated infrastructures.		pre-construction monitoring.

Gaps in knowledge and recommendations for further study:

Currently there is no baseline information to suggest that the Wind Energy Facility will or will not have a negative impact on bats occurring in the study area, and more baseline data is required to determine the occurrence of habitat and roosts and the relationship of bats to the proposed infrastructure.

EIA Phase

The following will be undertaken during the EIA Phase:

» The micro habitats on site will be assessed for their suitability for the key species.
» The sensitivity zones and suitable buffer zones will be identified and mapped.
» The impacts identified in this scoping phase study will be assessed formally according to the supplied criteria.
» A site visit must be conducted for the EIA phase of this project to more accurately determine bat presence and to provide more guidance regarding the appropriate positioning of the turbines correctly as well as to deal with the details of the associated infrastructure that was not provided at this stage of the process.
» Baseline data collected during the pre-construction monitoring to be undertaken will be considered in the final report.

Pre-construction Monitoring Programme (wind)

The primary aims of the bat monitoring programme are to assess the potential impacts resulting from the construction and operation of the Wind Energy Facility over the bat community of the study area. Therefore the main objectives of this monitoring program are:

» To characterize the bat community present within the wind farm site in order to establish a reference characterization and enable detection of the potential changes in the bat community and the eventual exclusion/displacement effect during the project phases (for example: avoidance of the wind facility area after construction);
» To document patterns of bats at the wind farm site and its immediate surroundings and establish a pre-impact baseline scenario of bat utilization of the study area;
» To determine and monitor the utilization of relevant bat roosts in the Wind Energy Facility and immediate surroundings;

- » To identify sensitive areas and to propose mitigation measures;
- » To establish the baseline scenario for the monitoring of the subsequent phases of the project.

In order to meet these objectives the following tasks will be implemented throughout the monitoring programme:

- » Bat roosts searches, inspection and monitoring within and in the vicinity of the Wind Energy Facility (covering at least four annual seasons before construction);
- » Active detection of ultra-sounds within the Wind Energy Facility and at control area(s) (covering at least four annual seasons before construction);
- » Passive detection of ultra-sounds within the Wind Energy Facility and at a control area(s) (covering at least four annual seasons before construction).

The implementation of similar monitoring protocols and sampling locations during the subsequent phases of the project (e.g. construction phase and at least for three years after the facility becomes operational) will be very important to determine if other impacts are occurring and adequately adjust any mitigation measures proposed at this stage (or propose new and more appropriate ones if necessary).

Detail regarding the above is provided in further detail in Chapter 7.

5.3.5 Potential impacts on Heritage and Paleontological Resources

The study area is underlain by the Molteno, Elliot and Clarens Formations of the Karoo Supergroup and dolerite igneous intrusive rocks of the Karoo Dolerite Suite, each of which offers differing probability of paleontological potential.

The archaeological background and timeframe of the study area is characterised by remains dating to the Stone Age including Rock Art, historical structures older than 60 years and graves/cemeteries. Several ruins, kraals and grave sites were identified during the Scoping phase. Some of these sites are probably older than 60 years and protected by heritage legislation.

Table 5.5: Potential heritage and paleontological impacts

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Potential impacts on heritage resources	Construction of a renewable energy facility and associated infrastructure impacting on heritage resources including graves, ruins, kraals and Stone Age sites.	Local	Identified heritage sites (subject to confirmation during EIA phase)

Potential movement, damage, or destruction of fossil material	Potential damage or destruction of fossil materials during the construction of project infrastructural elements	Local	None identified
	Movement of fossil materials during the construction phase, such that they are no longer in situ when discovered.	Local	None identified
	The loss of access for scientific study to any fossil materials present beneath infrastructural elements.	Local	None identified
Operational Phase			
Potential impact on sense of place	The proposed wind energy facility could directly impact on both the visual context and sense of place of historical sites	Local and regional	Not applicable

Gaps in knowledge and recommendations for further study

The status and significance of the heritage sites identified at a desktop level was not confirmed at Scoping. Verification of the desktop information collected regarding the position and status of the heritage sites identified is required to determine the significance of the impacts on the heritage environment.

Heritage

In order to comply with the National Heritage Resources Act (Act No 25 of 1999) a Phase 1 Archaeological Impact Assessment must be undertaken. During this study sites of archaeological, historical or places of cultural interest must be located, identified, recorded, photographed and described. During this study the levels of significance of recorded heritage resources must be determined and mitigation proposed should any significant sites be impacted upon, ensuring that all the requirements of the South African Heritage Resources Agency are met.

Palaeontology

A thorough site investigation of the outcrops of the area where development of infrastructure would occur and in areas of paleontological potential prior to commencement of the project by a palaeontologist would make it possible that scientifically and/or culturally significant fossils, present within the area may be discovered that would be otherwise damaged, destroyed or inadvertently moved. Similarly, examination should be made of excavations as they are being performed. Detail regarding the above is provided in further detail in Chapter 7.

5.3.6 Potential Visual Impacts

It is evident from the preliminary theoretical viewshed analyses (refer to Figure 5.3) that the proposed Wind Energy Facility would have a large area of potential visibility (i.e. within a 10km radius of the site), especially to the north-west and to the south of the site. The area of exposure is generally restricted to vacant grazing

land and natural land, but does contain a number of potentially sensitive visual receptors. This pattern of exposure is generally attributed to the elevated topography of the study area and the fact that the Wind Energy Facility is planned both above (plateau) and below (basin) the escarpment.

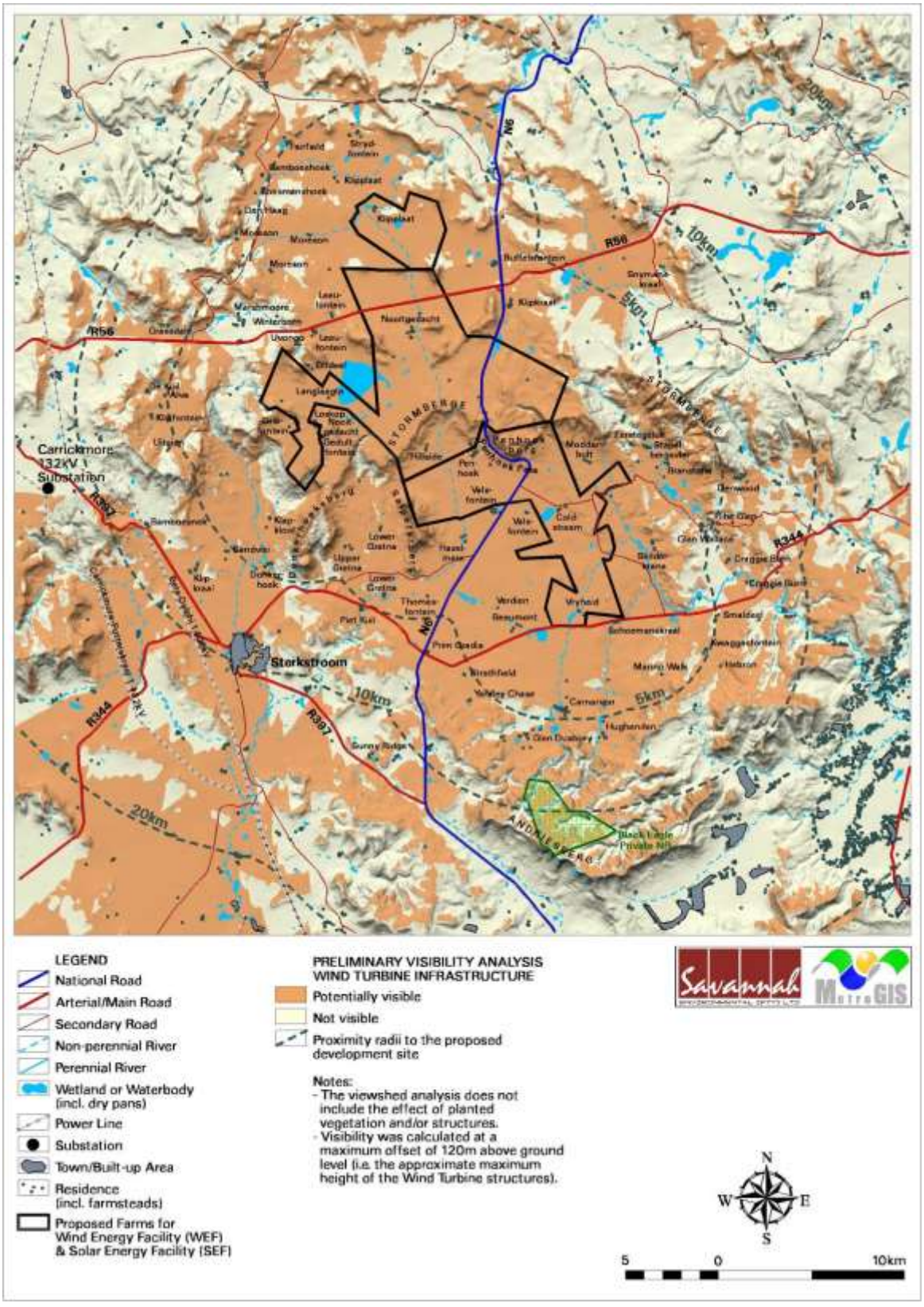

Figure 5.3: Preliminary Visibility Analysis (Wind Turbine Infrastructure only). This viewshed analysis represents a theoretical view showing areas where one or more turbines could potentially be observed

Table 5.6: Potential visual impacts

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Potential visual impacts associated with the construction phase	Construction of the wind energy facility and associated infrastructure	Local and regional	None identified
Operational Phase			
Visibility to observers and residences	» The visibility of the facility to, and potential visual impact on, observers travelling along the N6 national road, the R56 and R344 arterial roads and the major local roads traversing near the proposed facility. » The visibility of the facility to, and potential visual impact on observers residing at homesteads (farm residences) located within close proximity of the site. » The potential visual impact of operational, safety and security lighting of the facility at night on observers residing in close proximity of the facility.	Local and regional	None identified
Impact on scenic resources	The potential visual impact on the scenic resources, landscape and topography of the region brought about by the construction of wind turbines within sensitive topographic units (i.e. hills, mountains and steep slopes).	Local and regional	None identified
Secondary visual impacts	Construction of new access roads within areas with steep slopes and elevated topography.	Local and regional	None identified
Cumulative impacts	Potential cumulative visual impacts (or alternately, consolidation of visual impacts) with specific reference to the authorised Dorper wind energy facility located within 20 km west of the proposed development site.	Regional	None identified

Gaps in knowledge and recommendations for further study:

The severity of the visual impact and the extent of visual exposure were not determined during Scoping. It is recommended that sensitive visual receptors within (but not restricted to) a 20km buffer zone from the wind energy facility be identified and the severity of the visual impact assessed within the EIA phase of the project.

Additional spatial analyses must be undertaken in order to:

» Determine Visual Distance/Observer Proximity to the facility
» Determine Viewer Incidence/Viewer Perception
» Determine the Visual Absorption Capacity of the landscape
» Determine the Visual Impact Index

Specific spatial criteria need to be applied to the visual exposure of the proposed facilities in order to successfully determine visual impact and ultimately the significance of the visual impact.

Detail regarding the above is provided in further detail in Chapter 7.

5.3.7 Potential Noise Impacts

Besides existing roads, no other significant ambient soundscape contributors exist in the study area. The ambient sound levels would have a suburban character at dwellings close to the N6 and R56 public roads, becoming more rural the further way from the roads the dwelling are. 30 potential noise-sensitive developments were identified in the noise specialist scoping study, 23 of which are located inside the study area boundary and 7 of which are located outside.

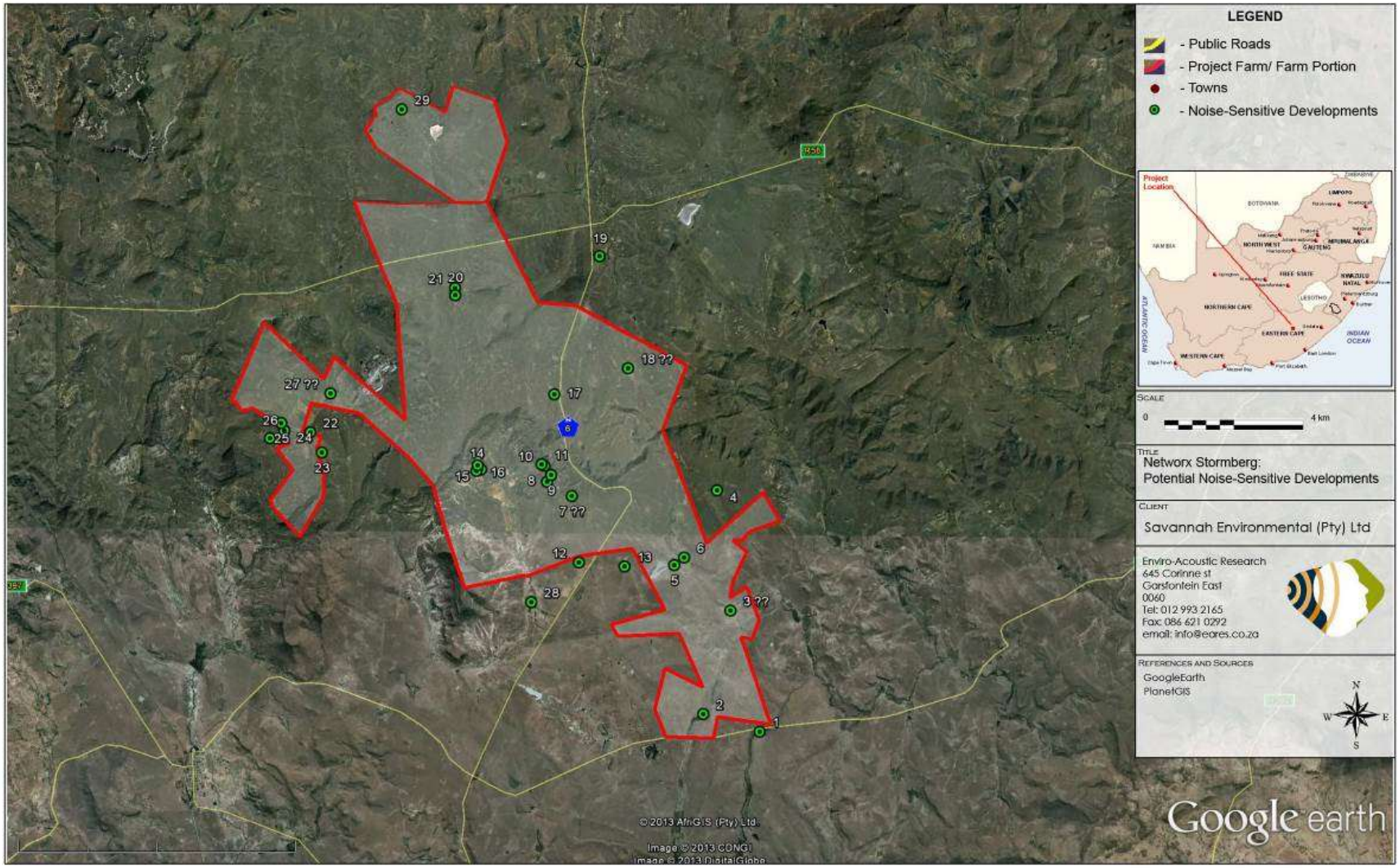

Figure 5.4: Location of potential noise sensitive developments

Potential sources of noise from construction and operation activities which could impact on the noise-sensitive developments include:

Table 5.7: Potential noise impacts

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction Phase			
Noise impact on identified noise sensitive developments (NSD)	» construction of access roads, » establishment of turbine tower foundations, and electrical substation(s), » the possible establishment, operation and removal of concrete batching plants, » the construction of any buildings, » digging of trenches to accommodate underground power cables; and » the erection of turbine towers and assembly of WTGs. » Construction equipment e.g. excavator/grader, bulldozer, dump trucks, vibratory roller, bucket loader, rock breaker, (potentially) drill rig, flat bed trucks, concrete truck(s), cranes, fork lift and various 4WD and service vehicles » Concrete batching plants and use of borrow pits (if required) » Blasting (if required) » Construction traffic.	Local	To be determined during EIA phase upon confirmation of noise sensitive developments.
Operational Phase			
Wind turbine noise: aerodynamic sources	» Self-noise due to the interaction of the turbulent boundary layer with the blade trailing edge. » Noise due to inflow turbulence (turbulence in the wind interacting with the blades). » Discrete frequency noise due to trailing edge thickness. » Discrete frequency noise due to laminar boundary layer instabilities (unstable flow close to the surface of the blade). » Noise generated by the rotor tips.	Local	Noise sensitive developments indicated in Figure 5.4 should be investigated to determine whether noise specific buffers must be applied. All noise sensitive development

			s will be required to be within the noise limits.
Wind turbine noise: mechanical sources	» the gearbox and the tooth mesh frequencies of the step up stages; » generator noise caused by coil flexure of the generator windings which is associated with power regulation and control; » generator noise caused by cooling fans; » control equipment noise caused by hydraulic compressors for pitch regulation and yaw control.	Local	Sites indicated in Figure 5.4 should be investigated to determine whether noise specific buffers must be applied. All noise sensitive developments will be required to be within the noise limits.

Gaps in knowledge and recommendations for further study:

There is currently no information available regarding the existing soundscape of the area. Projected impacts from the construction phase can only be modelled once more information regarding the duration of construction and equipment used are known.

It is recommended that the potential noise impact be investigated and modelled in more detail in the EIA Phase once the exact location of the wind turbines is known. The following information is considered critical:

» The prevailing night-time background ambient noise levels,
» The available meteorological data,
» The exact locations of the various wind turbine generators within the wind farm development footprint,
» The confirmation of the noise-sensitive developments, and;
» An overview of the equipment, processes and schedules for the construction phase.

Detail regarding the above is provided in further detail in Chapter 7.

5.3.8 Potential Impacts on the Social Environment

The potential positive social impacts during the construction phase are largely linked to the creation of employment and skills development opportunities. The

potential negative impacts are linked to the impact on local road surfaces associated with the transport of heavy components and the impact on local communities and current farming activities associated with the presence of construction workers on the site. A number of key social issues are potentially associated with the construction and operation of the wind energy facility as noted in the table below.

Table 5.8: Potential social impacts

Issue	Nature of Impact	Extent of Impact	'No go' areas
Construction phase			
Impact on rural sense of place	Impact on sense of place closely linked to the visual impacts from the wind energy facility	Local and regional	N/A
Impact on farming activities	» Safety and security impacts, stock losses, damage to farm infrastructure and damage to farm roads. » Potential impact on farming operations and loss of productive land (during the construction and operational phase).	Local and regional	N/A
Impact on existing infrastructure	Potential damage to roads by heavy equipment and increased traffic volumes (during the construction and operational phase)	Local and regional	N/A
Influx of job seekers into the area	» The influx of job seekers may result in an increase in sexually transmitted diseases, including HIV/AIDS; increase in prostitution; increase in alcohol and drug related incidents; increase in crime; and creation of tension and conflict in the community. » Potential threat to farm safety due to increased number of people in the area and construction workers.	Local and Regional	N/A
Creation of employment and business opportunities	Positive impact associated with indirect business opportunities created as a result of the proposed project.	Local and regional	N/A
Creation of potential training and skills development opportunities for local communities	Positive impact associated with potential for skills development and business opportunities.	Local and Regional	N/A

and businesses			
Potential up and down-stream economic opportunities for the local, regional and national economy	Maximising opportunities to local and regional SMMEs and other businesses to provide a range of services, which may include, but not limited to, catering, laundry, transport (limited positive impact)	Local, Regional and National	N/A
Operational phase			
Impact on property prices	» Generation of additional land use income makes a positive contribution to farming cash flow, and thereby improves the financial sustainability of agricultural activity. » Decrease in value of property due to reduced grazing capability	Local and regional	N/A
Impact on tourism	Positive or negative impact on tourism potential due to viewer perception of the wind energy facility.	Local and Regional	
Creation of potential training and skills development opportunities	Positive impact associated with potential for skills development and business opportunities.	Local and Regional	N/A
Renewable energy	Provision of clean, renewable energy source for the national grid	Local and Regional	N/A
Local content	Benefits associated with the establishment of a Community Trust	Local and Regional	N/A

Gaps in knowledge and recommendations for further study:

With regard to local level policy documents, the ILM IDP indicates that the area has potential for the establishment of wind energy facilities. It is therefore reasonable to assume that the establishment of renewable energy projects in the area is supported, however, the extent and significance of the social impacts at a low level are not fully understood.

The following typical, generic project information is required to be considered in order to address the gaps in information:

» Comments received from I&APs during the public participation process, including comments reflected in the Final Scoping Report;
» A plan of the proposed lay-out(s) of the facilities (including an indication of the phasing sequence on the site), supporting structures and infrastructure;
» Duration of the construction phase (months);

- Number of people employed during the construction phase;
- Breakdown of number of people employed in terms of skills categories (low skilled, semi-skilled and skilled);
- Estimate of the total wage bill for the construction phase and breakdown in % as per skills categories;
- Estimate of total capital expenditure for the construction phase;
- Indication of where construction workers will be housed;
- Opportunities for on-site skills development and training;
- Description of the typical activities associated with the construction phase, specifically on-site construction activities. This includes a description of how the components associated with a REF will be transported to and assembled on site;
- The size of the vehicles needed to transport the components and the routes that will be used to transport the large components to the site, and an estimate of the number of vehicle trips required; and
- Information on the nature of the agreements with the affected landowners and or communities, specifically with regard to compensation for damage to land, infrastructure etc.

5.4 Decommissioning phase

Decommissioning activities may include removal of project infrastructure and site rehabilitation.

Similar to the construction phase, environmental issues associated with decommissioning activities may include, among others, noise impacts, soil erosion, and threats to biodiversity and ecological processes, including habitat alteration and impacts to fauna.

5.5 Cumulative impacts

National Perspective: The CSIR has released a map with initial identification of geographical areas best suited for the roll-out of wind and solar photovoltaic (PV) energy projects in South Africa. These results form part of the strategic environmental assessment (SEA) that the CSIR is conducting for wind and solar energy, on behalf of the national Department of Environmental Affairs (DEA). The aim of the assessment is to designate Renewable Energy Development Zones (REDZ) within which such development will be incentivised and streamlined. Phase I of the SEA was completed in July 2013. Wind and solar PV study areas have been identified based on assessment of resource potential, social development needs, the electrical grid and a comprehensive set of environmental factors and were released for public comments at the beginning of August 2013[2].

[2] http://www.csir.co.za/enews/2013_oct/02.html

The proposed Stormberg Wind Energy Facility falls within the wind study area (southern portion to the south of the escarpment) while the majority of the site falls within the solar PV study area (Figure 5.5). The implication therefore, is that this wind energy facility together with other future facilities proposed to occur in the region will potentially result in considerable cumulative impacts.

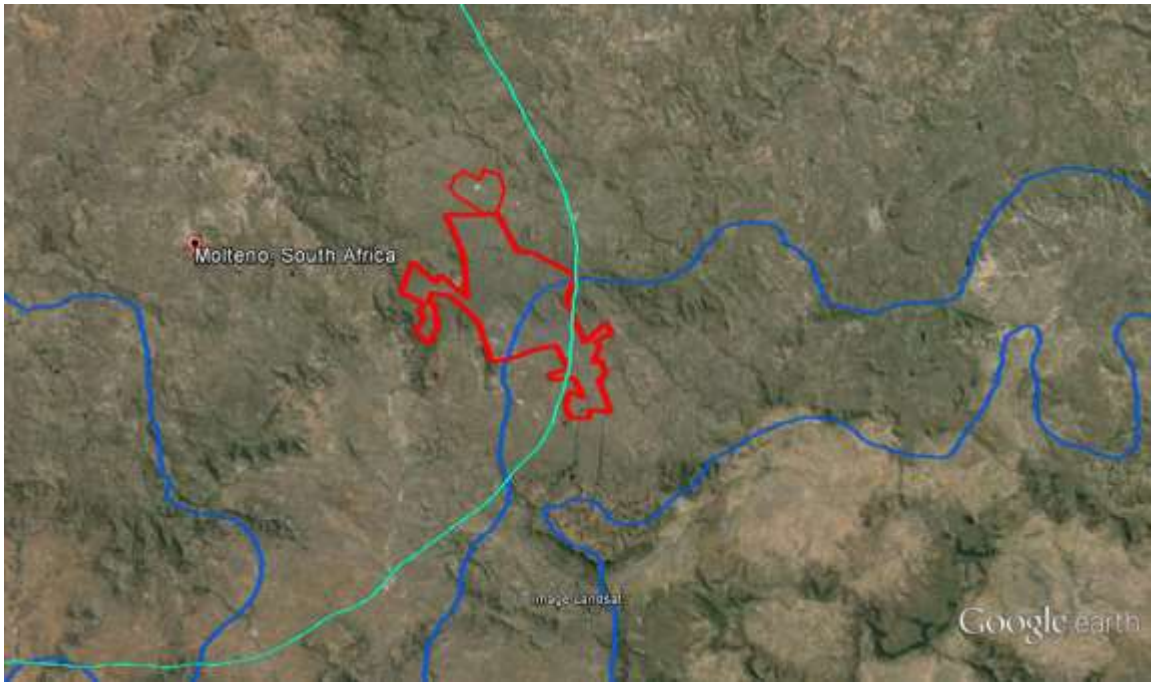

Figure 5.5: Stormberg study area in relation to the Renewable Energy Development Zones (wind study area indicated by dark blue line and solar PV study area indicated by light blue line) – Source: DEA and CSIR

Regional perspective: the proposed Wind Energy Facility is located in close proximity to the authorised Dorper Wind Farm, a 5 phase facility located approximately 12km west (straight line distance) of the study area boundary. A 40 turbine facility is currently under construction.

Other wind energy facilities within 100km from the study area include:

» Indwe Wind Farm (authorised), a 55.7 MW facility located approximately 70km from the study area (straight line distance), consisting of 23 turbines.
» Elliot Wind Farm (proposed) located approximately 100km east of the study area.

Cumulative effects within approximately 30km from the study area (accounting primarily for visual and avifaunal impacts) will be addressed during the EIA phase and can only be adequately assessed once a preliminary layout is available. The significance of the cumulative impact will therefore be directly influenced by the proximity of the proposed Wind Energy Facility to the authorised Dorper Wind Farm (all phases). Cumulative visual impacts which may alternately be perceived as a

consolidation of visual impacts (with specific reference to the authorised Dorper Wind Energy Facility) will need to be addressed in further detail.

Local perspective: The cumulative impacts associated with the proposed Wind Energy Facility are expected to be associated with the scale of the project (i.e. that up to 150 wind turbines and associated infrastructure will be located on the proposed site). A reduction of the number of turbines across the site will result in a reduction of the cumulative impacts if sensitive areas are avoided.

The site could suffer some level of disturbance as a result of the activities required to be undertaken. However, once construction is complete, it is anticipated that only a small portion of this area (in this case less than 0.5%) will be permanently impacted by infrastructure associated with the project.

The anticipated cumulative impacts on agricultural resources, flora and fauna and environmental and social receptors are not considered to be of high significance at this Scoping stage of the process if identified environmental constraints and sensitivities are observed. Currently most of the site is environmentally constrained due to no-go areas associated with potential impacts on bird habitat and overall ecological functioning. The potential direct cumulative impacts associated with the operation phase of the project are expected to be of most significance on bird and bat species which may make use of the study area.

CONCLUSION CHAPTER 6

This Scoping Report aimed at detailing the nature and extent of the Wind Energy Facility on the proposed study area, identifying potential issues associated with the proposed project, and defining the scope of the studies required within the EIA. This was achieved through an evaluation of the proposed project, involving the project proponent, specialist consultants, and a consultation process with key stakeholders that included relevant government authorities, stakeholders and interested and affected parties (I&APs). In accordance with the requirements of the EIA Regulations, feasible project-specific alternatives (including the "do nothing" option) have been identified for consideration within the EIA process.

The conclusions and recommendations of this Scoping Report are the result of limited on-site inspections, desk-top evaluations of impacts identified by specialists, and the parallel process of public participation. A summary of the conclusions of the evaluation of the potential impacts identified to be associated with the proposed Wind Energy Facility is provided below.

Recommendations regarding investigations required to be undertaken within the EIA Phase are provided within the Plan of Study for EIA, contained within Chapter 8 of this report.

6.1. Conclusions drawn from the Evaluation of the Proposed Site for Development of a Wind Energy Facility

The Wind Energy Facility will comprise of up to 150 turbines with a hub height of up to 120m and a rotor diameter of up to 130m. The wind energy facility would have a capacity of up to 420MW and is to be developed in progressive stages/phases. The majority of potential impacts identified to be associated with the construction and operation of the proposed facility are anticipated to be largely localised with more significant regional impacts than the solar development also proposed to occur in the study area owing to visual, noise and avifaunal impacts. A more accurate understanding of the final development footprint will be determined during the EIA Phase with the availability of a facility layout plan.

The study area proposed to accommodate the facilities includes several farm portions north and south of the escarpment (approximately 15 000 ha) where, due to the dominance of grazing, the natural habitats occurring remain largely intact and based on habitat availability are potentially host to a number of sensitive species, of which birds are of most concern. Currently most of the development constraints within the study area are associated with overall ecological sensitivity and the presence of bird and bat habitat.

6.2. Summary of potential impacts

Potential issues identified through this scoping study associated with the proposed Wind Energy Facility identified in Chapter 5 are summarised in Tables 6.1 and 6.2 below.

Table 6.1 Potential impacts associated with the construction phase

Potential Positive Impacts	Social Impacts » Generation of additional land use income makes a positive contribution to farming cash flow, and thereby improves the financial sustainability of agricultural activity » Skills development » Job and direct and indirect business opportunities » Improvement in opportunities for local and regional SMMEs
Potential Negative Impacts	Soil and agricultural impacts » Physical soil disturbance, erosion and disruption to current agricultural practices due to construction activities Ecological impacts » Impacts on a Critical Biodiversity Area (CBA Tier 2 and CBA Tier 3) and loss of landscape connectivity » Degradation of ecosystems » Direct impacts on fauna, their habitat and movement Impact on birds » Destruction of bird habitat and disturbance of birds » Displacement of birds from the site and barrier effects Impacts on bats » The disturbance of habitats resulting in a reduced prey-base and/or the destruction of roost sites Heritage and palaeontology » Impacts on heritage resources (26 possible heritage sites potentially affected depending on specific siting of the wind energy facility and associated infrastructure) » Impacts on paleontological resources (fossil material) to varying degrees across the extent of the site (the study area is underlain by four bedrock geologies of varying degrees of paleontological potential) Visual impacts » Visual impacts associated with the construction of the facility and associated infrastructure Noise impacts » Noise impacts due to movement of construction machinery and vehicles, traffic and blasting (if required) Social impacts » Impacts on land use and grazing capacity » Influx of job seekers and associated social issues » Loss of sense of place » Impacts on property prices » Increased traffic

	» Increase crime in the study area

Table 6.2: Potential impacts associated with the operation phase

Potential Positive Impacts	Clean energy » Provision of a clean, renewable energy source for the national grid Social Impacts » Generation of additional land use income makes a positive contribution to farming cash flow, and thereby improves the financial sustainability of agricultural activity. » Creation of opportunities to local business during the operational phase, including but not limited to, provision of security, staff transport, and other services » Potential up and down-stream economic opportunities for the local, regional and national economy » Potential positive impacts on existing tourism potential due to visitors from other areas wanting to view the facility » Potential positive impacts on local farmers due to upgrade of roads and other infrastructure thereby improving efficiencies » Assistance towards provision of secure power supply in South Africa
Potential Negative Impacts	Soil and agricultural impacts » Soil erosion due to alteration of the land surface run-off characteristics Ecological impacts » Change in runoff and drainage patterns » Establishment of alien plant species Impacts on birds » Displacement of birds and increased mortality of target species identified due to collision with turbine blades Impacts on bats » Increased mortality of bats as a result of collision with turbine blades and barotrauma Heritage Impacts » Indirect impact on heritage sites and impact on cultural landscape and sense of place Visual impacts » Visual exposure of wind turbines (due to scale of the structures) and associated infrastructure on observers from roads, built-up areas, homesteads and farmsteads » Visual impact on affecting perception of sensitive topographic features and sense of place Noise impacts » Wind turbine noise: aerodynamic sources » Wind turbine noise: mechanical sources Social impacts » Potential localised negative impacts on farming activities and land use » Visual and sense of place impacts on existing receptors, including

	nearby rural and urban residences

Cumulative effects: within approximately 30km from the study area (accounting primarily for visual and avifaunal impacts) will be addressed during the EIA phase and will take into account other facilities in the region, most notable of which is the Dorper Wind Farm.

Environmental fatal flaws: No environmental fatal flaws were identified to be associated with the proposed Wind Energy Facility at this stage in the process. However, areas of potential high sensitivity were identified at a desk-top level through the scoping phase, as illustrated in the sensitivity map (refer to Figure 6.1).

Sensitivity mapping: The sensitivity map is a rough-scale estimate of sensitivity on the site, and these areas will be subject to survey and ground-truthing during the EIA phase of the project. These potentially sensitive areas will, therefore, be further investigated and assessed through detailed specialist studies (including field surveys) during the EIA phase in order to identify and confirm exclusion or no-go areas.

Areas where High to Very-High sensitivity classes overlap (i.e. High Bird Sensitivity Areas overlapping with Very High Ecologically sensitive areas), in Figure 6.1 are those areas which could potentially pose the most significant constraints to the proposed siting of Wind Energy Facility.

In order to assess potential impacts within sensitive areas, a preliminary layout for the Wind Energy Facility is required to be compiled by the applicant. Due to the anticipated variation in the significance of the impacts between wind and solar facilities some parts of the study area may be more suitable to the construction of one technology than other parts and vice versa. This is of particular significance in the case of bird sensitive areas identified in the study area (refer to Section 5.3.3)

The potentially sensitive areas/environmental features that have been mapped in Figure 6.1 include:

- Areas of ecological sensitivity
- Areas of avifaunal sensitivity
- Areas of bat sensitivity
- Potential noise sensitive developments
- Potential heritage sites

The following is evident from the preliminary sensitivity map:

- Areas of very high ecological sensitivity are shown as the escarpment running east to west through the centre of the study area, other mountainous sections, wetlands and watercourses and drainage lines traversing the study area. These areas are considered to be critical and unique habitats that serve

as habitat for rare/endangered species or perform critical ecological roles and are essentially no-go areas from a developmental perspective and should be avoided as far as possible. These areas overlap to a large extent with areas of high birding sensitivity especially along the escarpment and around the wetlands within the study area.

» The area to the north of the escarpment is assigned a medium to high bird sensitivity, with the area north of the escarpment being generally more sensitive than the area south of the escarpment from a birding perspective.

» Areas of bird sensitivity include the following buffers:
  - 1km buffer around large pans and dams
  - 500m buffer around small pans and dams
  - 500m around both sides of the escarpment edge

» A 200m buffer has been assigned to areas associated with bat feeding areas including natural vegetation patches, riparian vegetation and water-bodies (corresponds primarily with areas of high to very high ecological sensitivity).

» The majority of the study area is allocated a medium ecological sensitivity. These include areas of natural or previously transformed land where the impacts are likely to be largely local and the risk of secondary impact such as erosion low. Development within these areas (where they do not overlay with areas of high or medium to high bird sensitivity) can proceed with relatively little ecological impact provided that appropriate mitigation measures are in place.

» Very little of the study area is allocated a low sensitivity status (which associated with cropping or land transformation).

» The identified heritage sites generally correspond with the noise sensitive developments identified within the study area, as these largely correspond with existing farm houses and settlements.

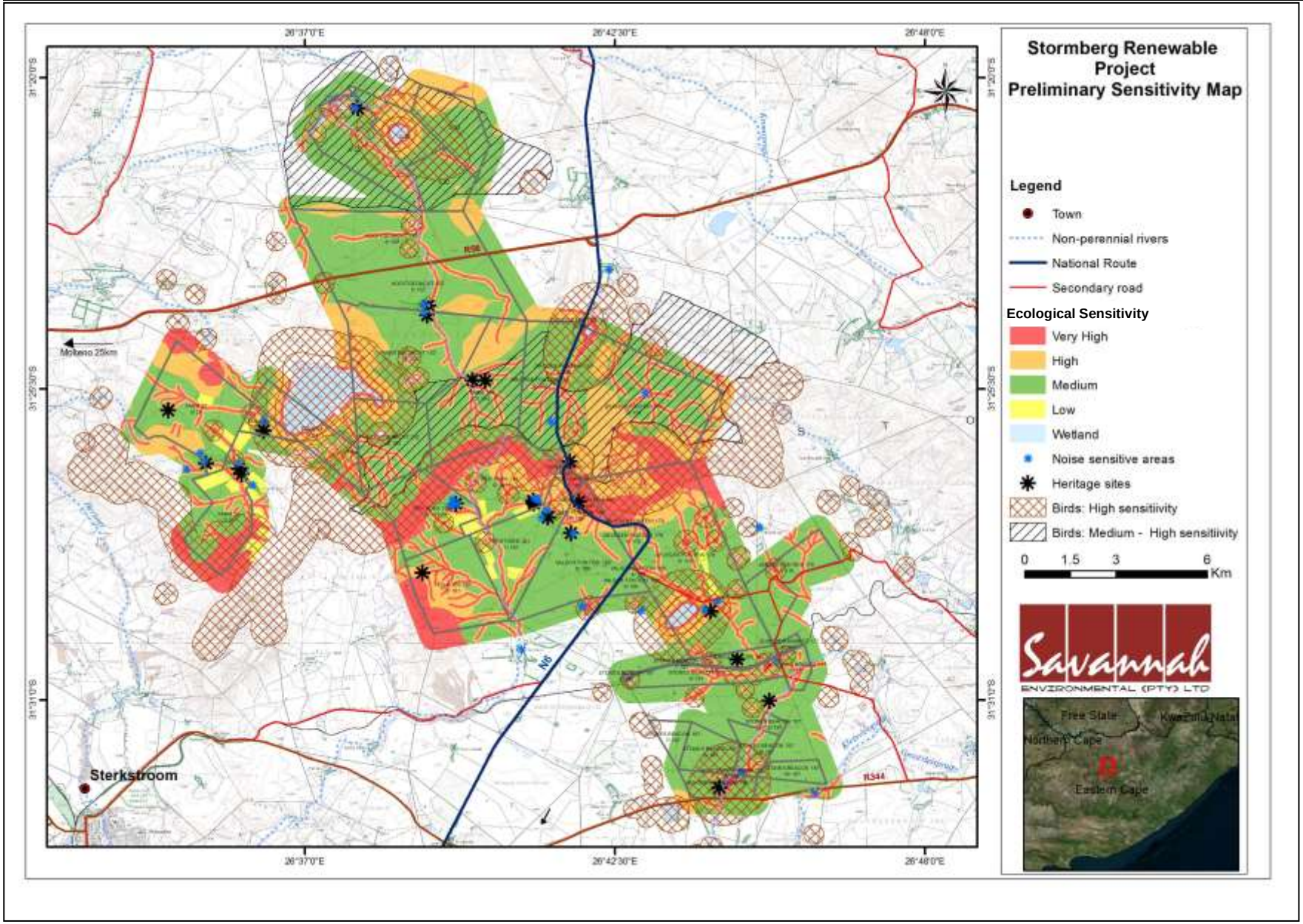

Figure 6.1: Preliminary sensitivity map of the Wind Energy Facility study area based on sensitivities identified at Scoping

PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT CHAPTER 7

A detailed description of the nature and extent of the proposed Stormberg Wind Energy Facility and associated infrastructure, details regarding the Scoping process followed, as well as the issues identified and evaluated through the Scoping Phase (to date) have been included in this Draft Scoping Report. This Chapter of the report provides the Plan of Study for Environmental Impact Assessment (EIA) for all of the proposed project development components (i.e. wind energy facility, solar energy facility, plus grid connection infrastructure).

The Plan of Study describes how the EIA Phase for the proposed Wind Energy Facility project will proceed. The EIA Phase of the study includes detailed specialist studies for those impacts recorded to be of potential significance, as well as on-going public consultation. The key findings of the Scoping Phase (which includes inputs from authorities, Organs of State, stakeholders, the public, the proponent and the EIA specialist team) are used to inform the Plan of Study for EIA, together with the requirements of the NEMA EIA Regulations and applicable guidelines.

7.1. Aims of the EIA Phase

The EIA Phase will aim to achieve the following:

» Provide an overall assessment of the social and biophysical environments affected by the proposed project.
» Assess potentially significant impacts (direct, indirect and cumulative, where required) associated with the proposed wind energy facility and associated infrastructure.
» Identify and recommend appropriate mitigation measures for potentially significant environmental impacts.
» Undertake a fully inclusive public involvement process to ensure that I&AP are afforded the opportunity to participate, and that their issues and concerns are recorded.

The EIA will address potential environmental impacts and benefits (direct, indirect and cumulative impacts) associated with all phases of the project including design, construction, operation and decommissioning, and will aim to provide the environmental authorities with sufficient information to make an informed decision regarding the proposed project. All feasible alternatives (including the 'do nothing' alternative) will be assessed.

7.2. Project components to be assessed under the EIA Phase

A variation of anticipated impacts for the wind, solar and power line components is anticipated due to the variability in the extent (and ultimately significance) of their impacts during construction and operation. The DEA has allocated the following reference numbers for each of the respective components:

- Wind Energy Facility - 14/12/16/3/3/2/394
- Solar Energy Facility - 14/12/16/3/3/2/398
- Power Lines – 14/12/16/3/3/1/912

The components of the proposed wind energy project as presented in this Scoping Report will be assessed separately in an EIA Report in order for the DEA to make an informed decision regarding the proposed solar energy facility.

7.3. Authority Consultation

Consultation with the regulating authorities (i.e. DEA and Eastern Cape DEDEA) will continue throughout the EIA process. On-going consultation will include the following:

- Submission of a Draft Scoping Report to Eastern Cape DEDEA for review and comment.
- Submission of a Draft Scoping Report to National DEA for review.
- Submission of a Final Scoping Report to DEA following a 30-day public review period.
- Submission of a Draft EIA Report to Eastern Cape DEDEA for review and comment.
- Submission of a Draft EIA Report to DEA.
- Submission of a Final EIA Report to DEA following a 30-day public review period.
- An opportunity to visit and inspect the site.

Pre-construction bird and bat monitoring will be required to be undertaken (refer to Section 7.7) over a 12 month period and the results thereof integrated into the draft EIA Report prior to release of the report for public review. The Draft EIA report will therefore only be submitted to the DEA on completion of the pre-construction monitoring campaigns.

7.4. Consideration of Alternatives

The following project alternatives will be investigated in the EIA:

- **The 'do nothing' alternative:** The applicant do not establish the proposed Stormberg Wind Energy Facility (maintain status quo).

» **Site-specific alternatives:** in terms of the siting or positioning of the wind turbine generators in response the identified environmental sensitivities.

» **Site alternatives:** The applicant has determined the quality of the wind resource over the farm portions included in this report. No site alternatives are currently proposed given the extent of the study area under consideration.

» **Alternative technologies:** for use in the establishment of the wind energy component of the facility.

7.5. Assessment of Potential Impacts and Recommendations regarding Mitigation Measures

A summary of the issues which require further investigation within the EIA phase, as well as the proposed activities to be undertaken in order to assess the significance of these potential impacts is provided in Table 9.1. The specialists which are to be involved in the EIA Phase are also reflected in this table. These specialist studies will consider the study area proposed for the development of the project components.

Table 7.1: Summary of the issues which require further investigation within the EIA phase and activities to be undertaken in order to assess the significance of these potential impacts across the full extent of the site development footprint

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Impacts on Soils and Agricultural Potential	The EIA Phase will include the following activities: **More detailed assessment of soil conditions** The EIA phase assessment will include a field investigation of soils and agricultural conditions across the site. This field investigation will be aimed at ground-truthing the existing land type information and understanding the specific soil conditions on site. It will not be based on a grid spacing of test pits, but will rather comprise a reconnaissance type of soil mapping exercise based on an assessment of surface conditions, topography, and hand augered samples in strategic places, if necessary. Such a soil investigation is considered adequate for the purposes of this study. A more detailed soil investigation is not considered likely to add anything significant to the assessment of agricultural soil suitability for the purposes of determining the impact of the development on agricultural resources and productivity. **Assessment of erosion and erosion potential on site** The field investigation will involve a visual assessment of erosion and erosion potential on site, taking into account the proposed development layout. **Assessment of the impacts of specific construction activities and layout on soil conditions** The EIA phase will include an assessment of the specifics of construction activities and the proposed development layout on potential loss of topsoil and generation of spoil material. **Assessment of specific on-site agricultural activities** The EIA phase will gather more detail on agricultural activity on the site and identify any locally important soil and agricultural issues. This will be done through interviews with farmers and agricultural role players in the area.	Johann Lanz

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
Impacts on Flora and Fauna	The EIA Phase will include the following activities: » Ground-truth and refine the ecological sensitivity map of the site and production of a power line sensitivity map. Particular attention will be paid to the wetland/pans and other sensitive features at the site and the region. » Characterise the vegetation and plant communities present at the site. The SA vegetation map only provides a coarse picture of the vegetation present and on-site surveys will be conducted to generate a species list for the site as well as identify and where necessary map different plant communities present at the site. » Identify and map the presence of any unique and special habitats at the site such wetlands not mapped under the NFEPA. » Locate, identify and map the location of significant populations of species of conservation concern, so that the final development footprint can be adjusted so as to avoid and reduce the impact on such species. Some species of concern may be widespread and others localised and the distribution of such species will be established during the site visit. » Evaluate the likely presence of listed faunal species at the site such as the Giant Bullfrog, and identify associated habitats that should be avoided to prevent impact to such species. » Evaluate, based on the site attributes, what the most applicable mitigation measures to reduce the impact of the development on the site would be and if there are any areas where specific precautions or mitigation measures should be implemented. » Assess the impacts identified in above in light of the site-specific findings and the final layout to be provided by the developer.	Simon Todd of Simon Todd Consulting
Impacts on Birds	» The Bird Specialist Report will include the characterisation of the bird populations on the site. Based on this characterisation the expected impacts of the wind energy facility over the bird community will be determined and the impact significance quantified and geographically indicated. This assessment will also provide the information to propose the measures that need to be implemented during construction and operation in order to avoid or reduce the significance of impacts. It will also determine the monitoring effort necessary to measure the	Bioinsight

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	wind facility impacts during operation and the success of the mitigation measures. » The baseline characterisation will include a species list with the birds with potential or confirmed presence at the site and their conservation status. This list will be based on desktop studies, the results from the monitoring programme in execution at the site. The data sources to consult will include the South African Bird Atlas Project 2 (SABAP2), the South African Bird Atlas Project 1 (SABAP1) (Harrison et al. 1997), the Avian Wind Farm Sensitivity Map for South Africa (Retief et al. 2012), the Coordinated Avifauna Roadcounts (CAR), Coordinated Waterbird Counts, among other information ready available. It will also be performed an interpretation on the type of use and activity of birds species based on the results obtained during the monitoring programme as well as the importance of the nesting sites and water bodies and species use. As a result of the previous analysis the most relevant areas to birds will be determined. » In order to undertake the impact assessment, a detailed matrix identifying project actions and their impacts will be produced. The matrix will allow the qualification and, if possible, quantification of the impacts' attributes (magnitude, duration, scope, etc.) in order to determine the impact significance. For the significant impacts mitigation measures will be established for construction and operation phases. It will also propose a monitoring programme for the construction and operation phases. » The Bird Specialist report will include the detailed methodology, the complete baseline characterisation and interpretation of the results, the detailed impact assessment, the main recommendations to the project development and a proposal of the next steps of the monitoring programme through to the construction and operation phases of the project. The estimated date for delivery of the final report, after all the proposed surveys are completed, is by December 2014	
Impact on Bats	Before making any recommendations as to whether or not this development could proceed, with respect to bat conservation, it is required that a bat EIA study be conducted which includes site visits. The EIA report will be treated as a draft until such time as results of 12 months of pre-	Claire Patterson-Abrolat of Endangered

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	construction monitoring (to be undertaken by a non EWT affiliated specialist) can be incorporated into the EIA findings. These data will describe risk levels and inform specific mitigation actions based on real, long-team scientific data. A site visit will be conducted by EWT to more accurately determine bat presence, and to provide more guidance regarding the appropriate positioning of the turbines as well as the associated infrastructure. Information for the EIA phase would include the following fieldwork techniques: » Species presence estimates determined through the use of a bat detector system operated whilst driving transect lines across the farm » Surveys to assess and identify potential key areas for roosting such as (but not limited to) buildings, underground sites and trees » Further roost investigation will be conducted if any areas adjacent to the site are identified and having a high chance of having suitable roost sites » Roost surveys will be conducted during day-light hours as well as at dusk and dawn at all infrastructure currently present on the farm; In addition, a full pre-construction bat monitoring programme which includes the above-mentioned activities will be conducted in order to establish the baseline species utilising the site and surroundings. The aims and methods of this programme have been detailed in Section 7.7.2.	Wildlife Trust (EWT)
Noise Impacts	The EIA Phase will include the following activities: » A site visit to obtain information regarding background noise levels, the prevailing meteorological conditions during this background noise level survey, as well as confirming and identifying Noise Sensitive Developments (NSDs), » Currently identified (potential) NSDs will be investigated during the EIA phase, and any additional NSDs will be identified. Their relative sensitivity to noise impacts will be determined.	Morné de Jager of Enviro Acoustic Research

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	This will be based on the SANS 10103 guideline, as well as current land uses on the properties (residential vs business/industrial). » Using the data (proposed processes, noise characteristics of the selected equipment, locations of the WTG) as provided by the project developer, the predicted impact of the Wind Energy Facility on NSDs will be predicted using the CONCAWE method as recommended by SANS 10357:2004 for both the construction and operational phases, as well as the ISO 9613-2 model for the operational phase. » Using the calculated noise levels at the identified NSDs, the projected significance of the facility (whether construction or operational) will be determined using the criteria as proposed (subject to possible changes after any stakeholder input). Further recommendations on the most suitable buffer zone can be made after more information is available for the proposed facility. The following information is considered critical in the assessment of the potential noise impact through the EIA Phase study: » The prevailing night-time background ambient noise levels; » The available meteorological data; » The exact locations of the various turbines in the facility; » The full specifications of the wind turbines being considered for use in the facility; » The confirmation of the location of noise-sensitive developments, and; » An overview of the equipment, processes and schedules for the construction phase.	
Impacts on Heritage Resources and Paleontological Resources	The EIA Phase will include the following activities: **Heritage Resources** In order to comply with the National Heritage Resources Act (Act 25 of 1999), a Phase 1 Archaeological Impact Assessment must be undertaken. During this study, sites of archaeological, historical or places of cultural interest must be located, identified, recorded, photographed and described. During this study the levels of significance of recorded heritage resources must be	**Heritage** Jaco van der Walt of Heritage Contracts and Archaeological

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	determined and mitigation proposed should any significant sites be impacted upon, ensuring that all the requirements of SAHRA are met. When the power line route is determined, this alignment must be subjected to a heritage walk down. A report will be compiled with recommendations for mitigation. It will include an assessment of the potential impact of development on the sites and proposals for mitigation and/or protection - towards a Phase 2 investigation. **Paleontological Resources** A thorough field investigation by a palaeontologist as part of a full EIA study prior to the commencement of construction, of the site identified for final development of the wind power generation facility as well as the proposed power line, will be undertaken.	Consulting **Palaeontology** Dr Barry Millsteed
Visual Impacts	The EIA Phase will include the following activities: **Determine Visual Distance/Observer Proximity to the facility** In order to refine the visual exposure of the facility on surrounding areas / receptors, the principle of reduced impact over distance is applied in order to determine the core area of visual influence for the wind turbine infrastructure, as well as the PV structures. Proximity radii for the proposed development site are created in order to indicate the scale and viewing distance of the facility and to determine the prominence of the structures in relation to their environment. **Wind Energy Facility:** The proximity radii (calculated from the boundary lines of the Wind Energy Facility) are as follows: » 0 – 5km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence.	Lourens du Plessis of MetroGIS

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» 5 - 10km. Medium distance view where the structures would be easily and comfortably visible and constitute a high visual prominence. » 10 - 20km. Longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence. » Greater than 20km. Very long distance view of the facility where the facility could potentially still be visible, though not as easily recognisable. This zone constitutes a low visual prominence for the facility. **PV Facility:** The proximity radii (calculated from the boundary lines of the PV facility) are as follows: » 0 – 2km. Short distance view where the facility would dominate the frame of vision and constitute a very high visual prominence. » 2 - 4km. Medium distance view where the structures would be easily and comfortably visible and constitute a high visual prominence. » 4 - 8km. Longer distance view where the facility would become part of the visual environment, but would still be visible and recognisable. This zone constitutes a medium visual prominence. » Greater than 8km. Very long distance view of the facility where the facility could potentially still be visible, though not as easily recognisable. This zone constitutes a low visual prominence for the facility. **Determine Viewer Incidence/Viewer Perception** The number of observers and their perception of a structure determine the concept of visual impact. If there are no observers, there would be no visual impact. If the visual perception of the structure is favourable to all the observers, then the visual impact would be positive. It is, therefore, necessary to identify areas of high viewer incidence and to classify certain areas according to the observer's visual sensitivity towards the proposed facility and its related	

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	infrastructure. **Determine the Visual Absorption Capacity (VAC) of the landscape** This is the capacity of the receiving environment to absorb or screen the potential visual impact of the proposed facility and generally increases with distance, where discernable detail in visual characteristics of both environment and structure decreases. The digital terrain model utilised in the calculation of the visual exposure of the facility does not incorporate the potential visual absorption capacity (VAC) of the region. It is therefore necessary to determine the VAC by means of the interpretation of the natural visual characteristics, supplemented with field observations. **Determine the Visual Impact Index** The results of the above analyses are merged in order to determine where the areas of likely visual impact would occur. These areas are further analysed in terms of the previously mentioned issues (related to the visual impact) and in order to judge the severity of each impact. The above exercise will be undertaken for the wind energy facility, as well as the ancillary infrastructure, as these structures (e.g. the substations and power lines) are envisaged to have varying levels of visual impact at a more localised scale. The site-specific issues and potential sensitive visual receptors should be measured against this visual impact index and be addressed individually in terms of nature, extent, duration, probability, severity and significance of visual impact, as well as suggested mitigation measures.	
Social Impact Assessment	Based on review of information relating to wind energy facility the most important issues that are likely to be raised and will need to be assessed during the EIA include:	Tony Barbour (Environmental

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Impact on rural sense of place (this will be closely linked to the visual impacts). The impact on sense of place is also linked to the associated 132 kV power line/s. » Impact on tourism, both locally and regionally; » Impact on farming activities; » Impact on property prices; » Influx of job seekers into the area during the construction phase. The influx of job seekers may result in an increase in sexually transmitted diseases, including HIV/AIDS; increase in prostitution; increase in alcohol and drug related incidents; increase in crime; and creation of tension and conflict in the community; » Creation of employment and business opportunities during the construction phase; » Creation of employment and business creation opportunities during the operational phase; » Creation of potential training and skills development opportunities for local communities and businesses; » Potential up and down-stream economic opportunities for the local, regional and national economy; » Provision of clean, renewable energy source for the national grid; » Benefits associated with the establishment of a Community Trust. In terms of potential impacts on local farmers in the area the following issues will need to be assessed: » Potential threat to farm safety due to increased number of people in the area and construction workers; » Potential stock losses (during the construction and operational phase); » Potential damage to water and other farm infrastructure (during the construction and operational phase); » Potential damage to roads by heavy equipment and increased traffic volumes (during the construction and operational phase);	Consultant and Researcher)

Issue	Activities to be undertaken in order to assess significance of impacts	Specialist
	» Potential impact on farming operations and loss of productive land (during the construction and operational phase).	

7.5. Methodology for the Assessment of Potential Impacts

Direct, indirect and cumulative impacts of the above issues, as well as all other issues identified will be assessed in terms of the following criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional:
  - local extending only as far as the development site area – assigned a score of 1;
  - limited to the site and its immediate surroundings (up to 10 km) – assigned a score of 2;
  - will have an impact on the region – assigned a score of 3;
  - will have an impact on a national scale – assigned a score of 4; or
  - will have an impact across international borders – assigned a score of 5.
- The **duration**, wherein it will be indicated whether:
  - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
  - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
  - medium-term (5–15 years) – assigned a score of 3;
  - long term (> 15 years) - assigned a score of 4; or
  - permanent - assigned a score of 5.
- The **magnitude**, quantified on a scale from 0-10, where a score is assigned:
  - 0 is small and will have no effect on the environment;
  - 2 is minor and will not result in an impact on processes;
  - 4 is low and will cause a slight impact on processes;
  - 6 is moderate and will result in processes continuing but in a modified way;
  - 8 is high (processes are altered to the extent that they temporarily cease); and
  - 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale, and a score assigned:
  - Assigned a score of 1–5, where 1 is very improbable (probably will not happen);
  - Assigned a score of 2 is improbable (some possibility, but low likelihood);
  - Assigned a score of 3 is probable (distinct possibility);
  - Assigned a score of 4 is highly probable (most likely); and
  - Assigned a score of 5 is definite (impact will occur regardless of any prevention measures).

» the **significance**, which shall be determined through a synthesis of the characteristics described above (refer formula below) and can be assessed as low, medium or high.
» the **status**, which will be described as either positive, negative or neutral.
» the degree to which the impact can be reversed.
» the degree to which the impact may cause irreplaceable loss of resources.
» the *degree* to which the impact can be *mitigated.*

The **significance** is determined by combining the criteria in the following formula:

S=(E+D+M)P; where

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

» < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
» 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
» > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

As the applicant has the responsibility to avoid or minimise impacts, and plan for their management (in terms of the EIA Regulations), the mitigation of significant impacts will be discussed and appropriate recommendations made. Assessment of impacts with mitigation will be made in order to demonstrate the effectiveness of the proposed mitigation measures.

The results of the specialist studies and other available information will be integrated and synthesised by the Savannah Environmental project team. An EIA report will be compiled, and will include:

» **detailed description** of the proposed activity
» a description of the property(ies) on which the activity is to be undertaken and the location of the activity on the property(ies)
» a description of the **environment that may be affected by the activity** and the manner in which the physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed activity
» details of the **public participation process** conducted, including:

    - steps undertaken in accordance with the plan of study for EIA;
    - a list of persons, organisations and organs of state that were registered as interested and affected parties;
    - a summary of comments received from, and a summary of issues raised by registered interested and affected parties, the date of receipt of these comments and the response to those comments; and
    - copies of any representations, objections and comments received from registered interested and affected parties
- a description of the **need and desirability** of the proposed project and identified potential alternatives to the proposed activity, including advantages and disadvantages that the proposed activity or alternatives may have on the environment and the community that may be affected by the activity
- an indication of the methodology used in determining the **significance** of potential environmental impacts
- a description and comparative **assessment of all alternatives** identified during the environmental impact assessment process
- a summary of the findings and recommendations of **specialist reports**
- a description of all environmental issues that were identified during the environmental impact assessment process, an assessment of the significance of each issue and an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- an assessment of each identified potentially significant impact
- An assessment of cumulative impacts
- a description of any assumptions, uncertainties and gaps in knowledge
- an environmental **impact statement** which contains:
    - a summary of the key findings of the environmental impact assessment; and
    - a comparative assessment of the positive and negative implications of the proposed activity and identified alternatives
- a draft **environmental management programme (EMPr)**
- copies of specialist reports undertaken for the EIA.

The draft EIA Report will be released for a 30-day public review period. The comments received from I&APs will be captured within a Comments and Response Report, which will be included within the final EIA Report, for submission to the authorities for decision-making.

7.6. Public Participation Process

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

In order to accommodate the varying needs of stakeholders and I&APs within the study area and within the power line corridors (routes to be determined), as well as capture their inputs regarding the project, various opportunities will be provided for stakeholders and I&APs to be involved in the EIA phase of the process, as follows:

» Public meeting (advertised meeting for registered I&APs and members of the general public).
» Focus group meetings (pre-arranged and stakeholders invited to attend).
» One-on-one consultation meetings (for example on request by stakeholders or I&APs).
» Telephonic consultation sessions (consultation with various parties from the EIA project team, including the project participation consultant, lead EIA consultant as well as specialist consultants).
» Written, faxed or e-mail correspondence.

The draft EIA report will be made available for public review for a 30-day period prior to finalisation and submission to the DEA for review and decision-making. In order to provide an overview of the findings of the EIA process and facilitate comments, meetings suitable to accommodating the needs of the I&APs and stakeholders as described above will be held during this public review period.

7.7. Pre-construction monitoring for birds and bats

Pre-construction bird and bat monitoring data has commenced in accordance with the respective bird[3] and bat[4] monitoring guidelines for wind farms in order to be presented to DEA for consideration to assist the decision making process. The monitoring programmes facilitate the collection of further baseline data than what is normally gathered during the course of an EIA phase study. The results will be analysed and interpreted in order to inform the decisions regarding the project feasibility, the final facility design, construction, and ultimately the management strategy of the development.

7.7.1. Birds

The proposed methodology assumes as a baseline the requirements of the most recent version of the Best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa (Jenkins et al., 2012). The primary aims of this monitoring programme are to assess the

[3] BirdLife South Africa / Endangered Wildlife Trust best practice guidelines for avian monitoring and impact mitigation at proposed wind energy development sites in southern Africa, 2012

[4] Endangered wildlife Trust South African Good Practice Guidelines for Surveying Bats in Wind Farm Developments, May 2012

potential impacts resulting from the construction and operation of the Stormberg Wind Energy Facility on avifauna utilising the study area. Therefore the main objectives of the monitoring program currently underway are:

- » To characterise the avifauna community and its utilization of the development site;
- » To establish the baseline scenario during a pre-construction phase. This will provide the required information to identify the potential changes in the bird community present within the wind farm site and the eventual exclusion/displacement effect (avoidance of the wind facility area after construction);
- » To provide the baseline scenario on the pre-construction phase of the development to inform the EIA avifauna specialist report;
- » To evaluate potential changes in the way the target-species, and the overall bird community, utilizes the wind farm site;
- » To document patterns of bird activity and movements at the wind farm site and its immediate surroundings and establish a pre-impact baseline scenario of bird utilization of the study area;
- » To estimate predicted collision risk for target-species;
- » To identify sensitive areas and to propose mitigation measures.

In order to meet these objectives the following tasks will be implemented throughout the monitoring programme:

Linear walkthrough transects

Linear walking transects, of at least 1000 m each, covering the different habitats present on site, and being equally distributed between the Wind Energy Facility site and a Control area, will be conducted. Each linear transect will be conducted by two expert bird observers, walking slowly and all the bird contacts (seen or heard) will be recorded on the left and right sides of the line of progression and with no distance limit (Buckland et al., 1993; Bibby et al., 2000). Surveys will start after sunrise and will be performed during the early morning (the first 3 hours after sunrise) avoiding the warmer periods of the day, when the birds may be less vocal and active and hence less conspicuous (Bibby et al., 2000). For analytical purposes, transects of 1000 m will divided into five sections of 200 m. Thus, a higher number of sampling sections will be available for hypothesis testing, and habitat relationships will be more accurate (Buckland et al., 1993; Bibby et al., 2000; Brotons et al., 2007; Carrascal et al., 2008).

Twelve linear transects are proposed to be established, six on site within the wind energy facility boundaries; as well as six transects in the Control area , considered to be of similar biotopes, located 8 km north-east of the wind energy facility area. Each linear transect will be conducted at least twice per season for at least a full calendar year before construction, resulting in eight surveys during a 12-month period.

Vantage points

Eight suitable vantage points are proposed at strategic locations in the Wind Energy Facility area in such a way as to allow the visualization of the developable area of wind energy facility and the immediate surroundings. Each vantage point will be surveyed at least four times per season for at least a full calendar year before construction (pre-construction phase), resulting in 8 surveys during a 12-month period. Raptors and large terrestrial birds monitoring will be implemented in order to evaluate the activity patterns of these birds in the Wind Energy Facility site, and surrounding areas. By collecting this information, it will allow:

- » Identification of the potential changes in the bird community present within the wind farm site and the eventual exclusion/displacement effect (avoidance of the wind facility area after construction);
- » Evaluation of potential changes in the way the target-species, and the overall bird community, utilizes the wind farm site;
- » Documentation of patterns of bird activity and movements at the wind farm site and its immediate surroundings and establish a pre-impact baseline scenario of bird utilization of the study area;
- » Estimates of predicted collision risk for target-species;
- » Identification of sensitive areas and to propose additional mitigation / compensation measures if needed;
- » Establishment of the baseline scenario for the monitoring of the subsequent phases of the project.

Observations from each vantage point will be conducted for at least 4 hours each season and be performed by two experienced observers, using good quality binoculars and a spotting scope covering a 360º area. All the raptors and large terrestrial species observed during this period will be recorded and their flight paths registered. For each observation the number of individuals and, whenever possible, the gender and age will also be recorded. Behavioural patterns observed will be recorded, such as (i) type of flight - passage flight, soaring, display, territorial; (ii) flight height - below rotor height, rotor height, above the rotor height; and (iii) the environmental conditions (air temperature, wind speed and direction, occurrence of precipitation, cloud cover and visibility).

All the observations of target species conducted in the area will be recorded and mapped.

Priority species nest monitoring

Nest monitoring will be undertaken to identify and monitor active nesting sites of target-species within the study area and its immediate surroundings (covering at least four annual seasons before construction);

Water body monitoring

Water body monitoring to evaluate the species present and their main movements at the main water bodies will be undertaken (at least for a full one year before construction)

The implementation of similar monitoring protocols and sampling locations during the subsequent phases of the project (e.g. construction phase and at least for three years after the facility becomes operational) will be very important once by referring to the baseline scenario established and implementing a Before-After-Control-Impact analysis it will be possible to validate the potential impacts identified, to determine if other impacts are occurring and adequately adjust any mitigation measures proposed at this stage (or propose new and more appropriate ones if necessary). This will contribute to the baseline results to be comparable between the entire monitoring programme of the wind energy facility.

7.7.2 Bats

The primary aims of pre-construction monitoring for the Stormberg study site plus surrounding areas are:

- To identify bat species that use the site and most important areas for bats;
- To determine the location and time of bats activity;
- To identify roost locations and their occupancy;
- To characterise the bat community at the site and its importance;
- To identify the measures that need to be applied during construction and operation in order to reduce the significance of impacts;
- To determine the monitoring effort necessary to follow the wind farm impact during operation and the success of the mitigation measures.

The following methodology will be employed during the programme:

- Implementation of static and manual surveys in order to ensure good representation of the study area and its habitats (manual surveys), and also to ensure a good representation of the bats activity during the night-time period (static surveys for 4 consecutive nights in 4 of the surveys and 10 consecutive nights in the other 4 surveys, a total of 56 nights).
- Static acoustic monitoring in 6 different locations (4-5 at the wind farm and 1-2 at the control site). Two of the locations will be at height on the installed met masts. Bat activity will be measured at 2 different heights to allow comparisons of bat activity and diversity at blade height and ground level.
- Static acoustic monitoring and manual surveys within the proposed site and for a control area will allow comparison of bat activity during the pre-construction, construction and operation phase. This approach will allow the comparison between the site where impacts will occur, and a control area

(with no impact) and will help to establish if the variations that might be detected in bat activity and diversity are due to the impact caused by the facility or to natural variations (interannual variations in populations).

Static Acoustic Monitoring

Eight detectors will be placed:

- » Within the wind energy facility;
- » On the met masts within the wind energy facility (to measure at blade height);
- » Within the control area.

Manual surveys

Manual surveys will be conducted each month (4-5 nights per survey). These surveys consist of vehicle transects and sample points. Transects will cover all the biotopes present and the sample points will be executed in, at least, two different sites of each biotope.

Transects and sample points will be characterized in terms of: distance to future wind towers, slope, orientation, predominant land use, proximity to water and proximity to roosts (if known).

The manual surveys will not be performed in adverse weather conditions (rain, wind, fog, thunderstorms). The fieldwork will start 30 minutes before sunset ensuring that bat species that emerge early in the evening are included in the surveys.

Roost Surveys

Potential bat roosts will be investigated (including caves, mines, abandoned buildings, bridges, etc.) to record evidence of bat's presence (guano accumulation, bat corpses or insect remains). If a roost is identified it will be sampled using a manual detector at dusk in order to determine the species present and their abundance.

7.8. Key Milestones of the programme for the EIA

The envisaged key milestones of the programme for the EIA phase of the project are outlined in Table 9.2.

Table 9.2: Envisaged key milestones of the programme for the EIA phase of the project

Key Milestone Activities	Approximate deliverable date[5]
Authority acceptance of the Scoping Report and	30-days after DEA receiving

[5] Indicative dates only

Key Milestone Activities	Approximate deliverable date[5]
Plan of Study to undertake the EIA	the Final Scoping report
Commencement of EIA phase studies, including a 12-month bird and bat monitoring programme	December 2013
Public review period of draft EIA Report	January 2015[6]
Finalisation of draft EIA Report	February 2015
Make final EIA Report and draft EMP available to the public, stakeholders and authorities	February 2015
Final EIA Report to DEA for review and decision-making, and issue of an Environmental Authorisation	Within 105 days after receiving the Final EIA report.

[6] Makes provision for results of 12 month monitoring programme to be included in the draft EIA report

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